Renfrewshire Local Development Plan – Main Issues Report

Strategic Flood Risk Assessment (2017)

Renfrewshire Council


IKEA

Contents

Introduction

Background

1.1 In 2011, Renfrewshire Council was one of the first Local Planning Authorities to produce a Strategic flood Risk Assessment as part of the evidence base in preparing the Renfrewshire Local Development Plan.

1.2 The Renfrewshire Strategic Flood Risk Assessment set out the probability of flooding from all sources which was part of the overall assessment when preparing the spatial strategy and the identification and direction of development within Renfrewshire.

1.3 In reviewing the current Adopted Renfrewshire Local Development Plan (2014), it is considered that the main components of the Council's Spatial Strategy remain relevant. Therefore it will be the main changes along with the key opportunities that will require assessment and consideration.

1.4 This Strategic Flood Risk Assessment will assess the potential impact that these changes and development opportunities on flood risk.

Planning Context

1.5 The current adopted Renfrewshire Local Development Plan sets out Renfrewshire Council's spatial strategy to facilitate investment and guide the future use of land.

1.6 The Renfrewshire Local Development Plan is a key document in supporting many policy areas and is essential for assisting in sustainable economic growth across the Renfrewshire area.

1.7 Renfrewshire Council is committed to providing an up to date policy framework in line with the requirements of new and emerging national, regional and local policy as well as Scottish Planning Policy, the National Planning Framework 3, Clydeplan's Strategic Development Plan, the Council Plan and Community Plan, the Renfrewshire Local Housing Strategy along with other relevant policy documents.

1.8 The current Local Development Plan has now been in place for two years and it is required to be reviewed or replaced every five years. The preparation of the Renfrewshire Local Development Plan Main Issues Report and Draft Environmental Report are presented as the first stage in the review of the current Renfrewshire Local Development Plan 2014.

1.9 The Renfrewshire Local Development Plan Main Issues Report identifies 8 Main Issues that have emerged since the Adoption of the Plan in 2014, they are as follows:

- City Deal Investment Policy
- Renfrewshire's Housing Land Requirements
- Affordable Housing
- Bishopton Community Growth Area
- Paisley South
- Infrastructure Provision/ Developer Contribution
- Housing for key specific housing groups
- Renewables

1.10 Renfrewshire Council consider that updating the Strategic Flood Risk Assessment alongside the review of the Renfrewshire Local Development Plan should assist in the preparation of the Plan by aiming to avoid inappropriate development and directing development to the right locations.

Aims and objectives of the Strategic Flood Risk Assessment

1.11 The main aim of the Strategic Flood Risk Assessment is to inform the emerging Renfrewshire Local Development Plan by providing a strategic overview of flood risk in Renfrewshire. In undertaking this assessment alongside the preparation of the Plan, new development should be directed to areas with little or no flood risk, thereby ensuring that the overall risk of flooding is not increased.

1.12 This Strategic Flood Risk Assessment has assisted in informing the next Renfrewshire Local Development Plan by providing a strategic overview of flood risk in and around Renfrewshire. It has also fully informed the individual site assessments which are contained within the Housing Background Paper as well as the Strategic Environmental Assessment by providing an evidence base that contains a proportionate level of detail and information.

1.13 In line with Scottish Planning Policy as well as the Flood Risk Management (Scotland) Act 2009, this Strategic Flood Risk Assessment identifies and details areas suitable for future development taking into consideration flood risk, identifying sustainable flood risk management mechanisms where appropriate along with sustainable drainage infrastructure that will require to be considered. The Strategic Flood Risk Assessment was undertaken using SEPA's Planning Guidance 'Strategic Flood Risk Assessment: SEPA Technical Guidance to Support Development Planning (2015).

1.14 The Strategic Flood Risk Assessment has been developed by building heavily upon existing knowledge with respect to flood risk and drainage in Renfrewshire.

1.15 Using the information and analysis gathered through national and local sources, this strategic overview of flood risk was undertaken to identify potential issues and considerations between development pressure or opportunities and flood risk now and through the lifetime of the Renfrewshire Local Development Plan.

1.16 This report should be read in conjunction with the Strategic Environmental Assessment Environmental Report for the Main Issues Report. Flood risk and the impact on the water environment of the Preferred and Alternative options identified in the Main Issues Report were an important part of the assessment that was carried out.

1.17 This Strategic Flood Risk Assessment has followed Scottish Planning Policy and had regard to the flood maps prepared by SEPA. It also takes into account the Clyde and Loch Lomond Local Plan District Local Flood Risk Management Strategy (2015), the Local Flood Risk Management Plan for the Clyde and Loch Lomond District (June 2016) and the River Basin Management Plan for the Scotland River Basin District (2015).

Key Considerations

Flood Risk Management (Scotland) Act 2009

2.1 The Flood Risk Management (Scotland) Act 2009 was introduced to provide a more sustainable approach to flood risk management, suited to the needs of the 21st century and to the impact of climate change. It creates a more joined up and co-ordinated approach to managing flood risk at a national and local level in an integrated and sustainable way.

National Planning Framework 3

2.2 One of the National Developments in the Scottish Government's National Planning Framework 3, is the Metropolitan Glasgow Strategic Drainage Partnership. Renfrewshire Council assists in developing surface water management across the Glasgow and the Clyde Valley area. This exemplar of catchment-scale water planning and management, contributes to the implementation of the Flood Risk Management Act both nationally and locally.

2.3 In meeting the objective of avoiding deterioration of all water bodies, the partnership also aims to implement effective drainage systems across the Glasgow City Region area. The White Cart Flood Alleviation Scheme, which is a flood prevention scheme forming flood storage areas upstream, is a joint project which has particular relevance to Renfrewshire.

2.4 In line with National Planning Framework 3, the current Renfrewshire Local Development Plan Spatial Strategy aims to build resilience into Renfrewshire's places by locating development in the right places. The next Renfrewshire Local Development Plan will continue this, creating and enhancing places by allowing development which will

enhance the water environment and water quality where possible, with an aim of positively managing drainage and flooding.

Scottish Planning Policy

2.5 Scottish Planning Policy suggests that in preparing Development Plans, Strategic Flood Risk Assessments should inform choices about the location of development and policies for flood risk management. This guidance forms the basis for this Strategic Flood Risk Assessment, where there is a presumption against development in areas of flood risk or where development would increase flood risk elsewhere.

National Marine Plan

2.6 The first Scottish National Marine Plan was published in 2015 and it sets out strategic policies for the sustainable development of Scotland's marine resources.

2.7 The Clyde Marine Planning Partnership is responsible for producing the regional Marine Plan that will cover the Clyde Estuary. This Plan will assess the condition of the region, summarise the significant pressures and consequences of human activity, set relevant economic, social, marine ecosystem and climate change policies and keep under review the characteristics of the region.

2.8 A project considering the evidence base of the known extent and associated risks of sea level rise and storm surges in the Firth of Clyde for habitats and communities around the river was recently completed. It will assist in the production of the Regional Marine Plan.

Clyde and Loch Lomond Local Plan District Local Flood Risk Management Strategy and The Local Flood Risk Management Plan for the Clyde and Loch Lomond District

2.9 The Clyde and Loch Lomond Local Flood Risk Management Strategy (2016) sets out the short to long term ambition for flood risk management in the area.

2.10 The Local Flood Risk Management Plan for the Clyde and Loch Lomond District presents actions to avoid and reduce the risk of flooding, and prepare and protect communities within potentially vulnerable areas and across the Local Plan District. These actions include flood protection schemes or works; 24 flood protection studies; as well as flood warning schemes, surface water management plans, and natural flood management studies and works.

The River Basin Management Plan for the Scotland River Basin District

2.11 The River Basin Management Plan sets revised objectives for the 12 year period from 2015 to the end of 2027 and a strengthened programme of measures for achieving them in order to protect and improve the water environment of the Scotland river basin district.

2.12 The next Renfrewshire Local Development Plan will continue to promote the principles and objectives set out in the River Basin Management Plan.

Clydeplan – Strategic Development Plan

2.13 The Proposed Clydeplan sets out the vision for securing improvements to water and drainage capacity and water quality as well as reducing flood risk through the adoption of a precautionary approach for the Glasgow and Clyde Valley City Region. The vision and strategic objectives for water management will be reflected in the Renfrewshire Local Development Plan Proposed Plan.

Metropolitan Glasgow Strategic Drainage Partnership

2.14 The Flood Risk Management (Scotland) Act 2009 encourages a co-ordinated approach to share services and seek economies of scale when tackling flood risk management. A very good example of putting this co-ordinated partnership working into practice is through the Metropolitan Glasgow Strategic Drainage Partnership (MGSDP) which involves a number of agencies including several local authorities, SEPA, Scottish Water and Scottish Enterprise.

2.15 The Metropolitan Glasgow Strategic Drainage Partnership should ensure that future drainage improvements enable new urban development and brownfield redevelopment to alleviate flooding and control pollution in the most sustainable way possible. The Metropolitan Glasgow Strategic Drainage Partnership hope to achieve this by integrated drainage plans and local surface water management plans delivering a range of integrated measures across the Metropolitan Glasgow area, which includes Renfrewshire.

2.16 It is hoped that this partnership will support organisations in fulfilling their obligations under the Flood Risk Management (Scotland) Act 2009, and adapting to a changing climate with a higher frequency of extreme events

Climate Change

2.17 It is expected that flooding will become a greater issue in the future due to the impact of climate change.

2.18 Measures to reduce and mitigate the effects of climate change are central to Scottish legislation and regulations in relation to flooding and drainage. The implementation of sustainable water management techniques is important in working towards reduction, adaptation and mitigation of the impacts from climate change. Again this will be supported by the policies and proposals put forward in the Renfrewshire Local Development Plan.

Partnership Approach

2.19 Through the partnership approach of the Metropolitan Glasgow Strategic Drainage Partnership, being a member of Clyde and Loch Lomond Local Plan District along with the Clyde Area Advisory Group for River Basin Management, Renfrewshire Council aim to address cross boundary flooding issues.

Historical Flooding in Renfrewshire

3.1 Renfrewshire is an area of contrast with densely urbanised towns such as Paisley and Renfrew and large expanses of rural land to the south and west. The landscape is generally low lying, however, there are a number of higher areas such as the Renfrewshire Heights.

