

**Midlothian Local Development Plan**  
Main Issues Report 2013:  
Technical Note

# Strategic Flood Risk Assessment



Midlothian



## Strategic Flood Risk Assessment in respect of the Midlothian Local Development Plan Main Issues Report 2013

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Note: Appendix 4 explains abbreviations

### **1 Background**

1.1 The Scottish Environment Protection Agency (SEPA) encourages planning authorities to make use of Strategic Flood Risk Assessment (SFRA) to consider flood risk matters early on in the development plan process. Under the Flood Risk Management (Scotland) Act 2009 there is a general duty upon local authorities when carrying out their functions, to act with a view to reducing flood risk.

1.2 An SFRA is designed for the purposes of specifically informing the development planning process, and to assist flood risk reduction by avoiding areas at significant risk of flooding. Development should not take place on land that could otherwise contribute to managing flood risk. An SFRA involves the collection, analysis, and presentation, of all existing and readily available flood risk information for the area of interest. It constitutes a strategic overview of flood risk, without necessarily meeting the reporting requirements of a detailed Flood Risk Assessment (FRA). SEPA expect SFRA to be principally desk-based studies, making use of existing sources of information. However, in some instances, greater detail may be required to inform the Development Plan. Part of an SFRA could be the identification of priority areas for more detailed analysis.

1.3 The SFRA should be used to apply the risk based approach to the identification of land for development (in Midlothian the sites assessment process has anticipated this task: see Development Sites Assessment Technical Note for details) and for the development of policies for flood risk management, including promotion of surface water management. The SFRA should be prepared in consultation with SEPA and other interested parties.

1.4 Midlothian Council expects to update this SFRA as the Midlothian Local Development Plan (MLDP) proceeds to adoption, taking into account any new information about the nature of flooding and flood defences, and reflecting changing proposals for the use of the land. Interested parties will be invited to respond to this SFRA for the MLDP Main Issues Report (MIR), which indicates where Midlothian Council's knowledge is incomplete. Future SFRA may benefit from work being undertaken in connection with the Local Flood Risk Management Plan for the area.

1.5 Key elements of an SFRA are as follows:

- Information on all potential sources of flooding
- Information on climate change impacts

- Information on existing flood defences
- Identification of the functional flood plain (built-up areas and sparsely developed)
- Identification of relevant drainage issues
- Identification of sites or areas constrained by flood risk

## **2 Information on all potential sources of flooding**

2.1 The SFRA should take account of all sources of flooding. SEPA guidance (SFRA - SEPA technical guidance to support Development Planning) on sustainable flood risk management identifies the following primary sources of flooding:

- River (fluvial) flooding - this occurs when the water draining from the surrounding land exceeds the capacity of the watercourse.
- Coastal flooding - this is not applicable in Midlothian.
- Surface water (pluvial) flooding - this is caused when rainfall water ponds or flows over the ground before it enters a natural or man-made drainage system or watercourse, or when it cannot enter the drainage system because the system is already full to capacity.
- Sewer flooding - this occurs when combined sewers are overwhelmed by heavy rainfall.
- Groundwater flooding - this occurs when water levels below ground (i.e. in soils, sands and gravels or rock formations) rise above surface levels.
- Reservoir flooding and flooding from other infrastructure - Although unlikely, failure of infrastructure such as dams or canals could result in a large volume of water being released quickly.

Taking these potential flood sources in turn:

2.2 River Flooding. The SEPA Indicative River and Coastal Flood Map (Scotland) published in 2006, broadly defines the area at varying degrees of annual probability of flooding: 1:100, 1:200 and 1:1000. The notation refers to the chance of flooding happening over a time period of one year – another way of expressing it as a percentage probability. For the probabilities set out above the risk of flooding over a period of 1 year are 1%, 0.5% and 0.1% respectively. These parameters allow decisions to be made with reference to the risk framework set out in Scottish Planning Policy (SPP) – set out in Appendix 2.

2.3 The Indicative River and Coastal Flood Map (Scotland) (or IRCFM) is just that – indicative. The IRCFM has been produced following a consistent, nationally applied methodology for catchment areas equal to or greater than 3km<sup>2</sup> using a Digital Terrain Model (DTM) to define river cross sections and low lying coastal land. The outlines do not account for flooding arising from sources such as surface water runoff, surcharged culverts or drainage systems. The methodology was not designed to quantify the impacts of factors such as flood alleviation measures, buildings and transport infrastructure on flood conveyance and storage. . The IRCFM is not a substitute for a Flood Risk

Assessment, but it is useful for indicating where flood risk may be a concern, and where further study may be required. The IRCFM used climate inputs based on the observed position when it was produced: it does not include an allowance for future climate change. This matter is considered further in the section on climate change below.

2.4 The IRCFM is used to indicate where flooding may pose a problem, and is often a trigger for further investigation, including a full Flood Risk Assessment (FRA). The SEPA –Planning Authority Protocol (Policy 41) contains principles to be followed by SEPA and planning authorities regarding advice and consultation on flood risk issues. The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 require that planning authorities must, before determining an application for planning permission for development, consult with SEPA where the development is likely to result in a material increase in the number of buildings at risk of being damaged by flooding (Schedule 5.1(1)). The SEPA paper, Technical Flood Risk Guidance for Stakeholders, considers different types of FRA methodology and what information SEPA requires to be submitted as part of an FRA. The extent of the indicative flood risk zones may increase over time if, as predicted, climate change induces more intensive rainfall, so there is a potential gap arising from use of the current IRCFM. Future SFRA's may benefit from any revision to the IRCFM which takes future climate change impacts into account (set out in Table 1, below).

2.5 SEPA has prepared an assessment of candidate development sites being considered for inclusion in the preferred development strategy of the Main Issues Report (MIR): this represents their best available knowledge, and is most developed with regard to river flooding. Section 7 of this SFRA, considers site specific matters.

2.6 Midlothian Council has commissioned no flood risk mapping for rivers. It logs flood incidents in its area as part of its responsibilities under flood prevention legislation. A summary of all events recorded in the Council's biennial flooding reports is set out in Appendix 1. Most of these incidents relate to surface water flooding, but have also arisen from temporary obstructions in small watercourses, particularly where they run through culverts. The Council's flood prevention work has been focussed on repair and maintenance, de-sedimentation, and fitment of screens to assist in avoiding future incidents. The existing local plan (Midlothian Local Plan 2008) contains detailed development policies relating to wayleaves around watercourses to aid maintenance, and the Council will review these, to ensure they meet current best practice. The Council has replaced culverts with new pipes and enhanced localised drainage capacity to remedy identified flood problems. The work to produce the Forth Estuary Local Flood Risk Management Plan (LFRMP) may generate additional information on river flooding, which will inform future SFRA's (more background on LFRMP's is set out in Section 8).

2.7 Where development raises flood risk concerns, a Flood Risk Assessment (FRA) is required. The coverage of these is haphazard, reflecting the distribution of previous development proposals. These can be of use for the SFRA, where one has been carried out at or near a

location that is the subject of continuing interest in the MLDP process. Where the Council has additional information in respect of a site, this is indicated in the site assessment section (7). Appendix 3 contains a summary of FRA activity.

2.8 Surface water (pluvial) flooding. Surface water flooding can occur where rainfall overwhelms local drain systems: this form of flooding can be particularly exacerbated by the topography, where rainfall runs off steeply sloping ground before it can be absorbed. Most of the incidents logged in Appendix 1 are remote from watercourses, and are the result of surface water flooding. Surface water flooding is often caused by temporary and localised obstructions in the drainage system and can be resolved by maintenance, although redesign to include greater resilience is an alternative solution pursued by the Council (para 2.6 refers).

2.9 SEPA has developed a national pluvial flood map which identifies areas susceptible to surface water flooding, although at present this is not available to local authorities. The national pluvial flood map may be used during the next review period. The impact of pluvial flooding, where known or inferred to be problematic, is considered in the site assessment section. New developments are likely to be accompanied by changes in the landform and the installation of a new drainage system, based on the principles of Sustainable Urban Drainage Systems (SUDS). It is difficult therefore to assess pluvial flooding at the development plan stage, and the emphasis for considering pluvial flooding tends to fall more at the development management phase. The existing local plan (Midlothian Local Plan 2008) contains detailed development policies relating to SUDS, and Midlothian Council will review these, to ensure they meet current best practice.

2.10 Sewer flooding This occurs when combined sewers are overwhelmed by heavy rainfall. Sewer flooding is often closely linked to surface water flooding, and may contain untreated foul water. The discharge of foul water from Combined Sewer Overflows (CSOs) into watercourses is a separate water quality and environment issue, but CSO overflow can further compound the hazard and distress caused by fluvial flooding.