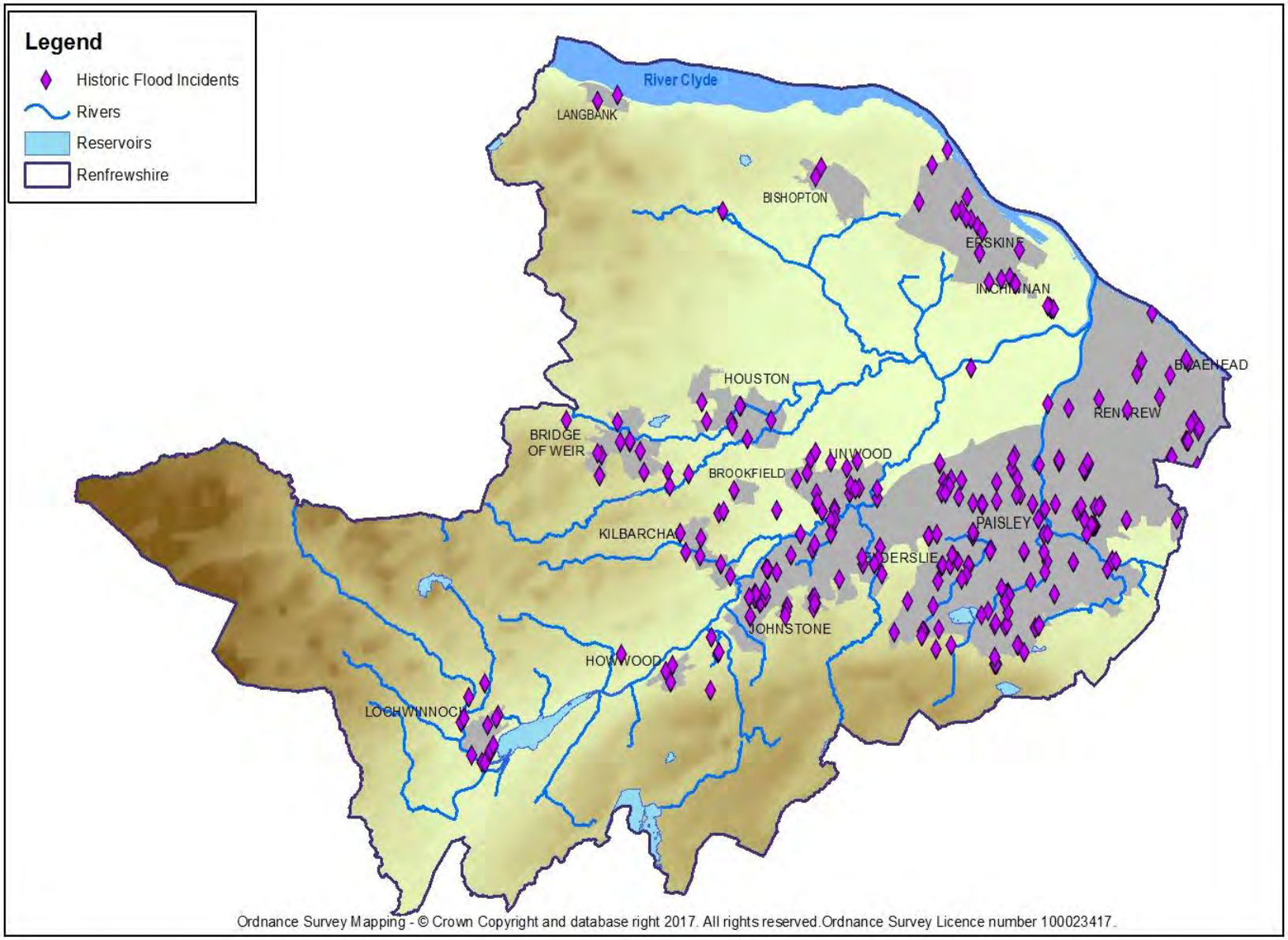
3.2 The River Clyde and its tributaries are essential to the character of the area. The River Clyde flows west from the City of Glasgow into Renfrewshire where it enters its final stages. As the river flows through Renfrewshire it widens to form the Clyde Estuary before reaching the Firth of the Clyde beyond Erskine Bridge.

3.3 The principle watercourses in Renfrewshire are the River Clyde, River Cart and the River Gryfe these are shown on Figure 1 with othe main water bodies.

3.4 A considerable amount of information is available with respect to flood risk within Renfrewshire including information relating to both historical flooding and the predicted extent of flooding under extreme weather conditions. The distribution of historical flood events is also shown on Figure 1.

3.5 Properties and infrastructure are at risk of flooding from a range of sources not only tidal and rivers but also surface water flooding, surcharging of the existing sewer system and blockages of culverts and gullies. Evidence of localised flooding of this nature has also been recorded and mapped to ensure there is a complete overview for Renfrewshire (see Figure 1).

Figure 1: Renfrewshire's Topography and Historical Flood Events



3.6 Major flooding has taken place in Paisley, Johnstone and Houston in the recent past and the north of Renfrew has been subject to regular flooding from the River Clyde. Renfrewshire experienced major flood events in 1994, 1999 and more recently in December 2006.

3.7 Flood events in Renfrewshire are typically characterised by a complex interaction between intense rainfall events, watercourses exceeding peak flow capacities, surface water run-off from developed areas and a lack of capacity in the sewerage system and the tidal influence of the Clyde.

3.8 The key flooding issue in the urban area within Renfrewshire, as seen in December 2006, relates to the capacity in the sewerage system and local watercourses which is exacerbated by overland flow, where water becomes concentrated and flows across land after heavy or persistent rainfall.

3.9 The recording of flooding incidents forms the basis of the Flood Risk Management (Scotland) Act. Data on likely future flood risk, restrictive river structures, major future developments and existing flood defences along with resulting management measures are being undertaken through the Local Flood Risk Management Plan.

Flooding in Candren Road, Paisley 1994

Stockholm Crescent, Paisley (1994)

Sources of Flooding

Fluvial (River) Flooding

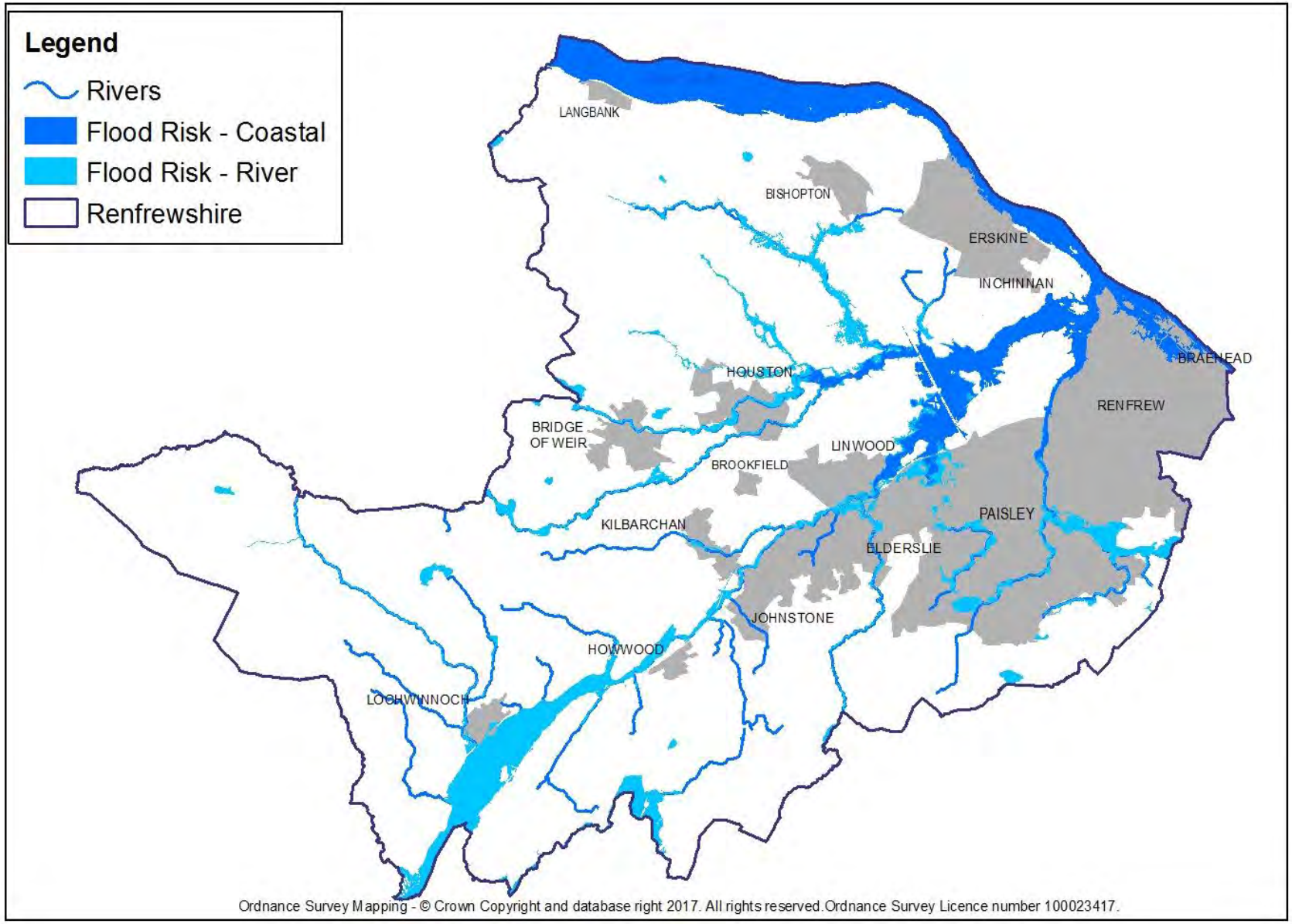
4.1 An overview of flooding from rivers in Renfrewshire is provided in Figure 2. The map is based on information held by the Council and SEPA.

4.2 It highlights the primary sources from fluvial flooding within Renfrewshire as being from the Calder in Lochwinnoch, the Black Cart, the Candren, Hawkhead and Espedair Burns in Paisley, the Kilbarchan Burn, the Gryfe at Crosslee, the Spateston, Auchengreoch, Floors and Peockland Burns in Johnstone, the Old Patrick Water and smaller water tributaries in Langbank.

Coastal (Tidal) Flooding

4.3 The River Clyde also results in flood risk to around 252 ground floor properties. However this is from tidal surge rather than flow from the Clyde. The North Renfrew Flood Prevention Scheme addresses the tidal risk posed by the River Clyde and will reduce the number of ground floor properties at risk substantially. The embankment, which runs westward for 1km from Ferry Road, provides a barrier against direct flooding from the Clyde. A new pumping station will ensure that tidal surges on the Clyde do not cause the Mill Burn to overflow and flood local properties, protecting the area from a 1 in 200 year flood event. Figure 2 shows the extent of potential tidal flooding within Renfrewshire.

Figure 2: Fluvial (River) and Coastal Flooding



Pluvial and Overland (Surface) Flooding

4.3 Pluvial flooding, or flooding due to excess surface water, occurs after periods of intense and prolonged rainfall which saturate the land or drainage systems and excess water cannot drain away. Pluvial flooding is more likely to occur where the ground is naturally poorly drained or has been developed without the implementation of adequate drainage systems.

4.4 Figure 3 shows the distribution of areas at risk from surface water flooding in Renfrewshire.

Groundwater

4.5 Flooding due to rising groundwater is also likely to occur after periods of intense and prolonged rainfall, when the water table rises above normal levels.

4.6 Groundwater flooding is most likely to occur in low lying areas which are underlain by permeable rocks such as chalk, sandstone, or localised sands and gravels. Therefore, information on underlying geology may give an indication if a site is prone to groundwater flooding.

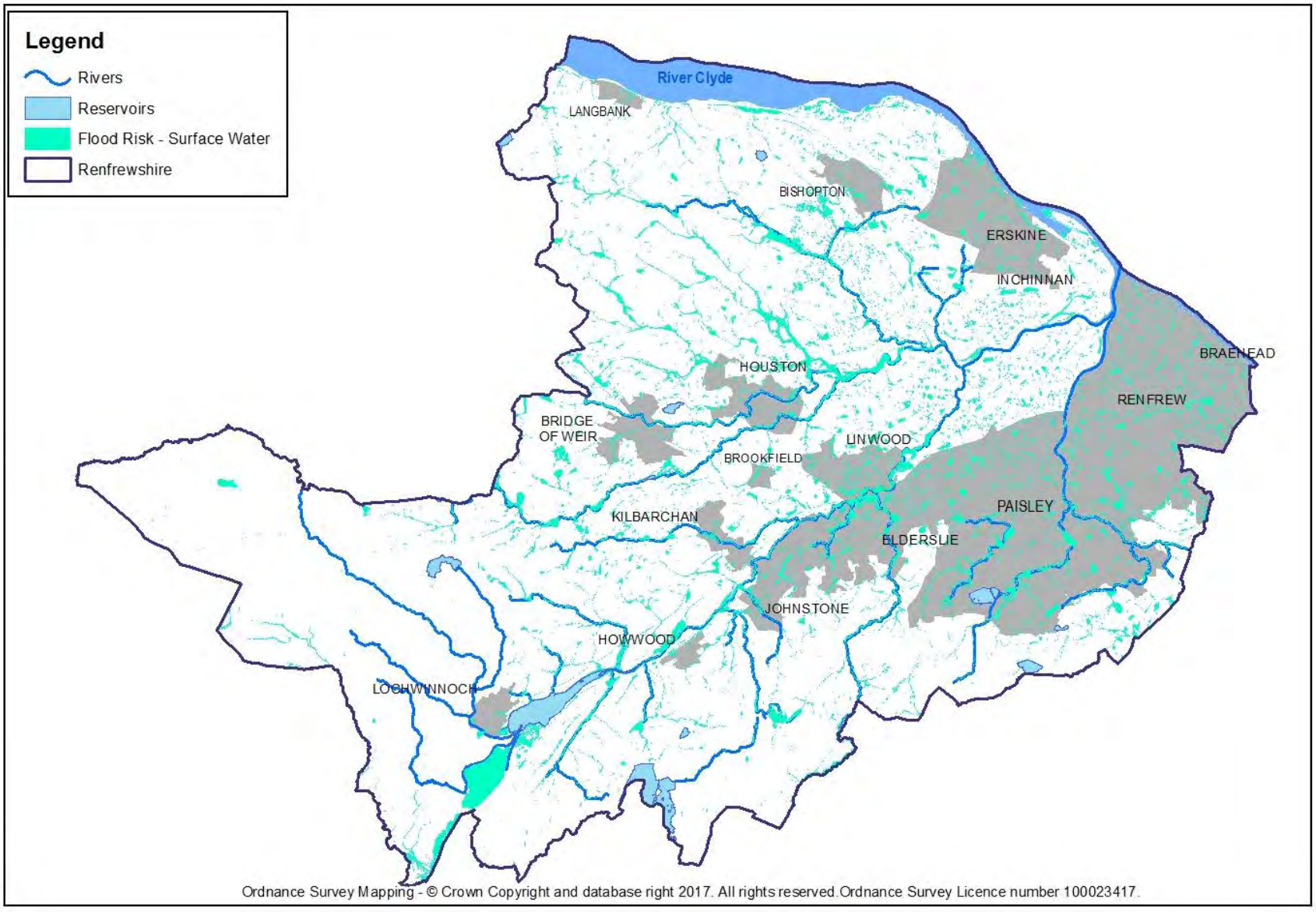
Sewers and drainage

4.7 Roadside drains, sewers and culverts can also be the cause of flood events if they fail, become blocked or are inundated with water that exceeds their capacity.

4.8 Many of the historic flood incident points shown on Figure 1 occurred as a result of blocked drains, gullies, culverts and other small watercourses. These occurred across Renfrewshire.

4.9 Flooding due to blocked drains is addressed by Roads Maintenance. There is also a regime for the inspection of open watercourses in place, and trash screens are inspected on a regular basis and before anticipated high level rainfall.

Figure 3: Flood Risk from Surface Water Flooding



Reservoirs

4.8 Renfrewshire has 13 large raised reservoirs. The distribution of these has been mapped on Figure 3. Table 1 provides more details about the size and capacity of the reservoirs.

Table 1 : Reservoir Capacity

Reservoir	Max height of dam in metres	Reservoir Capacity ($m^{3)}$	Top Water Surface Area (sqm)
Barcraigs	18	5,533,000	730,000
Bowfield Dam	6.2	60,400	Not available
Elliston Weir	1.2	900,000	841,000
Glenburn (Paisley)	9.75	360,000	110,000
Houstonhead Dam	3.7	132,000	63,000
Kaim	8.5	480,200	167,000
Locher Dam	9.1	54,000	25,000
Moredun	5.6	25,500	22,600
Rowbank	12	2,250,000	320,000
Stanely (Large)	11	696,000	147,000
Stanely (Small)	9.5	184,000	28,000
Thornley	8	38,000	22,190
Whitemoss Dam	3.5	94,700	41,200

4.9 The revised Reservoir (Scotland) Act provides regulations for the construction, alteration and management of reservoirs capable of holding 10,000 cubic metres or more of water. In particular, the key principle changes that the new Reservoir Bill has introduced are in relation to the risk of flooding from reservoirs and facilitation of more environmental objectives relating to reservoirs and river basin management.

4.10 Under the new legislation, reservoirs with a capacity of 10,000 cubic metres or more, are registered with the Scottish Environment Protection Agency and categorised under one of three categories, 'High', 'Medium' or 'Low' according to risk. A new Scottish panel of engineers has been created to supervise and inspect reservoirs in consultation with the Institution of Civil Engineers (ICE).

4.12 Under the new Reservoir Act there is an emphasis on ensuring that Scotland's reservoirs are structurally sound, properly monitored and well maintained. The proposals mean that people living close to reservoirs will be better protected as a result of a new proportionate inspection regime.

Flood Risk Management Infrastructure

5.1 Flood risk management measures implemented within Renfrewshire, have included major flood prevention schemes such as at North Renfrew, two major flood barriers at Collier Street, Johnstone and Crosslee, and one major storage scheme at Moredun / Stanely Reservoirs (Moredun stores 25,000 m3).

5.2 Work commenced in 2008 to create a flood prevention scheme for the north of Renfrew in accordance with the Flood Prevention (Scotland) Act 1961. Phase 1 of the work involved the construction of flood embankments and retaining walls as well as the diversion of the Mill Burn culvert. The embankments have been created between the Scottish Water sewage pumping station off North Lodge Road and Meadowside Street/Neil Street.

Espedair Burn, Paisley - Testing of flood storage scheme

Historic Flooding in North Renfrew – Renfrewshire Council

5.3 Phase 2 involved the dredging of 10,000 tonnes of sediment from the river's bed before the foundations were laid for the new pumping station. All three phases of this work are now complete. This action ensures that the waters of the Mill Burn can be discharged into the River Clyde for up to a 1 in 200 year tidal surge - decreasing flood risk from these sources.

5.4 The recent completion of the pumping station for Phase 3, means that a total of £10.3m has been invested by Renfrewshire Council to ensure that the area has a 1 in 200 year level of flood protection from the combined risks of Mill Burn flow and tidal surge from the River Clyde. This is particularly important to protect Renfrew Town Centre in addition to realising the significant development that is currently taking place to provide the sustainable transformation of North Renfrew.

5.5 The majority of mitigatory work for the Council and other responsible authorities will continue to be watercourse inspection and clearance and repair work, pump maintenance, flood defence scheme maintenance, promotion of sustainable development through co-ordinated work within Development Planning and Development Management and preparation of assessments and maps to inform post 2015 Flood Risk Management (Act) flood plans.

Construction of Phase 3 - North Renfrew Flood Prevention Scheme Pumping Station

Natural Flood Management

5.6 SEPA are developing mapping to identify areas where natural features can be altered or restored to assist in the management of flood risk. The mapping has been designed to be used at a catchment or strategic level and considered run-off reduction, floodplain storage, estuarine surge attenuation, sediment management and wave energy dissipation.

5.7 The Council will work with SEPA to identify any opportunities to use Natural flood Management techniques within Renfrewshire.

5.8 Johnstone South West Community Growth Area will provide for 500 new residential units. Sites have been identified through the Renfrewshire Local Development Plan for development. The Johnstone South West masterplan is underpinned by an outline surface water management strategy which considers a holistic approach to development and infrastructure requirements. The outline strategy was updated in 2017 which sets out detailed proposals for required infrastructure, supported by budget costs, anticipated land values and an approach to phasing.