2.11 As with surface water flooding, changes to the drainage system associated with new development mean that the emphasis for considering sewer flooding falls more at the development management phase than the site allocation stage. Scottish Water is a consultee on planning applications, and is a key agency in the development plan process (within the meaning of the Planning etc (Scotland) Act 2006). Scottish Water (the sewer authority) is regulated on environment matters by SEPA, and they are also required to carry out their obligations with regard to the principles of sustainable flood management. Appendix 1 records known incidents of sewer flooding.

2.12 Groundwater flooding. Midlothian Council is not aware of a history of groundwater flooding in Midlothian. SEPA has undertaken an assessment of the causes and potential extent of groundwater flooding. Historically, flooding from groundwater has not been considered a significant hazard in Scotland. Regional screening of areas potentially susceptible to groundwater flooding has been undertaken, and further

pilot hazard assessment work is to be carried out: SEPA has stated that its hydrologists have reviewed groundwater information and deemed it not useful at this stage. This is an area where our knowledge is incomplete, and will be considered further in future SFRAs as further evidence is assembled.

2.13 Reservoir flooding and flooding from other infrastructure. The effects of failures in infrastructure have not been modelled. Under the Reservoirs (Scotland) Act 2011, SEPA will be required to assign a risk designation of either 'high', 'medium' or 'low' to all sites covered by the legislation. These designations will be based on the potential adverse consequences of an uncontrolled release of water and the probability of such a release. SEPA will assist planning authorities to assess the implications of reservoir flood risk. Reservoirs in Midlothian are in sparsely populated rural areas, and not in close proximity to development sites. Future SFRAs may revisit consideration of this type of flooding, as more information becomes available.

2.14 There are high pressure water mains crossing Midlothian, which if breached could cause flooding (and also have potentially hazardous impacts in the vicinity of the breach). For this reason (as well as for maintenance access and to avoid interruption of supply) wayleaves are observed around pipelines, appropriate to the diameter of the pipe. The engagement with SW in planning applications and development plan preparation is designed to ensure that development does not occur in these wayleave locations.

2.15 There are weirs and impoundments on Midlothian's rivers, principally on the North Esk. In most cases these were built to impound water to supply the papermaking mills. This industry has left Midlothian and the weirs are redundant for their original purpose. The removal or amelioration of weirs is an activity supported by a SEPA administered water environment restoration fund (in connection with meeting the objectives of the River Basin Management Plan). The effect of weirs in general on flooding is considered in the Environment Agency for England and Wales (although the legislative framework is different, the issues are common) publication 'River Weirs – Good Practice Guide (W5B-023/HQP)'. Weirs increase depths upstream, and so increase flood risk. Upstream velocities are reduced, with possible impacts on the sediment transporting capacity of the channel: siltation of the channel upstream and trapping of debris may be possible secondary upstream impacts. Downstream turbulence and increased flow velocity may result in the immediate vicinity of the weir, leading to potential increased erosion; but removal of weirs has the effect of steepening the overall water surface slope which can also result in channel bed erosion or damage to river side structures. The specific effects of the impoundments on the North Esk on water flow and flooding has not been studied: these would have to be investigated further, before proposals to remove them are brought forward.

### **3 Information on climate change impacts**

3.1 The SEPA Indicative River and Coastal Flood Map (Scotland) 2006 does not take future climate change into account (only such climate change as had already been exhibited at the time the model was constructed). Although there is no model to indicate the additional extent of

the land across Midlothian that is likely to be at risk of flooding under likely climate change scenarios, SEPA's technical guidance requires climate change to be taken into account in preparing FRAs for individual developments.

3.2 The United Kingdom Climate Change Projections (UKCIP09) represent the best available knowledge of climate change factors. Projections have been prepared based on high, medium and low greenhouse gas emission projections. Projections have been prepared for the 2020s, 2050s and 2080s. Midlothian Council considers it probable that housing and other built development at land allocated in the MLDP will still be in use over the timescale of these long-range projections.

**Table 1. Projected Change in Mean Precipitation, Eastern Scotland, for 2020s, 2050s and 2080s, by season and for different greenhouse gas emission scenarios. Central estimate and range within which precipitation change is very likely\* to fall, under each scenario. Projections are shown as aggregated values for the region, and are relative to a 1961-1990 baseline.**

Decade	2020s			2050s			2080s		
Season	annual	winter	summer	annual	winter	summer	annual	winter	summer
<b>Low emissions scenario</b>	+1% (range -4 to +6%)	+3% (range -4 to +11%)	-5% (range -15 to +7%)	-1% (range -6 to +5%)	+6% (range -2 to +15%)	-11% (range -26 to 6%)	0% (range -5 to +6%)	11% (range +2 to +22%)	-12% (range -27 to 3%)
<b>Medium emissions scenario</b>	0% (range -4 to +5%)	+4% (range -2 to +12%)	-6% (range -17 to +7%)	0% (range -5 to +5%)	+10% (range +1 to +20%)	-13% (range -27 to 1%)	0% (range -6 to +6%)	+12% (range +1 to +25%)	-17% (range -33 to 0%)
<b>High emissions scenario</b>	0% (range -5 to +5%)	+3% (range -4 to +11%)	-4% (range -15 to +8%)	0% (range -6 to +6%)	+10% (range -1 to +20%)	-13% (range -28 to 2%)	0% (range -8 to +9%)	+19% (range +6 to +36%)	-21% (range -40 to -1%)

Source: United Kingdom Climate Impact Programme 2009 projection (UKCIP09)

\* lower figure in range very likely to be exceeded (90% probability), and higher level in range very unlikely to be exceeded (10% probability)

3.3 For the purposes of carrying out FRA, SEPA advise that a +20% value be used for peak river flow and rainfall estimates. This takes into account potential increased winter precipitation up to the 2080s in the high emissions scenario (central projection). Midlothian Council requires that developers follow SEPA guidance when carrying out FRAs (see SEPA document Technical Flood Risk Guidance for Stakeholders).

#### **4 Information on existing flood defences**

4.1 No schemes in Midlothian have been approved under the Flood Prevention (Scotland) Act 1961 or the subsequent Acts – this reflects the relatively low level of flood risk in Midlothian (para 8.4 refers). There are two schemes in Midlothian (Polton Road Bridge Relief and Rullion Road Flood Prevention Scheme) promoted by the Council outside the 1961 Act (source: Scottish Government's Flood Defence Asset Database). Midlothian Council does not hold a comprehensive register of flood defences: particularly those constructed before the 1961 Act. This is an area where our knowledge is incomplete, and future SFRA will try to address this. Users of this SFRA with further information on this topic are invited to contribute their knowledge.

4.2 Mobile, temporary flood defence equipment is maintained for emergency situations, including pallet barriers, sandbags and pumps. The preparation of the LFRMP may lead to systematic survey work and the preparation of such a register. In Midlothian the principal defence has been topography – the river valleys are deeply incised and the need for formal flood defences is much reduced. The Potentially Vulnerable Area (see section 8 for background) information sheets (reference 10/22) note that there are existing defences on the North Esk and a surface water scheme in Penicuik. Some limited 'groundtruthing' has been carried out in connection with this SFRA, and where flood defences have been noted, this is recorded in the sections relating to definition of the flood plain.

4.3 SPP states that development should not take place on land that could otherwise contribute to managing flood risk. This policy may have implications for future LDPs. When the first LFRMP is prepared (2016), it may include proposals with land use implications; in particular the sustainable approach to handling water across a catchment may lead to the creation of upstream water detention areas on lower value agricultural land, potentially remote from the location where the flooding occurs. Undeveloped land in the flood plain also represents a flood management resource.

#### **5 Identification of the functional flood plain**

5.1 The functional flood plain is the area where water is conveyed or stored at times of flood. Scottish Planning Policy defines the functional flood plain for planning purposes as being an area with generally a greater than 0.5% (1:200) probability of flooding in any year. Development on the functional flood plain will not only be at risk itself, but will add to the risk elsewhere. Built development should only take place on functional flood plains where it will not affect the ability of the flood plain to store and convey water. Piecemeal reduction of the flood plain should be avoided because of the cumulative effects of reducing storage capacity.



5.2 One of the requirements of the SFRA, is to define the functional flood plain, and within that definition identify 'built-up' and 'sparsely developed' areas. The SPP risk framework for flooding (set out in Appendix 2) establishes a different approach to development in medium to high risk flood areas, depending on whether the area is built-up or sparsely developed. Within built-up areas, medium to high risk flood zones (defined as those with annual probability of watercourse flooding >0.5%) may be suitable for residential, institutional, commercial and industrial development provided flood prevention measures to the appropriate standard already exist, are under construction or are planned as part of a long term development strategy. When taking flood measures into account to enable new development, these protection measures should relate solely to those formal schemes approved via the Flood Prevention (Scotland) Act 1961 (as amended in 1997), the Flood Prevention and Land Drainage (Scotland) Act 1997 and now, the Flood Risk Management Act 2009. These must be maintained by the flood prevention authority. It should be noted that any informal flood protection measures such as embankments or walls, are not likely to be designed, constructed or maintained to the same standards as formal schemes and therefore be more likely to fail. Paragraph 4.1 refers to formal flood defences in Midlothian. In undeveloped and sparsely developed areas, medium to high risk areas are generally not suitable for additional development, unless it can be demonstrated that such a location is essential for operational purposes (e.g. a water-based recreation development).

5.3 Map 1 identifies the 0.5% probability of flooding area defined in the IRCFM 2006. This is the flood plain (although in Midlothian it is more usually a tightly bounded area at the valley floor). In defining the built-up and sparsely populated elements of the flood plain, the Council proposes to use the definition of the built up area established in its adopted development plan. Those areas where the flood plain coincides with the built up area are shown in orange, the sparsely populated areas outside the settlements are shown in blue. Depending on the sites allocated through the LDP (a process not completely in the Council's control), the coincidence between the flood plain and the built-up area may expand. Future SFRAs may consider revising the definition of the functional flood plain.

5.4 The SPP risk framework only treats built-up areas differently to sparsely populated areas in the cases set out in para 5.2 above. There are at present no flood risk prevention schemes under construction or planned. The IRCFM 2006 does not take into account existing flood defences or other structures (para 2.6 refers). The burden of proof would be on developers in these areas, to demonstrate that formal flood prevention measures to the appropriate standard already exist. Were developers to promote such protection as part of the development, this would have to be considered critically for its effect on the overall storage capacity of the watercourse: for this reason it is likely only to be flood prevention schemes promoted as part of the overall strategy for sustainable flood risk management of the watercourse that are taken into account.

5.5 In order to help 'groundtruth' the IRCFM results, flood risk areas coincident with the built-up area (the orange zones on Map 1) were visited by the Council to ascertain the condition of existing flood defences. The results of these site visits are set out in table 2, below. The

address point dataset was also considered in conjunction with the IRCFM outline to establish the degree of risk across the built-up flood risk zones (as this is based on an indicative flood risk map only, this is only useful to show the relative degree of vulnerability in very broad terms and to assist in drawing up an order of priorities – detailed FRA would be required to establish the risk or otherwise of flooding at a particular property). The relative vulnerability of the proposed built-up flood plain area has been graded by the Council as either low (<= 49 properties in indicative flood risk outline), medium (50-99 properties in indicative flood risk outline), or elevated (100+ properties in indicative flood risk outline).

**Table 2: Condition of the built-up flood plain**

Location	Grid reference	Findings
North Esk at Dalkeith	33276670 to 33306675	<p>Low flood risk. (based on methodology set out in para 5.5).</p> <p>The SQA building has been demolished and residential properties were being erected on the site at the time of site visits (January 2013). This proposal was the subject of flood risk assessment. FRA finds that SQA site not at unacceptable flood risk.</p> <p>The river North Esk represents the northern edge of the settlement boundary. Upstream of the Ironmills Road bridge the settlement is set back from the river on high ground, with the exception of two properties which occupy a lower terrace location. Downstream of the Ironmills bridge the lower terrace opens out and there are significant numbers of buildings in this area (to be augmented by SQA redevelopment referred to above). There are no formal flood defences, but some informal flood defences in this locality – the modern looking development off Ironmills Road in lee of Edinburgh Road bridge has c1m high wall above level of river bank. Downstream of Edinburgh Road the small industrial area has the protection of c1.5m high stone wall. Further downstream of this point it was not possible to gain access to observe presence of flood defences, but the difference in levels between built areas and the river provides protection at this point. The river leaves the built up area and flows through Dalkeith Country Park.</p> <p>The FRA suggests that the flood risk found in the IRCFM is of less concern in practice.</p>
North Esk at Lasswade	33016657 to 33046661	Low flood risk.

		<p>There are no formal flood defences, but some informal flood defences in this locality. On South Bank the raised structure and walls around the Paper Mill restaurant provide some protection (although not sufficient to prevent flooding at this location, Summer 2012). The following West Mill Wynd housing development has low wall (approx 1m height above river bank) to rear. Beyond this point, into the locality of the Kevock Caravan Park, there is some local reinforcement of river banks.</p> <p>The Kevock Caravan Park has Planning Permission in Principle to be redeveloped for housing; an FRA was carried out and a Scottish Government Reporter concluded that although some of the proposed units lay in the flood risk outline, this could be controlled at detailed planning application stage.</p> <p>On north bank there is generally greater difference of levels and more setback of buildings from edge.</p>
North Esk at Auchendinny (also Glencorse Burn)	32486617 to 32556616 and Glencorse Burn at 32546619	<p>Low flood risk. Great difference in ground levels between established built up areas and River North Esk, so in practice unlikely to be problem, at this location.</p> <p>There are no formal flood defences in this locality. Glencorse Burn crosses B7026 at right angles, deeply incised, engineered structures at river bank. Brick retaining wall at south east side of Auchendinny/ Glencorse Burn bridge showing signs of deterioration.</p> <p>Additional sensitive receptors likely to fall within indicative flood risk zone as result of Dalmore Mill redevelopment. Dalmore Mill area is flat site with North Esk on two sides, with less deep incision and difference in levels between developed area and watercourse than at other locations on river. Glencorse Burn crosses east of site, partly under road bridge. This water course appears to have been heavily modified at this location, presumably at time of mill operations. Development is still under construction and not all parts accessible, but no flood defence wall or embankment appears to be being formed behind the substantially completed flats to west of site.</p>
North Esk at Penicuik (including	32326595 & 32376595 to	<p>Elevated flood risk.</p> <p>There are no formal flood defences, but some informal flood defences in this locality. The</p>

Black Burn)	32476609	<p>watercourse has been altered by human intervention in this area as a result of the papermaking industry and former Penicuik Railway. A mill lade, and river banks replaced in places by retaining walls or reinforced by gabions were noted at site visit.</p> <p>Built-up area lies on west side of river, very little development on landward side. Between Eskmill Bridge downstream to Auchendinny, difference in levels gives protection.</p> <p>Area between Peebles Road and Eskmill Bridge contains many sensitive receptors arising from the 1990s Valleyfield and Eskmill Developments.</p> <p>The landform in the Eskmill locality is one of an initial terrace by the river bank, with a further raised terraced area on which the development sits. It is not known if this landform is man-made and informed by earlier assessment work.</p> <p>The Valleyfield development was informed by a FRA in 1994. The FRA found that the flood risk at the Valleyfield site was low based on channel conditions at June 1994. Predicted levels were below bank height for both a 100 year flood (the then design standard) and a recorded 1990 flood (estimated to be a 1:120 event). SEPA guidance on consideration of climate change and elevated rainfall levels in FRAs postdates this assessment.</p> <p>Seems little risk on upper parts of North Esk (upstream of Peebles Road or the Black Burn). Re: Black Burn: Stone walls on back gardens of properties on east side of Black Burn, where difference in levels is less, no protecting structures on west bank, but much greater difference in levels.</p> <p>The flood risk found in the IRCFM appears to be of less concern based on the FRA findings, although standards have changed in the intervening period.</p>
Dean/Cuiken/Loan Burn at Penicuik	32376607 to 32476614	<p>Low flood risk.</p> <p>IRCFM 2006 generated flood risk area commences at emergence from culvert behind Tesco. No additional flood defences noted. Much of this area is vacant and derelict and there may be more</p>

		<p>sensitive receptors in area once redeveloped. There are no formal flood defences in this locality.</p> <p>Beyond Eastfield Farm Road culvert, watercourse enters deep valley behind Beeslack School to enter North Esk thereafter. No additional flood defences noted or appear necessary on this section due to difference in levels.</p> <p>Upstream parts of Loan Burn and tributary Dean &amp; Cuiken Burns run from further back in Penicuik, beyond scope of 2006 IRCFM. These watercourses form amenity areas within the town, with housing set back on higher ground, although Loan Burn is more urbanised and closer to development. Culverts, urban setting and flashy nature of upland streams may pose problems.</p>
Boghall/Bilston Burn at Bilston	32586647 to 32636647	<p>Low flood risk. (note: based on inaccurate IRCFM 2006 plot of watercourse).</p> <p>There are no formal flood defences in this locality. Boghall Burn appears more significant in terms of catchment and volume of waters. There is an extended culvert where it crosses Seafield Road at an oblique angle (approx 70m). Upstream floodwater build-up in the event of a culvert blockage may have implications for MIR Preferred Development Strategy site BN1, (although this may be relieved by overtopping). Burn proceeds through settlement in open cut in tight corridor behind gardens (with limited access to maintenance plant &amp; personnel) to Myrtle Crescent Culvert (c15m length), after which joined by Bilston Burn. Bilston Burn runs through settlement in open cut to Castelaw Culvert (c15m) after which it joins the Boghall Burn. The combined watercourse (called Bilston Burn) runs in shallow incised valley forming amenity area until A701 culvert.</p> <p>The frequency of culverts may give rise to elevated concern in this area. In combination with proposed additional development there may be scope to consider measures to 'de-risk' the watercourses in this settlement.</p>
South Esk at Dalkeith	33346671 to 33396676	<p>Low flood risk.</p> <p>There are no formal flood defences, but some informal flood defences, in this locality. Short length of wall (approximately 20m long, 1m high) next to south bank, starting under Newmills Road. Steepness of valley offers protection. High School site has additional protection as on higher</p>