5.9 A number of linked interventions across the Community Growth Area have been identified including the deculverting of watercourses, supported by the creation of swales, new woodland areas and storage ponds. The strategy identifies a range of green infrastructure interventions across the area which address flooding issues and enable delivery of development sites outlined in Table 2.

Culvert on the Spateston Burn, Johnstone South West

Table 2: Johnstone South West Community Growth Area

Johnstone South West Community Growth Area Green Infrastructure Interventions	
Short term	**Medium/Long Term**
Deculverting of Floors Burn and creation of a flood attenuation area on land immediately east of Spateston Centre (site of former community centre); Creation of flood attenuation area at Churchill Avenue, involving regrading of amenity grassland and creation of raised walkway.	Extending the scope of proposals at Tannahill Crescent. This involves re-profiling of existing open section of Floors Burn, deculverting an existing closed section, the creation of attenuation areas and planting of small areas of woodland.
Deculverting a section of Floors Burn within amenity open space adjacent to Tannahill Crescent, with the creation of attenuation areas and small scale woodland planting.	Creation of small 'check dams' at Floors Burn, a short distance east of Spateston Centre, to slow flows and provide small scale attenuation
Deculverting a section of the Floors Burn within the western extent of the former school site at Beith Road.	

Identification of the Functional Flood Plain

5.10 For planning purposes the functional flood plain is identified as the land that has a greater than 1 in 200 year annual probability of river or coastal flooding. Avoidance of flood risk and inappropriate development on the functional flood plain provides the most sustainable solution in terms of sustainable flood management.

Development Required For Potentially Vulnerable Areas

5.11 Scotland has been separated into 14 Local Plan Districts for flood risk management purposes. Renfrewshire lies within the Clyde and Loch Lomond Flood Plan District. These districts are based on river catchments and coastal areas which cross administrative and institutional boundaries. A Flood Risk Management Strategy has been prepared for each Local Plan District.

5.12 The Flood Risk Management Strategy has been prepared for each Local Flood Plan District which identifies where the risks of flooding and the benefits of investment are greatest. It describes the agreed collaborative approach for managing flooding within the area and the priority of actions required for this to be delivered.

5.13 The Clyde and Loch Lomond Flood Risk Management Plan (2016) has also been prepared as a supplement to the Flood Risk Management Strategy. The Flood Risk Management Plan provides the detailed actions required to reduce the impact of flooding within the Plan area.

5.14 For priority areas within each district (called Potentially Vulnerable Areas) there is a description of the causes and consequences of flooding; the agreed goals or objectives of local flood risk management; and the specific actions that will deliver these actions over the short to long term. Figure 4 shows the five Potentially Vulnerable Areas in Renfrewshire.

5.15 Actions specific to the Potentially Vulnerable Areas that are required to be progressed during the period 2016 – 2022 to reduce and manage flood risk are set out in the Clyde and Loch Lomond Local District Plan. The actions respond to objectives set out in the Flood Risk Management Strategy. Some of the actions are applicable across the Plan area, however, Table 3 below outlines the actions that Renfrewshire Council are responsible for, either alone or in partnership.

Figure 4: Renfrewshire's Potentially Vulnerable Areas

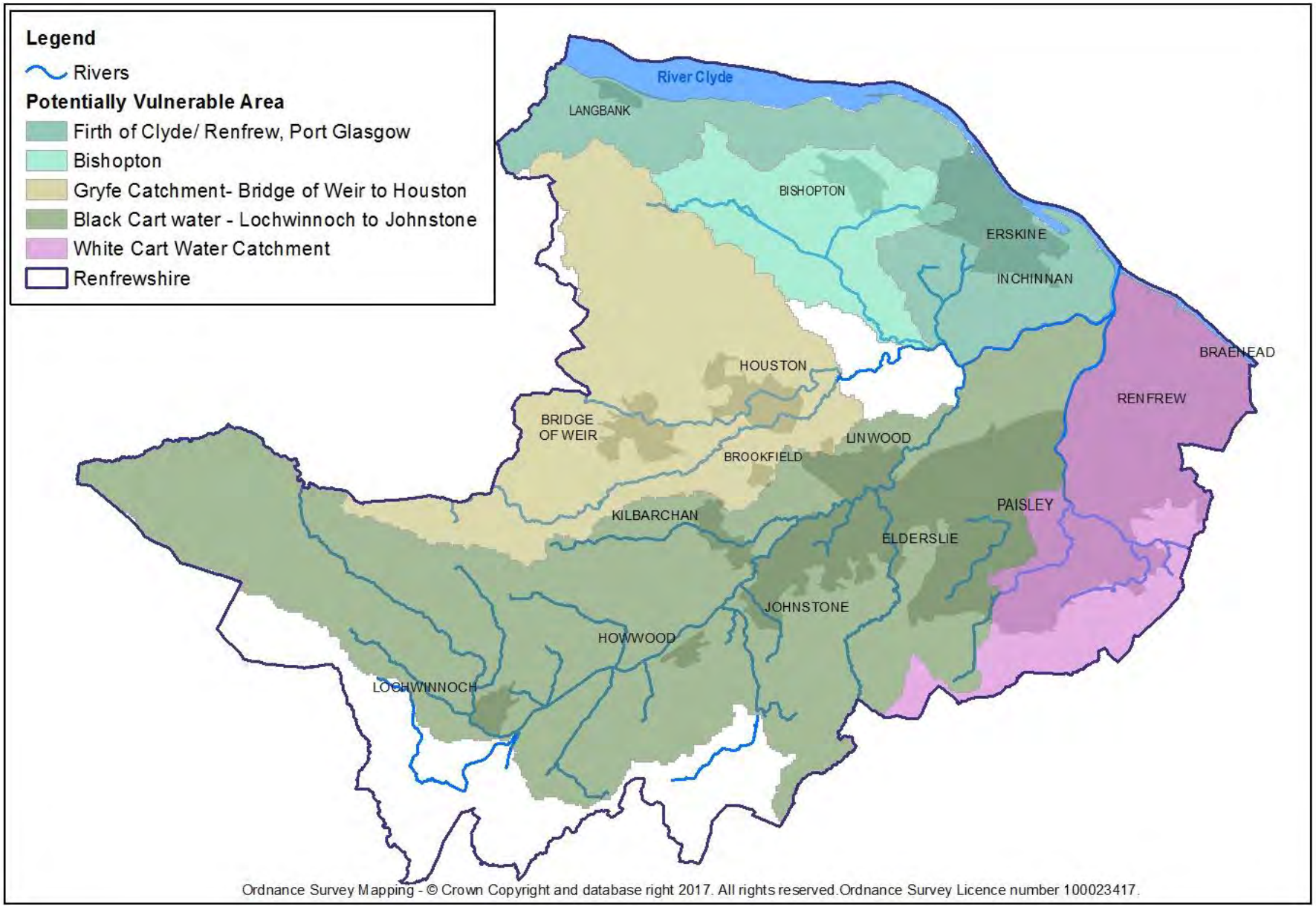


Table 3: Development Required for Potentially Vulnerable Areas

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
11/09 Firth of Clyde – Renfrew to Port Glasgow	**River Clyde** - The area has a risk of river, surface water and coastal flooding. The majority of issues are caused by surface water flooding.	Surface water flooding is the greatest risk. The northern boundary of the area fronts onto the River Clyde. Coastal flooding of transport routes, particularly the M8 and rail line can occur. River flooding is not extensive.	Surface water flooding occurred between November and December 2006 when flooding affected the A8 carriageway near Inchinnan. Erskine also experienced flooding.	1. Prepare and Implement Surface Water Management Plan 2. Prepare Integrated Catchment Study – Inchinnan 3. Maintenance of watercourses to reduce flood risk 4. Planning Policies Integral to the Renfrewshire Local Development Plan	Renfrewshire Council Renfrewshire Council and Scottish Water Inverclyde Council and Renfrewshire Council, asset / land managers Renfrewshire Council	2022-2027 2016-2021 Ongoing Ongoing

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
11/10 Bishopton	**River Gryfe** - The area has a risk of river, surface water and coastal flooding. The majority of issues are caused by surface water flooding.	Surface water flooding is the primary source of flood risk. River flooding from the Craigton and Dargavel Burns is also possible, although local measures are in place to reduce the risk.	Several reported incidents of flooding. Surface water flooding has been the main source of flooding in the Rossland area with records dating back to 1991. Surface water flooding in 2006 and 2008, caused sewerage problems and flooded the A8 carriageway	1. Prepare and Implement Surface Water Management Plan – Erskine 2. Prepare Integrated Catchment Study – Erskine 3. Maintenance to reduce overall flood risk 4. Planning Policies Integral to the Renfrewshire Local Development Plan	Renfrewshire Council Renfrewshire Council and Scottish Water Renfrewshire Council/land and asset managers. Renfrewshire Council	2022-2027 2016-2021 Ongoing Ongoing

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
11/11 Gryfe Catchment - Bridge of Weir to Houston	**River Gryfe** - The area has a risk of river and surface water flooding.	Most of the impacts are around Bridge of Weir, Crosslee, Houston and Quarriers Village. Some interaction between the river and surface water flooding near Quarriers Village. There is an existing flood protection scheme on the River Gryfe at Crosslee Park, Crosslee.	River flooding was recorded in the 19th century and more recently in peak river flows were exceeded in 1994 and 2006/7 causing flooding at Crosslee . Surface water flooding frequently reported affecting Crosslee and the A761 in Bridge of Weir.	1. Prepare and Implement Surface Water Management Plan – Johnstone and Kilbarchan 2. Prepare and Implement Surface Water Management Plan – Linwood 3. Prepare Integrated Catchment Study – Linwood 4. Maintenance to reduce overall flood risk 5. Planning Policies Integral to the Renfrewshire Local Development Plan	Renfrewshire Council Scottish Water and Renfrewshire Council Scottish Water and Renfrewshire Council Inverclyde Council and Renfrewshire Council, asset / land managers Renfrewshire Council	2016-2021 2022-2027 2022-2027 Ongoing Ongoing