		<p>escarpment, possibly artificial landform and not reflected in digital terrain model (DTM) used in IRCFM 2006.</p> <p>The Council proposes to carry out an FRA at the former High School site, to inform redevelopment options. This position is supported by SEPA.</p>
Gore Water at Gorebridge	33476611 to 33446612	<p>Low flood risk. (there is also an additional area to east of watercourse allocated for development in the 2008 Midlothian Local Plan)</p> <p>There are no formal flood defences, but some informal flood defences, in this locality. No flood defences atop bank on east side of river. Stone garden walls of varying heights on west bank but these are discontinuous – probably less concern on west bank due to levels and setback of buildings.</p> <p>Redevelopment of Robertson’s Bank (‘Scally’s Yard’) for housing (allocated in 2008 MLP) would potentially increase properties at risk, development may require further flood risk assessment with flood protection if necessary. Earlier Roberstson’s Bank planning application required significant changes to the landform, and these changes should be taken into account in any FRA.</p>
Pittendreich Burn at Bonnyrigg	33176644 to 33196652	<p>Low flood risk.</p> <p>No formal or informal flood defences: burn meanders through new build housing area mostly in open cut, seemingly in natural course, in culvert only at road crossings. This forms part of natural park feature, MC unlikely to support development in this area.</p>
Minor watercourse at Harelaw (nr Millerhill)	33226697 to 33256699	<p>Low flood risk. (area around watercourse allocated for development in 2003 Shawfair Local Plan). Shawfair development will potentially increase properties at risk, but development will be accompanied by new drainage structure for area.</p> <p>It was not possible to access this area fully, due to Borders Rail construction works, but maps and aerial photography indicate that it is a drainage ditch, following man made alignment with lengthy</p>

		culvert under Millerhill rail site, after which point watercourse enters East Lothian.
Minor watercourse at Smeaton	33486686 to 33506690	<p>Low flood risk. (area around watercourse allocated for non –residential development in 2003 Midlothian Local Plan).</p> <p>No formal or informal flood defences. Unnamed burn (possibly Smeaton Burn?) in flat landscape with little natural protection, under bridges (not culverts); no additional flood protection noted.</p> <p>Preferred development strategy proposes to allocate further land in this area for non residential development.</p>
Middleton North Burn at North Middleton	33576587 to 33606590	<p>Low flood risk.</p> <p>No flood defences evident, depth of the cleugh provides good protection.</p>
South Esk at Newbattle (additional sensitive area outwith settlement boundaries)	33316656 to 33266649	<p>Medium flood risk. This area is something of an anomaly as it is outside the built-up area as defined in the development plan for the area, but has the characteristics of a built-up area.</p> <p>No formal flood defences . From Lothianbridge to Newbattle Bridge no additional flood defences atop river bank, although in places top of river bank is higher than land behind and deep trench for much of way behind gives some additional storage should it be overtopped.</p> <p>Pittendreich Burn enters long culvert in amenity land to south west of 1960/70s housing, runs for approximately 200m before exiting to North Esk over stepped glacis. No grill protection on culvert but appears larger diameter than others observed.</p> <p>Downstream of Newbattle Bridge no additional flood defences noted in vicinity of Newbattle College.</p>

5.6 There are no flood defence schemes under construction. The Local Flood Risk Management Plan will set out the long term strategy for flood risk prevention. This will be adopted in 2016. Further work to gauge flood risk with more precision may be carried out as part of the

LFRRMP – some areas where flood risk appeared to be a problem from the IRCFM 2006 have been found to be acceptable upon further assessment. On the North Esk in particular, the morphology of the river has been changed by human activity, and the degree to which these changes can be modelled by the digital terrain model used in the early indicative modelling is uncertain.

5.7 The identification of the functional flood plain may affect a number of community and property interests. SEPA may wish to comment on the proposed separation between built-up and sparsely populated areas, and the overall outline of the flood plain itself, given its knowledge of the limitations of the digital terrain model used to prepare the 1<sup>st</sup> generation IRCFM and any ongoing projects to improve the modelling (for example through LiDAR). Further views on the proposed functional flood plain, may be gathered through the MIR process.

## **6 Identification of drainage issues**

6.1 New build developments are required to incorporate SUDS features. A design parameter of such systems is that the run-off flow rate is no higher in the developed state than in the undeveloped state. Midlothian Council expects to handle this matter on a site by site basis (with adequate supporting policy in the MLDP) through assessment of proposed drainage arrangements at planning application stage.

6.2 While this approach may prevent new development making the situation worse, there is a need to consider existing drainage problems. The involvement of Scottish Water and SEPA as key agencies also provides an opportunity to consider any strategic interventions that would serve multiple sites or address existing problems (for example by retrofitting SUDS features to existing built up areas).

6.3 There are recorded instances of Combined Sewer Overflows (CSOs) discharging into watercourses in Midlothian. These are being addressed through Scottish Water's regulatory regime for the environment, and represent a water quality and environmental health problem rather than a flooding problem (although the impact of flooding is made worse where CSO discharge has occurred). SUDS have been developed at most large new developments in Midlothian since 2005. None has been adopted by Scottish Water.

## **7 Identification of sites or areas constrained by flood risk**

7.1 Midlothian Council has evaluated potential sites for inclusion in the preferred development strategy for the MIR. These sites have, in most cases, been submitted by developer interests. In terms of flooding, SEPA provided comments for each potential MLDP site (this matter is also considered in the sites appraisal matrix in the Development Sites Assessment Technical Note). The sites evaluated would collectively provide significantly more development land than is required by the Strategic Development Plan for Edinburgh and South East Scotland (SESplan), so not all will be required. Table 3 sets out the SESplan requirements for Midlothian (2009-2024).



**Table 3: SESplan requirements, Midlothian**

A701 Corridor	A7/A68/Borders Rail Corridor	South East Edinburgh (Shawfair)
750 houses	1250 houses	450 houses
15ha employment land	10ha employment land	20ha employment land

7.2 The full SEPA flooding response is held by Midlothian Council, and may be viewed on request. **Note that Midlothian Council accepts no liability for any decision made on the basis of information contained in this SFRA.** The tables below give the Council’s overall appraisal in terms of flooding (based largely on interpretation of SEPA’s findings, together with any other pertinent information) in relation to the development sites submitted for assessment by site promoters. In preparing the related ‘Development Sites Assessment Technical Note’ and ‘Environmental Report ‘ where SEPA intimated that it would object to the inclusion of a site in the plan, Midlothian Council gave those sites an overall negative rating in terms of flood risk. Sites where SEPA has objected and requested detailed FRA at an early stage are marked with a ‘?’ within the ‘Development Sites Assessment Technical Note’ and ‘Environmental Report ‘. At other locations where SEPA has requested basic FRA at planning application stage only, Midlothian Council gave the sites an overall positive rating. SEPA has subsequently changed its approach to LDP engagement. It now solely recommends that that an FRA is carried out and does not determine the nature of this. This will be determined through subsequent discussion between interested parties. At other locations, SEPA has not indicated flood problems, but Midlothian Council’s flood incident records have raised concerns, usually in connection with pluvial flooding. Paragraphs 7.4-7.6, 7.8-7.10 and 7.12- 7.14 indicate locations that the Council proposes to include in the MIR preferred development strategy, or put forward as reasonable alternatives, and indicates where more information is required. It should be noted that the decision on whether to include a site in the preferred development strategy is not taken on assessment of flooding matters alone, and users of the SFRA are referred to the MIR and the Development Sites Assessment Technical Note for further information.

7.3 **A701 Corridor.** The North Esk river system crosses the corridor, usually in deep valleys and with little flooding impact on the settlements, which are situated on higher ground. Some smaller tributaries have an impact on the built up area. There is potential for surface water flooding, especially from run-off from the slopes of the Pentland Hills, although there is limited scope for development in that locality. There have been multiple incidents recorded in the log of flooding events in this corridor (Appendix 1), usually due to localised drainage problems.