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
11/12 Black Cart Water – Lochwinnoch to Johnstone	**Black Cart Water** - This area has a risk of river, surface water and coastal flooding	River flooding within the area is primarily from the Black Cart Water. Surface water flooding is primarily in the urban areas of Linwood and Johnstone. Interaction between sources of river and coastal flooding is predicted to occur in the lower reaches of the Black Cart Water.	A number of floods in this area have affected properties and transport routes. Major flooding in 1994 in Ferguslie Park from the Candren Burn and the Kintyre Avenue area of Linwood was inundated by another tributary of the Black Cart Water. Surface water flooding affected Low Barholm in 1998 and between 2004	1. Prepare Flood Protection study - Candren Burn Catchment 2. Flood Protection Study – Johnstone 3. Flood Protection Study and Natural Flood Management Study – Lochwinnoch 4. Flood Protection Study and Natural Flood Management Study – Kilbarchan 5. Prepare and Implement Surface Water Management Plan	Renfrewshire Council Renfrewshire Council Renfrewshire Council Renfrewshire Council Renfrewshire Council	2016-2021 2016-2021 2016-2021 2016-2021 2016-2021

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
			and 2007, drainage systems exceeded capacity causing flooding. River and surface water have affected properties and transport in Milliken Park, Johnstone Centre and Elderslie.	– Johnstone and Kilbarchan 6. Prepare and Implement Surface Water Management Plan – Linwood 7. Prepare and Implement Surface Water Management Plan – Paisley 8. Maintenance to reduce overall flood risk and maintain Flood Protection Scheme – Johnstone 6. Planning Policies Integral to the Renfrewshire Local Development Plan	 Scottish Water in partnership with Renfrewshire Council Renfrewshire Council Renfrewshire Council, asset /land managers Renfrewshire Council	 2022-2027 2016-2021 Ongoing Ongoing

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
11/13 White Cart Water Catchment	**White Cart Water** -This area has a risk of river, surface water and coastal flooding	River flooding is primarily attributed to the White Cart Water and its tributaries which flows from east to west through the area. The White Cart Water Flood Protection Scheme has been developed to reduce the impact of flooding. Surface water flooding is potentially a risk in Paisley. There is a risk of coastal flooding attributed to the	There is a long history of flooding in this area with over 20 significant floods in the last 100 years. In 1994, Paisley, Penilee, Hillington and Renfrew all experienced major flooding from watercourses. Surface water flooding impacted the south of Paisley and the M8 near Hillington. Ferry Road, Renfrew has had a history of coastal flooding often exacerbated by	1. Flood protection scheme/works – North Renfrew 2. Flood Protection Study/Integrated Catchment Study – North of Thornley Reservoir 3. Flood Protection Study – Paisley (Hawkhead Burn) 4. Prepare and Implement Surface Water Plan/Study – Paisley 5. Maintenance to reduce overall flood risk and maintain Flood Protection Schemes –	Renfrewshire Council Renfrewshire Council/Scottish Water Renfrewshire Council Renfrewshire Council Renfrewshire Council	2016 – 2021 2022-2027 2022-2027 2016-2021 Ongoing

Potentially Vulnerable Area	Main River Catchment	Summary of Flood Impact	History of Flooding	Action by Council to Manage Flooding	Delivery Lead	Delivery Timescale
		tidal influence on the River Clyde along the northern boundary of the area where Renfrew may be affected.	heavy rainfall. 16 incidents have been recorded since 1897.	Moredun and North Renfrew Flood Protection Scheme 6. Planning Policies Integral to the Renfrewshire Local Development Plan	Renfrewshire Council	Ongoing

Potential Development Considerations

6.1 The Strategic Flood Risk Assessment which has been prepared alongside and informed the Renfrewshire Local Development Plan Main Issues Report provides information on flood risk that has enabled the Council to understand existing and potential flood risk associated with the preferred and alternative options considered in the Main Issues Report.

6.2 Renfrewshire's Spatial Strategy is proposed to remain focused on the promotion of sustainable economic growth by identifying opportunities for change and supporting investment which help to regenerate and enhance communities and places, providing high quality new development in appropriate locations.

6.3 The new Renfrewshire Local Development Plan will strengthen the focus on place making and the delivery of new homes across Renfrewshire to meet the housing needs. The priority remains the development of previously used sites, concentrating first on existing urban areas and key redevelopment sites, aiming to facilitate sustainable development and a low carbon economy.

6.4 Consideration is now given to the Main Issues that are likely to have the most significance in relation to the Strategic Flood Risk Assessment.

Housing Land

6.5 It is proposed through the Renfrewshire Local Development Plan Main Issues Report that Renfrewshire's all tenure Housing Land Requirements will be met from the supply of housing land outlined in Renfrewshire's Housing Land Audit 2016. At present no new land allocations are required.

6.6 These sites seek to regenerate, create and enhance communities and places, providing high quality new development in the right locations.

6.7 However, given the recent experience in relation to the delivery of housing identified in the current Renfrewshire Local Development Plan, where 13 sites were released from the greenbelt with only 1 of the sites now complete and 3 under construction, there may be a requirement to identify pipeline sites in the next Local Development Plan. These sites would require to be in line with the Spatial Strategy, in existing built up areas with the focus on brownfield land and previously used sites before the use of greenbelt land.

6.8 The identification of sites for Renfrewshire's Housing Land Supply involves a flood risk based approach. Furthermore, many of the sites in the Housing Land Audit 2016 have been subject to a planning application and relevant details in relation to drainage, flood risk and water quality were assessed, with further details submitted where required, as well as Sustainable Urban Drainage Systems or other drainage infrastructure implemented.

6.9 The sites included in the Renfrewshire Housing Land Audit 2016 are listed in Background Paper 1 Housing Land Requirements.

6.10 In addition, 56 potential housing sites were submitted to the Council in preparation of the Main Issues Report for consideration for the next Renfrewshire Local Development Plan. All of these sites have been assessed against environmental criteria through the Strategic Environmental Assessment and wider planning considerations through sustainable development criteria.

6.11 For each location of proposed development, consideration of existing planning policies and comments received from the Key Agencies, including SEPA and Scottish Water were taken into account.

6.12 The approach to site assessment highlighted where a more detailed site-specific flood risk assessment may be necessary and, when appropriate, the requirement for mitigatory measures.

6.13 Appendix 1 of the Strategic Flood Risk Assessment contains a detailed assessment of the flood risk and mitigation required for all new sites submitted through the Suggestions for Land Use Change exercise.

City Deal

6.14 City Deal has the potential to deliver significant economic growth through investment in infrastructure, places and people. A 20 year investment programme will see £274 million of the overall £1.13 billion City Deal investment being delivered in Renfrewshire.

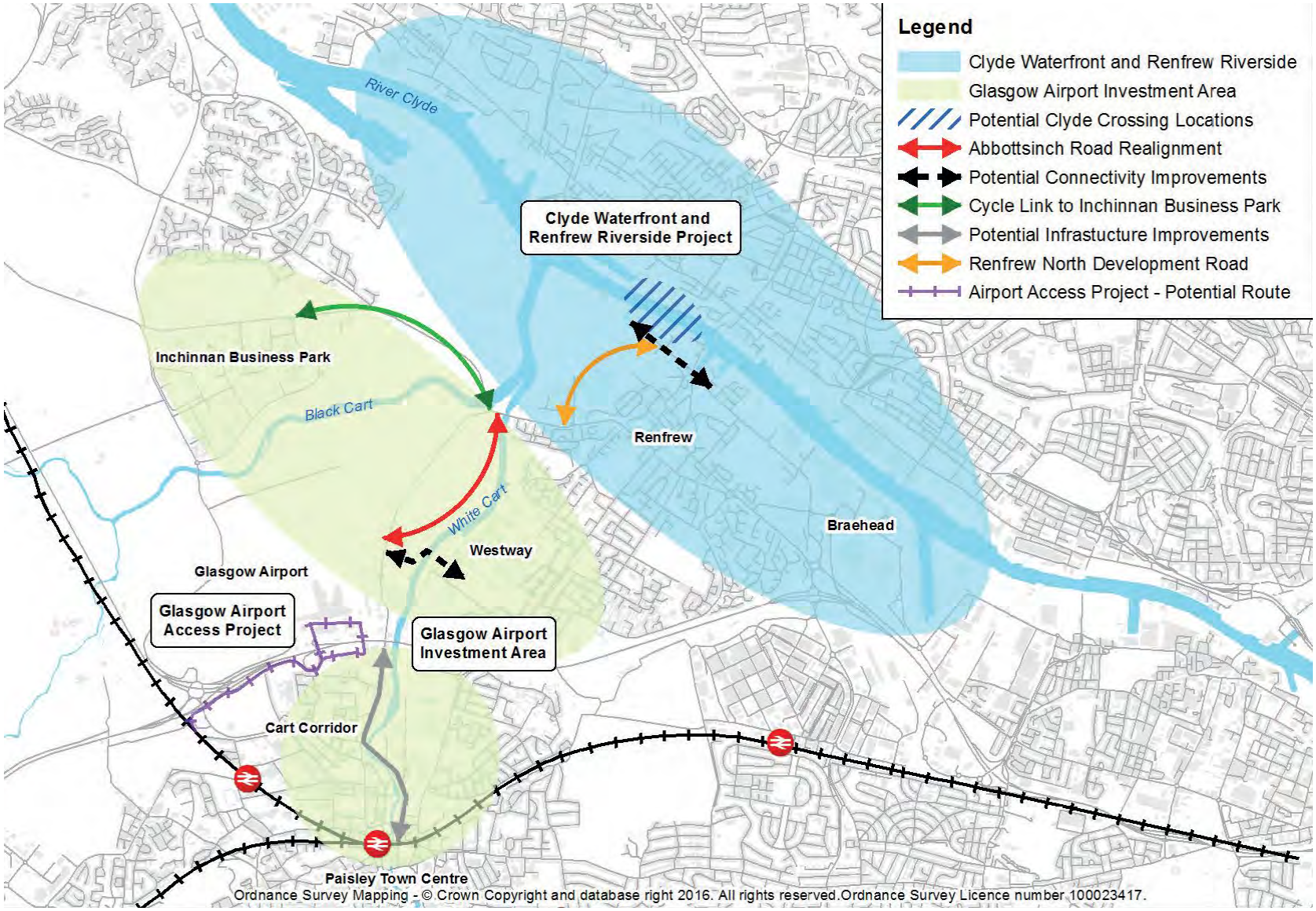
6.15 Renfrewshire is to benefit from three of the biggest infrastructure investments; the Airport Access Project; the Clyde Waterfront and Renfrew Riverside project; and the Glasgow Airport Investment Area (GAIA).

6.16 The Renfrewshire Local Development Plan sets out an economic framework for investment. The City Deal projects present the delivery mechanism for strengthening and growing Renfrewshire's economy.

6.17 The Preferred Option identified through the Main Issues Report proposes that the new Local Development Plan requires a policy enabling the benefits and opportunities of City Deal investment to be delivered as well as supporting the implementation of potential developments across Renfrewshire. Proposals associated with the delivery of City Deal investment will be considered in relation to the Local Development Plan Spatial Strategy, ensuring economic growth is supported by infrastructure.

6.18 In doing so, development stemming from City Deal should be in the most sustainable locations. If potential flood risks are identified, development could only take place once appropriate infrastructure was in place. This policy approach to City Deal may also provide a catalyst for the provision of flood related infrastructure elsewhere in Renfrewshire and support the implementation of the action required within the Potentially Vulnerable Areas.

Figure 5: City Deal



Paisley South Expansion Area

6.19 The potential expansion of an area to the south of Paisley to accommodate new homes to assist in meeting future housing land requirements, is identified in the current adopted Renfrewshire Local Development Plan. It is suggested that the site required further investigation and a masterplanned approach is proposed to take forward the development of a new place.

6.20 The Council continues to encourage a masterplan approach to the development of sites, focussing on previously used land at the University of the West of Scotland's Campus at Caplethill Road and at Dykebar Hospital to provide a range, type and size of new homes, as well as creating a high quality, sustainable place. In doing so, flood risk can be fully assessed and mitigation taken into account early in the development process.

Ferguslie Park Regeneration

6.21 An opportunity to work with partners to regenerate and invest in Ferguslie Park has been identified, with the allocation of £7.5m towards the delivery of a regional sports facility. The proposed facility is anticipated to provide the catalyst for strategic and sustained renewal across a wide geographic area and is associated with a housing regeneration programme. The review of the Local Development Plan will require to reflect and support this framework for regeneration.

6.22 The proposed redevelopment of this area will provide an opportunity to address historic flood related issues in Ferguslie Park. The initiative aims to reduce Renfrewshire's vacant and derelict land, however, it can also contribute to the objective of enhancing places and delivering more sustainable, safe communities.

Developer contributions

6.23 The current Adopted Renfrewshire Local Development Plan does not have a Developer Contribution Policy. Through the planning application process, the applicant is required to make good any infrastructure deficits associated with any new development. Throughout the development of the Main Issues Report, a number of concerns were raised regarding suitable or adequate infrastructure to facilitate future development in Renfrewshire. These included concerns about education, water and transport provision.

6.24 The Council has worked closely with key agencies and infrastructure providers to ensure that future developments have sufficient levels of infrastructure and services. In particular, SEPA have advised the Council throughout the development of the Main Issues Report on flood related matters.

6.25 Renfrewshire Council continues to work closely with infrastructure and service providers when considering how the best use of resources can be made of existing infrastructure capacity. A key consideration in putting forward the right sites in the right locations is their ability to be adequately accommodated with no significant increased burdens upon services, facilities or infrastructure or whereby the developer could assist with addressing any known deficit.

6.26 In line with Scottish Planning Policy, the Renfrewshire Local Development Plan Main Issues Report identifies a Preferred Option where a specific Developer Contribution Policy is not required for the new Local Development Plan. Instead it is proposed to have an Infrastructure Considerations Map which identifies parts of Renfrewshire's infrastructure that have already been considered or require further consideration when preparing development proposals.

6.27 This provides certainty for developers that they require to discuss detailed solutions prior to the submission of a planning application.

6.28 Consideration of flood related infrastructure is treated in a similar way to ensure that placemaking is delivered without significant increased burdens on infrastructure, services and facilities or an adverse impact to the existing place or communities

Conclusions

7.1 A stage 1 strategic assessment of flood risk across Renfrewshire has been carried out to assist with the review of the Adopted Renfrewshire Local Development Plan. It has provided risk-based approach to the consideration of land for development.

7.2 The Adopted Renfrewshire Local Development Plan has provided a framework for managing flood risk and drainage as well as protecting and enhancing water quality. This policy approach aimed to reflect the five overarching outcomes of 'Delivering Sustainable Flood Risk Management' as set out by the Scottish Government.

7.3 Since the adoption of the Local Development Plan in 2014, new guidance on Strategic Flood Risk Assessment has been issued and the Local Flood Risk Management Plan for the Clyde and Loch Lomond Local Plan District has also been finalised. Revised Flooding data has recently been provided by SEPA, which further improves our understanding of flood risk within Renfrewshire and potential interactions between this and land uses or development.

7.4 Through the Renfrewshire Local Development Plan and its Spatial Strategy, the Council is seeking to provide the most sustainable forms of development for the area where the risk of flooding is minimised over the lifetime of the development plan.

7.5 Flood risk is one of many factors that will influence the spatial planning process however it is necessary to maintain a balance between flood risk considerations and other considerations such as the integration of social, economic and environmental matters.

7.6 A careful balance must be sought in these instances and the Strategic Flood Risk Assessment aims to assist in the plan preparation process. It forms the basis for preparing appropriate policies for flood risk management for the Renfrewshire Local Development Plan and provides an evidence base upon which informed decisions can be made.

Appendix 1: Detailed Flood Risk Assessment

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Land to the East of Shuttle Street, Kilbarchan	LDP2001	155 units	Yes	A small tributary burn bisects the site in an east to west direction. Development of this site may cause problems downstream, history of flooding in the settlement. A comprehensive and satisfactory drainage assessment could address this issue through attenuation and control of water run-off.	Most of this site is fine from a flood risk perspective. A more detailed flood risk assessment may be required to ascertain the precise developable extent of the site. Development could impact on Station Road Combined Sewer Overflow. Drainage Impact Assessment recommended. Standard watercourse buffer. Minor un-named issues and sinks at two separate locations within the site, boundary buffer strips would be required in accordance with guidance. Scottish Environment Protection Agency (SEPA) would oppose any culverting of the watercourse and any planned surface water discharge to the watercourse would require consultation with SEPA regarding applicable authorisation. Potential co-location issues with Bridge of Weir Leather Group site 1 km to north west of site and Kilbarchan Quarry 650 metres to the south east, however no present on going issues with sites.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Calder Street, Lochwinnoch	LDP2002	150 units	Yes	A small tributary burn bisects the site in an east to west direction. Development of this site may cause problems downstream, history of flooding in the settlement. A comprehensive and satisfactory drainage assessment could address this issue through attenuation and control of water run-off.	Whilst most of this site is fine from a flood risk a detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site. A record of flooding adjacent to the site from 11/12/1994. We have the following details on record 'Calder Street, Lochwinnoch – Most roads leading to the area impassable'.
Rhubarb Farm, Land between Craigends Road and Ardgryffe Cresent, Houston	LDP2003	150-200 homes.	Yes	Flood risk assessment required due to the watercourse to the southern boundary of the site. Surface water risk to the northern and eastern boundaries which may result in flooding to access roads surrounding the site.	No flood risk concerns with the allocation of this site. Part of the site is shown to be at medium risk of surface water flooding.
Land to the south of the Kilmacolm Road and Strathgryffe Crescent, Bridge of Weir	LDP2007	70 units	Yes	Part of the site could potentially flood given the close proximity to the river. A detailed Flood Risk Assessment and Drainage Impact Assessment will be required to ascertain the precise developable extent of the site. Development could have an impact on the riparian environment. Site partially in a functional floodplain.	Whilst most of this site is fine from a flood risk perspective it is partially within the functional floodplain of the River Gryfe. It will be necessary to make sure that all development is set back and above this watercourse. A detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site. Possible increased spills at Auchens pumping station. Drainage Impact Assessment required and mitigation measures identified. Tannery pressure also on Gryffe

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
					and Tannery flows could be increasing. Site could be developed but with suitable mitigation.
Gleniffer Road, Paisley	LDP2016	40-50 units	Yes	A Flood Risk Assessment would be required to address surface water risk. Also, the development of this site may cause problems downstream, where there is a history of flooding. A Flood Risk Assessment and Drainage Impact Assessment could potentially address this issue through attenuation and control of water run-off. SEPA would oppose culverting and consultation would be required regarding appropriate authorisation if discharging surface water into watercourse.	Whilst most of this site is fine from a flood risk perspective a minor watercourse issues and runs through a small section of this site, it will be necessary to provide finalised plans and more detailed topographic information to establish if a Flood Risk Assessment will be required. Minor un-named water course and sinks within site boundary, buffer strips required in accordance with guidance. SEPA would oppose culverting and consultation would be required regarding appropriate authorisation if discharging surface water into watercourse. Gleniffer Burn within close proximity of south site boundary (400 metres approximately), buffer strip may be required.
Arkleston Farm, Paisley	LDP2022	Unknown	Yes	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs through part of this site. Surface water risk to the northern portion and south west corner of site. Culverted watercourse to north west corner of the site, a flood risk assessment is required to	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs through part of this site. It will be necessary to make sure that all development is set back from this feature. Parts of the site are also shown to be at medium risk of surface water flooding. A Flood Risk Assessment will