**Table 4: Flood Risk at Development Sites in the A701 Corridor (sites expected to be developed predominantly for housing shown with white background).**

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
A1 (a and b)	Auchendinny	250	SEPA does not object. A small part of A1(b) may be at risk of flooding, based on IRCFM: SEPA recommend FRA, the nature of which to be determined in consultation with consultants, developers and other interested parties (see para 7.2 above). SEPA states that there are no formal flood defences present.	Following site visit, in MC view unlikely to be fluvial flood problem at (b) given difference in levels. The apparent small overlap between development boundary and flood risk outline may be a function of the margin of error in definition of flood risk zone and in digitisation of site boundaries. Historic (2005) record of surface water flooding at bridge, but unlikely to affect site due to change in levels.	FRA likely to be required for A1(b).
A2	Auchendinny Estate	Not Known	Part of site within/adjacent to the IRCFM flood risk zone, there are also small watercourses running through the site. SEPA consider that FRA is required, but do not seek removal from plan. If allocated, SEPA consider that a developer requirement to carry out a flood risk assessment (or requirement not to build in the functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA states that there are no formal flood defences apparent.		FRA required (If developed for low density rural housing may be more potential to avoid risk areas).

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
BN1	Seafield Road, Phase II	550	<p>SEPA objects on flood risk grounds, but may remove objection with further information, or if the LDP notes that not all of the site may be available for development. SEPA advise that the flood map (IRCFM 2006) envelope is incorrect here. There is also a small, unmapped watercourse, running partly in culvert.</p> <p>FRA will be required to define the area at risk of flooding, appropriate detailed design layout and levels.</p> <p>SEPA states that there are no formal flood defences present.</p>	<p>MC site visit: noted watercourse to south. This crosses road at oblique angle so length of culvert approximately 60m. Potential housing site is on gentle slope, and this reduces risk stemming from blockage. Confirmed SEPA statement that course of burn in Bilston settlement is inaccurate in IRCFM: there is potentially larger coterminous zone between this site and Bilston Burn flood risk zone, based on correct alignment. SEPA reference to unmapped watercourse (in the sense that small catchment and not flood-mapped) presumably refers to drainage ditch running beneath Seafield Moor Road (SMR) and running north westerly (eventually to form Pentland Burn). Culvert beneath SMR may give rise to problems – further assessment required. Historic record of flooding on Seafield Moor Road, but location not recorded precisely.</p>	FRA required

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
BN2	Seafield Mill	40	SEPA objects on flood risk grounds, but may remove objection with further information, or if the LDP notes that not all of the site may be available for development. Part of site within/adjacent to the IRCFM flood risk zone. Boghall Burn is culverted adjacent to the development site which may exacerbate the flood risk to site. FRA will be required to define the area at risk of flooding, appropriate detailed design layout and levels. SEPA states that there are no formal flood defences present.	Historic record of flooding on Seafield Moor Road, but location not recorded precisely.	FRA required
BN3	Pentland Plants	50	No apparent flood risk		
BN4	Easter Bush	18.2 ha	SEPA does not object but raises concerns that there is potential for development in this location to increase the probability of flooding elsewhere. There are a number of small watercourses (<3km <sup>2</sup> catchment, so not modelled in IRCFM) in the site boundary. FRA required. SEPA state that there are no known flood defences at the site.		FRA required

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
BT1	Easter Bush North	6.4 ha	Not assessed	Minor watercourses, tributaries of Bilston Burn run in open channels around site. Relatively little change of levels, would need to consider sensitivity of final uses and FRA may be required.	FRA likely to be required
BT2	Easter Bush South	5.8 ha	Not assessed	Minor watercourse, Bilston Burn, runs in open channels to north of site. Relatively little change of levels, would need to consider sensitivity of final uses and FRA may be required.	FRA likely to be required
BT3	Technopole North West	2.2 ha	Not assessed	No watercourses close to site, land steeply slopes to west (Pentland Hills) and may elevate pluvial flooding risk.	
LD1	West Straiton	60.1 ha	No apparent flood risk		
LD2	Hunter Avenue	TBC	There is a small catchment watercourse in the locality of the development. SEPA recommend that FRA is carried out, but do not seek removal from plan. If allocated, SEPA consider that a developer requirement to carry out a flood risk assessment (or requirement not to build in the functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA		FRA required

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			states that there are no formal flood defences apparent.		
LD3	Burghlee	175	No apparent flood risk		
LD4	Ashgrove North	11.5 ha	No apparent flood risk		
LD5	Straiton Road	2.9 ha	No problem identified or further assessment requested		
LD6	Dansco (developed site to rear of Asda)	1.78 ha	No problem identified or further assessment requested		
P1a	Glencorse Mains(a)	120	No apparent flood risk		
P1b	Glencorse Mains (b)	105	No apparent flood risk		
P1c	Glencorse Mains(c)	150	No apparent flood risk		
RN1	Penicuik Road South, Roslin	150	No apparent flood risk		
RN2	Dryden Farm	235	No apparent flood risk		
RN3	Roslin Expansion(1)	100	No apparent flood risk		
RN4 (economic)	Oatslie Expansion	4.5 ha	No apparent flood risk		

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
RN5	Roslin Institute	180	No apparent flood risk		
RN6	Roslin Expansion(2)	160	No apparent flood risk		
RN7	West of Roslin Institute site	120	SEPA does not object, but notes that there is a small watercourse along the FRA required. SEPA state that there are no known flood defences at the site.		FRA required
VR3 Mixed use (non- housing)	Lothianburn	12.6 ha	FRA recommended, but SEPA do not object. Small watercourse (catchment <3km <sup>2</sup> ) noted at site. SEPA state that there are no known flood defences at the site.		FRA required
VR6	Walltower Farm, Howgate	170	SEPA objects on flood risk grounds, but may remove objection with further information, or if the LDP notes that not all of the site may be available for development. FRA will be required to define the area at risk of flooding, appropriate detailed design layout and levels. Not in IRCFM flood risk zone. Small watercourse (catchment <3km <sup>2</sup> ) noted at site. SEPA state that there are no known flood defences at the site.	Local authority record of flood incidents and ongoing risk around A6094 at Leadburn tributary, and surface water flooding around Howgate Road.	FRA required
VR9	Springfield	32	Small field drains along boundary of site. SEPA recommend that FRA is		FRA required

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			carried out, but do not seek removal from plan. If allocated, SEPA consider that a developer requirement to carry out a flood risk assessment (or requirement not to build in the functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA states that there are no formal flood defences apparent.		

#### 7.4 MLDP MIR preferred strategy for A701 Corridor:

BN1, Seafield Road, phase II, 320 units with potential for further expansion. SEPA objects on flood risk grounds, but may remove objection with further information, or if the LDP notes that not all of the site may be available for development. Inclusion of this site in the strategy carries a risk that the site may be undeliverable or not generate the expected number of units. While it may be difficult to carry out a detailed FRA when the site layout is not known, it would inform consideration of this site at Proposed Plan stage if early attention was paid to gaining better understanding of flooding matters. The site has sufficient land for 550 units at 15 units/ha, so there is potential to draw back from higher risk areas. **More information required.**

RN5, Roslin Institute, 180-200 units, no flooding problems apparent.

RN3, Roslin Expansion (1), 100 units, no flooding problems apparent.

RN6, Roslin Expansion (2), 160 units, no flooding problems apparent.

LD1, West Straiton, 60.1ha (mixed use, including: retail, commercial leisure, hotel, economic uses, possibly housing), no flooding problems apparent.

LD4, Ashgrove North, 11.5ha (economic land), no flooding problems apparent.

RN4, Oatslie, 4.5ha (economic land), no flooding problems apparent.

BT1, Easter Bush North, 6.4ha (economic land), small watercourses around site. **More information required.**

BT2, Easter Bush South, 5.8ha (economic land), small watercourses around site. **More information required.**

BT3, Technopole North West, 2.2ha (economic land), no flooding problems apparent, although SEPA have not commented on this site.



### 7.5 Alternative sites, A701 Corridor.

Midlothian Council is required where possible to identify 'reasonable alternatives' for comparison purposes, under the Environment Assessment (Scotland) Act 2005.

A1a, Auchendinny, 250 units. No flooding problems apparent.

### 7.6 Additional development opportunities, A701 Corridor.

These are additional sites, providing development in addition to the SESplan requirements, that the Council may support. These are sites where the Council is content in principle for development to take place, but has doubts about the likelihood of their deliverability, and hence they are not relied upon to meet the SESplan requirements.

BN3, Pentland Plants, by Bilston, 50 units. No flooding problems apparent.

LD2, Hunter Avenue/ Foundry Lane, Loanhead, (economic land, area not determined), there is a small watercourse in the locality of the development. **More information required.**

LD3, Burghlee, Loanhead, 175 units. No flooding problems apparent.