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
				define developable area. Two minor unnamed watercourses within site, buffer strips would be required to protect water quality.	be required to ascertain the precise developable extent of the site. Two minor unnamed watercourses within site boundary, one to north west and other to north east of site. Buffer strips required in accordance with guidance. SEPA would oppose culverting and consultation should be sought regarding appropriate authorisation if discharging surface water into either watercourse.
Good Shepherd, Old Greenock Road, Bishopton	LDP2023	8-10 units	No	No water issues associated with this site. Flat site and no watercourses running through or close to the site.	No flood risk concerns with the allocation of this site.
South of Woodend House, Houston Road, Houston	LDP2024	25 units	No	No water issues associated with this site. No watercourses running through or close to the site.	No flood risk concerns with the allocation of this site.
West of Woodend House, Houston Road, Houston	LDP2025	6 units	No	No water issues associated with this site. Flat site and no watercourses running through or close to the site.	No flood risk concerns with the allocation of this site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
East Fulton Farm, Darluith Road, Linwood	LDP2026	66 units	No	There is a small pluvial risk to the eastern boundary which would require to be addressed through a drainage assessment and any remedial works indicated from this assessment. Development of the site would provide an opportunity to promote sustainable flood risk management and integrate sustainable urban drainage solutions.	No flood risk concerns with this site.
Former BASF Site, Hawkhead Road, Paisley	LDP 2027	480 homes	Yes	Extensive flood risk to a large proportion of this site, a flood risk assessment is required. This site provides an opportunity to both protect and enhance the water environment and promote sustainable flood risk management.	A full Flood Risk Assessment will be required to ascertain the developable extent of this site. Potential for improvements to banks of the White Cart.
Johnshill, Lochwinnoch – (west of road)	LDP2028	5 individual plots or one development of 5 dwellings.	No	Small site, so limited impact.	There is no capacity for Castle Semple Loch to accept an increase in nutrients. Adequate improvements to sewage provision require to be identified and implemented to ensure any additional housing does not have a detrimental impact on the Loch.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
North & South of Midton Road, Spateston, Johnstone	LDP2029	200 units	Yes	Watercourse runs through the site and also borders the site. Assessment will be required to look at potential flood extents. Development of this site may cause problems downstream where there has been a history of flooding which the Council aims to resolve by comprehensive measures in the Spateston area. This site provides an opportunity to both protect and enhance the water environment and promote sustainable flood risk management which would require to feed into the overall comprehensive drainage system being designed for the Spateston area.	Whilst most of this site is fine from a flood risk perspective a number of minor watercourses cross and border this site. A Flood Risk Assessment will be required to ascertain the precise developable extent of the site.
South of Kilmacolm Road, Bridge of Weir	LDP2030	150 units		While most of this site is fine from a flood risk perspective part of the site is within the functional flood plain of the River Gryfe. Surface water run-off from the Kilmacolm Road causes issues for this site as the road is at a higher level than the site. Both a flood risk assessment and drainage assessment would be required.	While most of this site is fine from a flood risk perspective part of the site is within the functional flood plain of the River Gryfe. It will be necessary make sure that all development is set back and above this watercourse. Parts of the site are also shown to be at medium risk of surface water flooding. A detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Barbush North, Johnstone	LDP2031	130 units	Yes	Localised surface water risk to a depth of 2.0 metres, ponding to south east and central areas of site. Both a flood risk assessment and drainage assessment would be required. There is an opportunity to protect and enhance the water environment and promote sustainable flood risk management.	No flood risk concerns with the development of this site.
West of Burnfoot Road, Lochwinnoch	LDP2032	130 units	Yes	Adjacent to the 1:200 year fluvial outline of the River Calder and a minor watercourse crosses and borders this site. A detailed Flood Risk Assessment and Drainage Impact Assessment will be required to ascertain the precise developable extent of the site. There is an opportunity to protect and enhance the water environment and promote sustainable flood risk management.	Whilst most of this site is fine from a flood risk perspective it is adjacent to the 1:200 year fluvial outline of the River Calder and a minor watercourse crosses and borders this site. It will be necessary to make sure that all development is set back and above these watercourses. A detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site. There is no capacity for Castle Semple Loch to accept an increase in nutrients. Adequate improvements to sewage provision require to be identified and implemented to ensure any additional housing does not have a detrimental impact on the Loch.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
West of Barochan Road, Houston	LDP2033	50 units	Yes	Surface water sump to north western section of the site. Surface water risk to southern portion of site, this could be addressed by appropriate water infrastructure. The site is adjacent to small watercourse. There is an opportunity to protect and enhance the water environment and promote sustainable flood risk management.	Whilst most of this site is fine from a flood risk perspective it is adjacent to the 1:200 year fluvial outline of the Houston Burn. It will be necessary to make sure that all development is set back and above this watercourse. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site. The site is adjacent to small watercourse, a buffer strip would be required in line with SEPA guidance.
West of Caplethill Road, Cross Stobbs, Paisley	LDP2034	180 units	Yes	Watercourse to north west boundary. Flood Risk Assessment will be required to ascertain the precise developable extent of the site. Suitable buffer strips would be required to protect water quality within the site.	Whilst most of this site is fine from a flood risk perspective a minor watercourse crosses part of this site and another one borders this site. It will be necessary make sure that all development is set back and above these watercourses. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Whitelint Gate, Bridge of Weir	LDP2035	200 units	Yes	Some potential flooding may affect a small portion of site to north, however, this unlikely to be significant.	Whilst most of this site is fine from a flood risk perspective a small part of it looks to be within the 1:200 year fluvial outline of the River Gryfe. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site. Lochar Water is currently rated moderate for diffuse pollution (farmland) and abstraction for tannery. Potential for increased spills at Auchens pumping station. Drainage Impact Assessment required and mitigation measures require to be identified.
Kilbarchan Road / Crosslee Road, Bridge of Weir	LDP2036	50 units	Yes	Historic flood events recorded to the north and south of the site. Whilst most of this site is fine from a flood risk perspective it is adjacent to the 1:200 year fluvial outline of a watercourse, the Locher Burn, this will required to be taken into consideration in the development of this site. Drainage Impact Assessment also required to ensure potential for diffuse pollution to Locher Burn is mitigated. There is an opportunity to protect and enhance the water environment and promote sustainable flood risk management.	Whilst most of this site is fine from a flood risk perspective it is adjacent to the 1:200 year fluvial outline of a watercourse, the Locher Burn, this will required to be taken into consideration in the development of this site, a detailed Flood Risk Assessment may be required. Lochar Water is currently rated moderate for diffuse pollution (farmland) and abstraction for tannery. Potential for increased spills at Auchens pumping station. Drainage Impact Assessment required and mitigation measures require to be identified Air quality is an issue related to the nearby tannery.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Barrhill Crescent, Kilbarchan	LDP2037	60 units	Yes	Some evidence of localised flooding in south west of site. The site is part of the upper catchment. Development of this site is likely to cause problems downstream, in particular there have been extensive historic flooding issues at Low Barholm. A comprehensive and satisfactory drainage assessment would address this issue through attenuation and control of water run-off. Development of the site would provide an opportunity to promote sustainable flood risk management and provide a potential for betterment.	No flood risk concerns with the allocation of this site. Development could impact on Station Road Combined Sewer Overflow. Drainage Impact Assessment recommended.
West of Lawmarnock Road, Bridge of Weir	LDP2038	320 units	Yes	Watercourse runs through the site and surface water risk to north of the site, a flood risk assessment and drainage impact assessment will be required to define developable area.	Whilst most of this site is fine from a flood risk perspective a minor watercourse crosses through this site. It will be necessary make sure that all development is set back and above this watercourse. A detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site. Drainage Impact Assessment required.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Kilbarchan Road, Bridge of Weir	LDP2039	200 units	Yes	Parts of the site are at risk from flooding. A drainage assessment and flood risk assessment will be required to define developable area.	Parts of this site are developable other parts are at risk of flooding. It will be necessary to undertake a Flood Risk Assessment to ascertain the developable extent of the site. If there are any field drains on site these will need to be avoided.
Land off Old Bridge of Weir Road, Houston	LDP2040	250 units	Yes	Localised deep surface water risk to southern section of the site. A comprehensive and satisfactory drainage assessment would address this issue through attenuation and control of water run-off. A detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site. Development of the site would provide an opportunity to promote sustainable flood risk management and provide a potential for betterment.	Whilst most of this site is fine from a flood risk perspective a minor watercourse and an impounded reservoir borders this site. It will be necessary make sure that all development is set back and above these features. In the first instance it will be necessary to provide finalised plans and more detailed topographic information. If this is not sufficient to demonstrate that the proposed development is consistent with Scottish Planning Policy a more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Harelaw Farm, Caplethill Road, Paisley	LDP2041	300 units	Yes	Watercourse runs through the site and flooding is found to the northern section of the site caused by the land form. Site is also marshy in places. A flood risk assessment and drainage impact assessment will be required to define developable area.	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs through the site. It will be necessary make sure that all development is set back and above this watercourse. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site. This site is also shown as being marshy.
Craigton Farm, Bishopton	LDP2042	100-150 units	Yes	Flood Risk Assessment and Drainage Impact Assessment will be required to define developable area due to Craigton Burn and potential landform issues.	Whilst most of this site is fine from a flood risk perspective the Craigton Burn runs along the boundary of this site. It will be necessary to make sure that all development is set back and above this watercourse. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.
Sandholes Road, Brookfield	LDP2043	90 new units	Yes	A culvert cuts across middle of the site. Water quality will require to be considered. A Flood risk and drainage assessment is required. Sandholes Road and Burnside Avenue has a history of flooding events.	No flood risk concerns with the allocation of this site. Brookfield storm tank/Combined Sewer Overflow may require to be upgraded. Drainage Impact Assessment recommended.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
5 East Fulton Holdings, Linwood	LDP2044		No	No water issues associated with this site. Flat site and no watercourses running through or close to the site.	No flood risk concerns with the allocation of this site.
Barochan Road/ Fulton Drive, Houston	LDP2045	300 units	Yes	A Flood risk and drainage assessment is required to define developable area due to burn dissecting the site. Stream flows south to north and along two spurs, water quality will need to be considered.	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs through this site. It will be necessary to make sure that all development is set back and above this watercourse. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.
Northbar Phase 2, Erskine	LDP2046	56 units	No	Drainage Impact Assessment would be required to address minimal surface water flood risk. If this were to be addressed this could provide potential for betterment.	No issues regarding flood risk.
Southbar Linburn, Erskine	LDP2047	720 units	Yes	Two burns are located within the site; one in the south west corner and one to the eastern area of the site. A Flood risk and drainage assessment is required to determine developable area of the site. The water quality will require to be protected.	Whilst most of this site is fine from a flood risk perspective several minor watercourse run through the site. It will be necessary make sure that all development is set back and above these watercourses. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site. A Drainage Impact Assessment will be required.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Branscroft, Kilbarchan	LDP2048	150 units	Yes	No significant flood risk issues, but development of this site may cause problems downstream where there has been a history of flooding. A comprehensive and satisfactory drainage assessment could address this issue through attenuation and control of water run-off. Water quality in conjunction with the watercourse will require to be considered.	Whilst most of this site is fine from a flood risk perspective, there is a minor watercourse which runs along the boundary of site. It will be necessary make sure that all development is set back and above this watercourse. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site. Development could impact on Station Road Combined Sewer Overflow. Co-location Issues with Kilbarchan quarry.
South of Merchiston & North of A737, Johnstone	LDP2050	1000 units	Yes	Partially within floodplain a full flood risk assessment and drainage impact assessment would be required in order to identify appropriate remediation to the water infrastructure and identify developable area.	Whilst most of this site is fine from a flood risk perspective it is partially within the functional floodplain of an unnamed watercourse. A more detailed flood risk assessment will be required to ascertain the precise developable extent of the site.
Land to North and South of Beith Road, Howwood	LDP2051	Northern Site 45 units, Southern Site 79 units.	Yes	Potential surface water risk running north to south across the site. Attenuation measures could control this leading to betterment.	No flood risk concerns with the allocation of this site.
Kilmacolm Road, Houston	LDP2052	85 Units.	Yes	Development of this site may cause problems downstream where there has been a history of flooding. A comprehensive and satisfactory drainage assessment would address this through attenuation and control of water run-off.	No flood risk concerns with the allocation of this site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Auchenlodment Road, Elderslie	LDP2053	40 units	Yes	A minor watercourse runs in proximity to one section of the site boundary. Water also appears to drain from north to south across the site. The risk from flooding will require to be addressed as well as any potential impact on water quality.	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs in proximity to one section of the site boundary. It will be necessary make sure that all development is set back and above this watercourse. A more detailed flood risk assessment will be required to ascertain the precise developable extent of the site.
Land at Erskine Hospital, Erskine	LDP2054	200 – 250 units.	Yes	Springs located throughout the site, flood risk assessment and drainage impact assessment would be required. Ditches located within the site would require management.	No flood risk concerns with the allocation of this site.
Milliken Road, Kilbarchan	LDP2055	58 new homes	Yes	Parts of this site are at risk of fluvial flooding and surface water risk to parts of the site due to existing watercourse. Flood risk assessment and drainage impact assessments required to address this and define developable area. Potential impact on the water environment would be an important consideration in developing the site.	Parts of this site are developable other parts are clearly at risk of fluvial flooding. It will be necessary to undertake a flood risk assessment to ascertain the developable extent of the site. A watercourse runs through the site and the Kilbarchan storm tank to Combined Sewer Overflow to Black Cart could be impacted. A drainage impact assessment is recommended.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Fields at Barochan Road, Brookfield	LDP2056	150 units	Yes	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs along its western boundary. It will be necessary make sure that all development is set back and above this watercourse. Localised surface water risk to south east of site. A Flood Risk Assessment and Drainage Impact Assessment would be required, water quality will require to be considered.	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs along its western boundary. It will be necessary to make sure that all development is set back and above this watercourse. A more detailed flood risk assessment will be required to ascertain the precise developable extent of the site.
Golf Driving Range, Rannoch Road, Johnstone.	LDP2057	75 units	Yes	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs along its western boundary. A more detailed look at water will be required, however, no significant impact is anticipated.	No flood risk concerns with the allocation of this site.
Mackies Mill, Elderslie	LDP2058	200 units	Yes	Potential flood risk affects part of the site. Burn cuts across the site from west to east. Flood risk and drainage assessment required. Buffer strips required to protect against potential pollution of the water source.	Whilst most of this site is fine from a flood risk perspective part of the site is within the 1:200 year fluvial extent of the Old Patrick Water. There are also several minor watercourses that run through the site. It will be necessary make sure that all development is set back and above all of these watercourses. A more detailed flood risk assessment will be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
10 Harbour Road, Paisley	LDP2059	60 units	Yes	Potential flood risk (tidal) covering the northern half of site, a flood risk assessment will be required to define developable area. Surface water risk also to the north of site. There is an opportunity to protect and enhance the water environment and promote sustainable flood risk management.	A full flood risk assessment will be required to better ascertain the developable extent of this site.
Marypark Road, Langbank	LDP2060	14 units	Yes	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs along its western boundary. A detailed Flood Risk Assessment would be required to ascertain the developable extent of the site. Buffer strips required to protect against potential pollution of the water source.	Whilst most of this site is fine from a flood risk perspective a minor watercourse runs along its western boundary. It will be necessary make sure that all development is set back and above this watercourse. A detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site.
Glencourse Road/Corsebar Road, Paisley	LDP2061	50 flats	Yes	Potential flood risk from Candren burn which requires comprehensive and satisfactory drainage and flood risk assessment to address this issue. There could be an opportunity for betterment.	Whilst most of this site looks to be fine from a flood risk perspective it is partially within the functional floodplain of the Candren Burn. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
South of Midton Road, Howwood	LDP2063	4/5 units	Yes	It is unclear if there are any culverted watercourses on site feeding the Skiff Dam Further information and a Flood Risk Assessment will need to be submitted to confirm the developable extent of the site.	It is unclear if there are any culverted watercourses on site feeding the Skiff Dam. If there are these pose a risk that will need to be considered in terms of any site layout. Further information / a Flood Risk Assessment will need to be submitted to confirm the developable extent of the site.
Land to West of Thriplee Road, Bridge of Weir	LDP2064	30-50 units	Yes	Potential flood risk affecting part of site. Drainage Impact Assessment required and mitigation measures require to be implemented. Development of the site would provide an opportunity to promote sustainable flood risk management and provide a potential for betterment downstream.	No flood risk concerns with the allocation of this site. Possible increased spills at Auchens pumping station. Drainage Impact Assessment required and mitigation measures require to be identified.
Land at Johnshill, Lochwinnoch	LDP2065	60 units	Yes	Minor watercourse runs along its southern boundary and another runs through the site. It will be necessary make sure that all development is set back and above these watercourses. A Flood Risk Assessment will be required to define developable area.	Whilst most of this site is fine from a flood risk perspective a minor watercourse (the Beech Burn) runs along its southern boundary and another runs through the site. It will be necessary make sure that all development is set back and above these watercourses. A more detailed Flood Risk Assessment will be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Lochwinnoch Golf Club, Lochwinnoch	LDP2066	5 -15 units	Yes	The site is bound by two watercourses to the southern side. Part of the site is within the functional floodplain. A Flood Risk Assessment and a Drainage Assessment would be required. It appears that there are only parts of the site that would be able to allow development. Adequate improvements to sewage provision would need to be identified and implemented.	Part of this site is developable and part is within the functional floodplain of the River Calder. It also extends to the edge of the Garpel Burn. It will therefore be necessary to undertake a Flood Risk Assessment to ascertain the developable extent of the site. Adequate improvements to sewage provision would need to be identified and implemented.
Eastbank, Houston Road, Langbank	LDP2068	25-50 units	Yes	Watercourse to western and eastern boundary, flood risk assessment required. Development of this site may cause problems downstream where there has been a history of flooding to the properties on Main Road. A comprehensive and satisfactory drainage assessment could address this issue through attenuation and control of water run-off.	Most of this site is fine from a flood risk with some parts of the site shown to be at medium risk of surface water flooding. There are two minor unnamed water bodies (non-baseline) within site boundary in north east of site. It will also be necessary to consider the potential impact of the culvert immediately downstream of the site. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site.
Kilmacolm Road, Adjacent Gryffe Castle, Bridge of Weir	LDP 2069	80 units	Yes	Any water run-off from the site is likely to be alleviated by a comprehensive and satisfactory drainage infrastructure which would address this issue through attenuation and control of water run-off. No significant issues.	Most of this site is fine from a flood risk perspective with parts of the site shown to be at medium risk of surface water flooding. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Goldenlea Farm, Bridge of Weir Road, Houston	LDP2070	344 units	Yes	Most of the site is fine from a flood risk perspective. It is adjacent to a 1:200 year fluvial outline and minor watercourses. Watercourses will be required to be retained through the site. A flood risk assessment will be required. A comprehensive and satisfactory drainage assessment will be required to define developable area.	Whilst the most of this site is fine from a flood risk perspective it is adjacent to the 1:200 year fluvial outline and a minor watercourse cross and border this site. It will be necessary make sure that all development is set back and above these watercourses. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site.
High Craig Quarry, Johnstone	LDP2071	880 units	Yes	Parts of the site are at risk from surface water flooding and a detailed Flood Risk Assessment will be required to ascertain the developable area. Development of the site would provide an opportunity to promote sustainable flood risk management and provide a potential for betterment for areas downstream.	Minor watercourse runs through part of the site and there are a number of ponds / lochans. Parts of the site are also shown to be at medium risk of surface water flooding. A more detailed Flood Risk Assessment may be required to ascertain the precise developable extent of the site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Linclive Interchange, Linwood	LDP2072	Leisure Proposal	Yes	The site is subject to fluvial flood risk (from the Black Cart) for the 1 in 200 year flood event, and from tidal flood risk to a lesser extent from the Black Cart, again for the 1 in 200 year flood event. A Flood Risk Assessment would be required to determine whether measures can be taken to mitigate such risk in a sustainable manner. The Candren Bowl SINC, which typically includes a large pond during winter months, located within the field to the north. Development of this site is likely to have an impact on water quality.	Part of this site is within the 1:200 year fluvial outline of the Black Cart Water. There are records of flooding on and adjacent to this site with approximately half of the site flooded. There is also a record of flooding on Candren Road. A flood risk assessment and drainage impact assessment is required to establish the developable area of the site.
Milliken Road Smallholdings, Kilbarchan	LDP2076	18 units	No	No water issues associated with this site. No watercourses running through or close to the site.	No flood risk concerns with the allocation of this site.
Golf Course at Newton Avenue, Elderslie	LDP2077	20 units	No	There are no flood risk issues with this site.	No water bodies immediately associated with site. No flood risk concerns with the allocation of this site.

Address	Site Reference	Proposed Use/ Number of Units	Potential Flood Risk	Flooding Comment	SEPA Comment
Land at Meadowside Farm, Johnstone	LDP2078	100 units	Yes	Surface water risk extends along northern boundary and down to south west. 50% of the site to the west is subject to direct flooding risk from the Black Cart. Flood Risk Assessment and Drainage Impact Assessment would be required to define the developable area.	Whilst part of the site looks to be developable, part of it is shown as being within the functional floodplain of the Black Cart Water. A minor water course (The Spateston Burn) also runs through the site. A detailed flood risk assessment will be required to ascertain the developable extent of the site.
Drum Farm, Langbank	LDP2079	200 units	Yes	There is a watercourse to the east, west and central area of this site. Any development should protect and enhance the water environment and promote sustainable flood risk management where required. Flood Risk Assessment required to define developable area.	A number of minor watercourses runs along the boundary of the site. A flood risk assessment required to confirm the developable extent of the site. There are three waterbodies associated with the site, two minor unnamed burns to the west of the site, one bordering the site and another running through the middle. SEPA would oppose any culverting or straightening of the watercourses.

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