### 7.7 A7/A68/Borders Rail Corridor

The River North Esk bounds the corridor to the west. The River South Esk and its tributaries roughly parallel the A7 and Borders Railway in the centre of the corridor. To the east the Tyne and its tributaries, which rise in the northern Moorfoots or the southern side of the Tranent ridge, flow out of the corridor towards East Lothian, crossing the line of the A68. The Tranent Ridge is a prominent topographical feature in this corridor: the ridge runs in an arc from south west to north east (from Gorebridge and on to Tranent) and creates some steep slopes in vicinity to existing and potential development areas (particularly around Gorebridge and Mayfield) which may give rise to pluvial flooding. There have been multiple incidents recorded in the log of flooding events in this corridor (Appendix 1), usually due to localised drainage problems.

**Table 5: Flood Risk at Development Sites in the A7/A68/Borders Rail corridor (sites expected to be developed predominantly housing shown with white background).**

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
BG1	Broomie- knowe, Bonnyrigg	50-60	No apparent flood risk		

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
BG2	Dalhousie Mains, Bonnyrigg	240	SEPA objects on flood risk grounds, but may remove objection with further information, or if the LDP notes that not all of the site may be available for development. Part of site within/adjacent to the IRCFM flood risk zone. A small (<3km <sup>2</sup> catchment) burn runs past the SW of the site. A small watercourse may have been historically straightened through site. SEPA recommend that any culverted watercourse is opened up if possible, and that no building takes place over culverts. FRA will be required to define the area at risk of flooding, appropriate detailed design layout and levels. SEPA state that there are no known flood defences at the site.	MC site visit. Pittendriech Burn is deeply incised, steep slope on southern edge, shallower on north. If development keeps back from top of slope this would reduce risk. Burn enters culvert of approx 70m length under A7 beyond sewage works, but would seem more likely to overtop road than affect BG2 in event of blockage. Minor tributary burn joins Pittendriech Burn from north – culvert more extensive than indicated on maps: starts around Gladstones Gait. Also badly drained area on top of presumed line of culvert behind Harmony Crescent, although this may be a swale formed in connection with Bairds Way development. Series of overflows noted near north end of Harmony Crescent which issue on to swale.	FRA required
BG3	Dalhousie South, Bonnyrigg	290	No apparent flood risk		
BG4	Midfield, Bonnyrigg	400	No apparent flood risk		

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
BG5	Hopefield Farm 2, Bonnyrigg	1000	SEPA objects on flood risk grounds, but may remove objection with further information, or if the LDP notes that not all of the site may be available for development. A small watercourse is noted in the site: this may have been historically straightened; SEPA recommend that any culverted watercourse is opened up if possible, and that no building takes place over culverts. FRA required, and depending on findings this may restrict the options for development. SEPA state that there are no known flood defences at the site.	Any FRA work in connection with the committed adjacent Hopefield site may be of use. Allocation to meet SESplan requirements considerably less than notional site capacity, so scope to adjust layout, avoiding flood risk areas. site visit: Pittendriech Burn flows through site –may be affected by any blockage at culvert in Hopefield area. Minor tributary burn entering Pittendriech from north not straightened and is in valley (2-5m deep).	FRA required
BG6	Former Melville Landfill Site	45.2 ha	SEPA does not object on flood risk grounds, but notes small watercourse at site, which may have been historically straightened. FRA required stage, the nature of the economic uses proposed, will be relevant to the level of detail of the assessment. SEPA state that there are no known flood defences at the site.	Imprecise record of flooding on Lasswade Road, October 2008. Record of flooding on Wadingburn Road and ongoing risk identified in Midlothian Council Biennial Report.	FRA required
BG7	Melville Dykes Road	15	No apparent flood risk		
BG8	Wadingburn Lane	2.05 ha	Small watercourses along edge of site, SEPA recommend that FRA is carried out, but do not seek removal from plan.	Imprecise record of flooding on Lasswade Road, October 2008.	FRA required

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			<p>If allocated, SEPA consider that a developer requirement to carry out a flood risk assessment (or requirement not to build in the functional flood plain) is required. Without these guarantees, SEPA may object. SEPA states that there are no formal flood defences apparent.</p> <p>Comments on culverting of burn running through the site and requirement for 6m buffer</p>		
BG9	Polton House Industrial Estate	1.34 ha	No problem identified or further assessment requested		
BG10	Polton Road	1.62 ha	No problem identified or further assessment requested		
D1a	Salter's Park Extension, Dalkeith (closest to Salter's Road)	12 ha	SEPA does not object on flood risk grounds, but notes small watercourse between D1a and D1b. FRA will be required and depending on the nature of the economic uses proposed, more detailed assessment may be appropriate. SEPA state that there are no known flood defences at the site.		FRA required
D1a HOU	Salter's Park Extension HOUSING ALTERNATIVE	12 ha	As above, SEPA does not object on flood risk grounds, but notes small watercourse between D1a and D1b. FRA will be required.		FRA required

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
D1b	Salter's Park Extension (mid site)	14 ha	SEPA does not object on flood risk grounds, but notes small watercourse between D1a and D1b. FRA will be required, the level of detail is dependent, among other things, on the nature of the economic uses proposed. Potential development of allocation could increase the probability of flooding elsewhere. SEPA state that there are no known flood defences at the site.		FRA required
D1c	Salter's Park Extension (most easterly)	10.5	SEPA does not object on flood risk grounds, but notes small watercourse between D1a and D1b. FRA will be required, the level of detail is dependent, among other things, on the nature of the economic uses proposed. SEPA state that there are no known flood defences at the site.		FRA required.
D1d	Salter's Park committed economic area (assessment of conversion to housing)	17.5	A small watercourse is noted at this site, which may have been straightened and would benefit from remediation. Part of the site in the IRCFM flood risk zone. SEPA recommend that FRA is carried out, but do not seek removal from plan. If allocated, SEPA consider that a developer requirement to carry out a flood risk assessment (or		FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			requirement not to build in the functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA states that there are no formal flood defences apparent.		
D2a	East of Wester Cowden (west)	180	No apparent flood risk		
D2b	East of Wester Cowden (mid)	180	No apparent flood risk		
D2c	East of Wester Cowden (east)	170	No apparent flood risk		
D3	Kingsgate, Newbattle	70	SEPA would object to housing allocation at this site in principle, and seek its removal from process. Half of site is within IRCFM 2006 indicative flood risk area, and its development would result in loss of storage which could exacerbate flooding elsewhere. SEPA state that there are no known flood defences at the site.		Given the nature of SEPA's comments, the Council does not consider that this location can be taken further forward in the MLDP process

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
D4	Newbattle Abbey Crescent	60	SEPA objects on flood risk grounds, but may remove objection with further information, or if MLDP notes that not all of site may be available for development. Part of site is within IRCFM 2006 indicative flood risk zone, small watercourse (lade) noted. Partially culverted Pittendriech Burn runs through site. SEPA recommend that culverts are investigated to establish potential for restoration and that no building takes place over culvert. FRA will be required to define area at risk of flooding, appropriate detailed design layout and levels. SEPA state that there are no known flood defences at the site.	Past record of flooding immediately upstream of the privately owned 'Bow and Arrow' bridge due to debris build-up. Raises concerns about flooding in locality of this site.	FRA required.
D5	Hardengreen 1	60	No apparent flood risk		
D6	Hardengreen 2	40	No apparent flood risk		
D7	Larkfield SW	45	A small culverted watercourse is noted at this site. SEPA recommend that FRA is carried out, but do not object. SEPA recommend that culverts are investigated to establish potential for restoration and that no building takes place over culvert.		FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			SEPA state that there are no known flood defences at the site.		
D8	Larkfield West, Eskbank	60	No apparent flood risk		
D9	South Sheriffhall	10.8 ha	SEPA are likely to object to the allocation of this site for development, in principle, and seek its removal from process. Middle of site is in IRCFM 2006 indicative flood risk area, and its development would result in loss of storage which could exacerbate flooding elsewhere. SEPA state that there are no known flood defences at the site.		Given the nature of SEPA's comments, the Council does not consider that this location can be taken further forward in the MLDP process
D10	Langside Head	8.6 ha	There is a small watercourse along southern edge and SEPA recommend FRA is carried out, but do not object. SEPA state that there are no known flood defences at the site.		FRA required.
D11	Newbattle Abbey College	40.16ha	SEPA note proximity of South Esk, and that part of site is in IRCFM flood risk zone (on right bank of river there is protection from difference in levels). Presence of multiple small watercourses noted. SEPA recommend that FRA is carried out, but do not seek removal from plan. If	On left bank of river there is little protection afforded by difference in levels.	FRA required.



Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			allocated, SEPA consider that a developer requirement to carry out FRA (or requirement not to build in the functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA state that there are no known flood defences at the site.		
D12	Lugton House Garden	1 unit	No problem identified or further assessment requested		
D13	Dalkeith Country Park	TBC	SEPA note presence of multiple small watercourses at site. SEPA recommend that FRA is carried out, but do not seek removal from plan. Level of FRA depends on nature of allocation, and precise location. If allocated, SEPA consider that a developer requirement to carry out FRA (or requirement not to build in functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA state that there are no apparent flood defences at the site.		FRA required.
D14	Melville Cottages	1	No SEPA comments.	In Midlothian Council view, likely not to be at risk of flooding or cause flooding elsewhere: no	

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
				record of flooding in vicinity and at some distance from nearest watercourse	
D15	Site E2 (Sherrifhall) in adopted plan, removal of Green Belt status, intensified economic development	4.29 ha	No SEPA comment as site already allocated for economic development. Flood risk matters would be considered at development management stage.	Appears to be acceptable, outwith IRCFM flood risk zone and no small watercourses noted or incidents recorded	
E1	Kippielaw, Easthouses	60-70	No apparent flood risk		
E2	Easthouses (Lothian Estates/ Clarendon site)	150	No problem identified or further assessment requested	Nearby Lawfield PS suffered flooding from run-off from fields in Autumn 2012 (reported Midlothian Advertiser). Pluvial run-off is a factor to be considered in developments on steep sided edge of Tranent Ridge.	Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – nature of this would be for discussion between interested stakeholders.
G1	Redheugh West (Redheugh phase 2)	600	SEPA recommend that FRA is carried out, but do not object. A small portion of the site lies in 1:200 IRCFM 2006 flood risk zone, and small watercourse	Significant difference in levels with South Esk. Small watercourse in site is more in nature of a field drain, and may kept as natural	FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			is observed running through site. SEPA state that there are no known flood defences at the site.	feature (as at development at Baird's Way, Bonnyrigg). This could be incorporated into new drainage system/SUDS.	
G2a	Monteith House Farm (a)	310	No apparent flood risk		
G2b	Monteith House Farm (b)	665	No apparent flood risk	.	
G3	Harvieston Mains	100	No apparent flood risk	Flood incident recorded on A7 at Harvieston Mains (January 2008), cause not stated.	
G4	Greenside	75	SEPA recommend FRA is carried out, as presence of small watercourse noted, but no objection in principle. SEPA state that there are no known flood defences at the site.		FRA required.
G5	Stobs Farm 2, Gorebridge	180	No apparent flood risk	Surface water run-off from existing Stobhill site was identified as causing a flooding problem on Lady Brae – now rectified. This suggests that pluvial flooding may need to be considered if G5, G6, G7 or G10 is developed.	Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – nature of this would be for discussion between interested stakeholders.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
G6	Stobs Farm 3, Gorebridge	300	SEPA recommend basic FRA at planning application stage, as presence of small watercourse noted, although SEPA does not object. SEPA state that there are no known flood defences at the site.	Surface water run-off from existing Stobhill site was identified as causing a flooding problem on Lady Brae – now rectified. This suggests that pluvial flooding may need to be considered if G5, G6, G7 or G10 is developed.	Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – nature of this would be for discussion between interested stakeholders
G7	Millstone Brow	4.2 ha (housing)	No apparent flood risk	Surface water run-off from existing Stobhill site was identified as causing a flooding problem on Lady Brae – now rectified. This suggests that pluvial flooding may need to be considered if G5, G6, G7 or G10 is developed.	Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – nature of this would be for discussion between interested stakeholders
G8	Haughhead	140	SEPA objects on flood risk grounds, but may remove objection with further information, or if MLDP notes that not all of site may be available for development; objection based on presence of small culverted watercourses at each boundary of site. FRA required. SEPA state that there		FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			are no known flood defences at the site.		
G9	Greenhall Centre	30-40	No apparent flood risk		
G10	Millstone Brow	c.4ha (housing)	No SEPA comments	Site is expanded version of G7 – extra field plus brownfield element. Surface water run-off from existing Stobhill site was identified as causing a flooding problem on Lady Brae – now rectified. This suggests that pluvial flooding may need to be considered if G5, G6, G7 or G10 are developed.	Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – the nature of this would be a matter for discussion between interested stakeholders.
G11	Brewers Bush	c.5	SEPA note presence of small culverted watercourse on boundary. SEPA recommend that, depending on location of development, an FRA be carried out. SEPA recommend opening up culvert provided it does not increase risk elsewhere and no development should take place above culvert if it is retained. SEPA state that there are no apparent defences at the site.		FRA required.
M1	SE Mayfield	40	SEPA recommend FRA is carried out, but no objection in principle. Small watercourse in culvert noted along western boundary. SEPA recommend	As with E1. Recorded flood incidents in Mayfield noted in Council's flood record.	FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			investigation of potential to open up culvert and that no development should take place above culvert. SEPA state that there are no known flood defences at the site.		
M2	Unit 1 Mayfield Industrial Estate	30	No apparent flood risk		
NE1	Newbattle Home Farm	180	SEPA recommend that FRA is carried out, but no objection in principle. Small watercourse noted in vicinity of site. SEPA state that there are no known flood defences at the site.	Imprecise record of flooding on The Beeches, January 2008.	FRA required.
NE2	Newbattle Home Farm West	90	SEPA recommend that FRA is carried out at planning application stage, but no objection in principle. Small watercourse noted in vicinity of site. SEPA state that there are no known flood defences at the site.		FRA required.
NE3	Newbattle Galadale	145	No apparent flood risk	Imprecise record of flooding on The Beeches, January 2008.	
NE4	Newbattle Campbell Park	275	SEPA recommend that FRA is carried out but no objection in principle. Small watercourse in culvert noted at site. SEPA recommend investigation of potential to open up culvert and that no development should take place above	Flood risk identified where Ochre Burn enters pipe to south of Beeches junction, and log of flood incidents records problems at this location (Appendix 1) – may cause problem at extreme NW corner of	FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			culvert. SEPA state that there are no known flood defences at the site.	NE4 (very small proportion of site affected).	
NE5	Newbattle Home Farm – Lady Lothian broader site	c300	Assessment of flood risk required, as small watercourse crosses site, including in culvert in proximity to site. Adjacent to IRCFM flood risk area, but unlikely to flood due to difference in levels. If allocated, SEPA consider that developer requirement to carry out FRA (or requirement not to build in functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA state that there are no apparent defences at the site.	MC flood records note incidents and ongoing risk in locality of Ochre Burn.	FRA required.
NE6	Newbattle Glebe (The Beeches)	c70	No problem identified or further assessment requested	Imprecise record of flooding on The Beeches, January 2008.	
R1	Rosewell North	60-100	No apparent flood risk		
R2	St Joseph's Drive	250	SEPA recommend FRA is carried out. Small encroachments of site boundaries into flood zone identified in the 2006 IRCFM. SEPA state that there are no known flood defences at the site.		FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
R3	Thornton Road North	100	FRA required. Small encroachments of site boundaries into flood zone identified in 2006 IRCFM. SEPA state that there are no known flood defences at the site.	Imprecise record of flooding on Carnethie Street, January 2005. May be an issue with digitisation	FRA required.
R4	Parkneuk West	165	FRA required. Small encroachments of site boundaries into flood zone identified in 2006 IRCFM. SEPA state that there are no known flood defences at the site.	Imprecise record of flooding on Carnethie Street, January 2005.	FRA required.
R5	Thornton Road South	50	FRA required. Small encroachments of site boundaries into flood zone identified in 2006 IRCFM. SEPA state that there are no known flood defences at the site.	Imprecise record of flooding on Carnethie Street, January 2005.	FRA required.
R6	Rosedale	200	FRA required. Small encroachments of site boundaries into flood zone identified in 2006 IRCFM. SEPA state that there are no known flood defences at the site.		FRA required.
R7	Rosewell South West	185	FRA required. Small encroachments of site boundaries into flood zone identified in 2006 IRCFM. SEPA state that there are no known flood defences at the site.		FRA required.
VR1	Tynehead new settlement	5000	SEPA objects on flood risk grounds, but may remove objection with further information, or if MLDP notes that not		FRA required.



Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			all of site may be available for development. Part of site within or adjacent to flood risk zone identified in 2006 IRCFM. Small watercourses noted on site. FRA required. SEPA state that there are no known flood defences at the site.		
VR2	Carrington	10	No apparent flood risk		
VR4	Dewarton, land west of Main Street	15-20	SEPA objects on flood risk grounds, but may remove objection with further information, or if MLDP notes that not all of site may be available for development. Small watercourse, thought to be partially culverted runs through nearby properties. SEPA recommend investigation of potential to open up culvert and that no development should take place above culvert. FRA required to define area at risk of flooding, appropriate detailed design layout and levels. SEPA state that there are no known flood defences at the site.	Flood record at Dewarton, July 2009, but cause and precise location not recorded.	FRA required.
VR5	Fordel – MIXED USE	3.2 ha	FRA required. Small watercourse noted at site. SEPA state that there are no known flood defences at the site.		FRA required.
VR7	Rosslynlee Hospital	120	Small watercourses along edge of site, SEPA recommend that FRA is carried		FRA required.

Site Ref	Site Name	Capacity (houses/ hectares(ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
			out, but do not seek removal from plan. If allocated, SEPA consider that developer requirement to carry out FRA (or requirement not to build in functional flood plain) is required. Without these guarantees, SEPA may object at Proposed Plan stage. SEPA states that there are no formal flood defences apparent.		
VR8	Whitehill	3.1 ha (housing)	No problem identified or further assessment requested		

#### 7.8 MLDP MIR preferred strategy for A7/ A68/ Borders Rail Corridor:

G1, Redheugh West, Gorebridge, 400 units with capacity for further extension of 200 units. SEPA does not object on flood risk grounds, but advises further assessment of flood risk, including FRA. **More information required.**

G9, Greenhall Centre, 30-50 units. No flooding problems apparent.

BG1, Broomieknowe, Bonnyrigg, 50-60 units. No flooding problems apparent.

BG2, Dalhousie Mains, Bonnyrigg, 240 units. SEPA objects on flood risk grounds, but may remove objection with further information, or if the MLDP notes that not all of the site may be available for development. Inclusion of this site in the strategy carries a risk that the site may be undeliverable or not generate the expected number of units. While it may be difficult to carry out a detailed FRA when the site layout is not known, it would inform consideration of this site at Proposed Plan stage if early attention was paid to gaining better understanding of flooding matters. **More information required.**

BG3, Dalhousie South, Bonnyrigg, 290 units. No flooding problems apparent.

D8, Larkfield West, Dalkeith, 60 units. No flooding problems apparent.

E1, Kippielaw, Easthouses, 60-70 units. No flooding problems apparent.

R1, Rosewell North, 60-100 units. No flooding problems apparent.

R3, Thornton Road North, Rosewell, 100 units. Slight overlap between site boundary and 1:200 flood risk outline. It may be possible to draw site back from the flood risk zone, and achieve workable layout which generates requisite number of units. **More information required.**

R5, Thornton Road South, Rosewell, 50 units. Slight overlap between site boundary and 1:200 flood risk outline. It may be possible to draw site back from the flood risk zone, and achieve workable layout which generates requisite number of units. **More information required.**

D1a, Salters Park Extension, Dalkeith, 12.0 ha (economic site). SEPA does not object on flood risk grounds, but advises further assessment of flood risk, level of scrutiny depends in part on nature of economic uses proposed. **More information required.**

#### 7.9 **Alternative sites, A7/A68/Borders Rail Corridor.**

Midlothian Council is required where possible to identify 'reasonable alternatives' for comparison purposes, under the Environment Assessment (Scotland) Act 2005.

G5, Stobs Farm 2, Gorebridge, 180 units. No flooding problems apparent. Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – the nature of this would be for discussion between interested stakeholders.

BG5, Hopefield Farm 2, Bonnyrigg, 450 units with capacity for extension by 300 units. SEPA objects on flood risk grounds, but may remove objection with further information, or if the MLDP noted that not all of the site may be available for development. Inclusion of this site in the strategy would carry a risk that the site may be undeliverable or not generate the expected number of units. While it may be difficult to carry out a detailed FRA when the site layout is not known, it would inform further consideration of the site. **More information required**

#### 7.10 **Additional development opportunities, A7/A68/Borders Rail Corridor.**

VR7, Rosslynlee Hospital, 120 units. SEPA advises that further assessment of flood risk is required. **More information required**

7.11 **South East Edinburgh (Shawfair).** Several burns, sometimes in culverts, cross this undulating area which is the subject of extensive committed development proposals, in addition to potential further growth through the MLDP. Development proposals will see the majority of this area become built-up, and the efficiency of the new drainage system will influence the future flooding regime in the area. Past biennial flood reports have referred to the rising water table in the area caused by closure of local coal mines. There have been some incidents recorded in the log of flooding events in this corridor (Appendix 1), exacerbated by groundwater drainage problems.

**Table 6: Flood risk at development sites in the South East Edinburgh (Shawfair) area: housing or sites expected to be predominantly housing shown with white background.**

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
S1	Cauldcoats Farm	55 ha	SEPA objects on flood risk grounds, but may remove objection with further information, or if MLDP notes that not all of site may be available for development. Part of site within or adjacent to flood risk zone identified in 2006 IRCFM. FRA will be required to define area at risk of flooding, appropriate detailed design layout and levels. SEPA state that there are no known flood defences at the site.		FRA required.
S2	Newton Farm	700	SEPA recommend that FRA is carried out. Small watercourse noted at Newton House, and likely to be in culvert. SEPA recommend investigation of potential to open up culvert and that no development should take place above culvert. SEPA state that there are no known flood defences at the site.	Record of surface water flooding on Millerhill Road in 2006 and 2009 (precise location not known).	FRA required.
S3	South East Wedge and Shawfair Park Extension	45.6 ha	No apparent flood risk		

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
S4	Shawfair Park Extension	20.6 ha	No apparent flood risk	Flood incidents have occurred around the Summerside & Campend areas, blocking A7 at times. Thought by Midlothian Council to result from pluvial flooding overwhelming local drainage systems.	Although SEPA has not raised concerns, their focus has been on fluvial flooding. Further information is needed to consider pluvial flooding matters in this locality – nature of this would be for discussion between interested stakeholders.
S5a	Economic	6 ha	No apparent flood risk		
S5b	Economic	8 ha	No apparent flood risk	Historic record of flooding around Maul Burn culvert, but location not recorded precisely.	
S6	Cauldcoats	Up to 435	SEPA objects on flood risk grounds, but may remove objection with further information, or if MLDP notes that not all of site may be available for development. Part of site within or adjacent to flood risk zone identified in 2006 IRCFM. Detailed FRA will be required to define area at risk of flooding, appropriate detailed design layout and levels. SEPA state that there are no known flood defences at the site.		FRA required.
S7	Shawfair Tip	?	No apparent flood risk		

Site Ref	Site Name	Capacity (houses/ hectares (ha))	SEPA comments (Midlothian Council summary)	Other information	Summary
S8	Cauldcoats Farm variant	52.2 ha	No specific comments to this sub-variant	Midlothian Council expects similar findings as S1 and S6.	FRA required.
S9	Edmonstone Road	c.2	No comments from SEPA.	In Midlothian Council view, no apparent cause of flood risk in proximity.	

#### 7.12 MLDP MIR preferred strategy for South East Edinburgh (Shawfair):

S2, Newton Farm, 450 units with further capacity for 250 units. SEPA does not object on flood risk grounds, but advises further assessment of flood risk, including FRA. **More information required.**

S4, Shawfair Park extension, 20.6ha. SEPA does not object on flood risk grounds, but there are recorded incidents of flooding in this locality, and further information is desirable to identify causes and solutions. **More information required.**

#### 7.13 Alternative site, South East Edinburgh (Shawfair).

Midlothian Council is required where possible to identify 'reasonable alternatives' for comparison purposes, under the Environment Assessment (Scotland) Act 2005.

S6, Cauldcoats, Shawfair, up to 435 units. SEPA objects on flood risk grounds, but may remove objection with further information, or if the MLDP notes that not all of the site may be available for development. Inclusion of this alternative site in the final strategy would carry a risk that the site may be undeliverable or not generate the expected number of units. **More information required.**

#### 7.14 Additional development opportunities, South East Edinburgh (Shawfair).

These are no additional development opportunities in this area.

## 7.15 Possible mineral extraction locations

**Table 7: Flood risk at possible mineral extraction locations**

Location Name	SEPA comments (Midlothian Council summary)	Other information	Summary conclusion
Cauldhall Moor (coal)	Number of small watercourses noted in area. FRA required. Must ensure during extraction and post restoration that runoff rates are constrained within greenfield levels.	This location is now the subject of a planning application – more information will become apparent through EIA.	Do not remove from further consideration on basis of early flood information.
Dalhousie (coa)	Small part of area is within flood risk zone identified in 2006 IRCFM. Number of small watercourses also noted in area. Must ensure during extraction and post restoration that runoff rates are constrained within greenfield levels.		Do not remove from further consideration on basis of early flood information.
Chesters Wood (coal)	Section of Vogrie Burn in culvert flows past edge of area. Must ensure during extraction and post restoration that runoff rates are constrained within greenfield levels.		Do not remove from further consideration on basis of early flood information.
Airfield Farm (coal)	Cotty Burn runs along southern boundary of site, IRCFM 2006 indicates that there may be an element of flood risk from this watercourse. Number of small watercourses also noted in area. Must ensure during extraction and post restoration that runoff rates are constrained within greenfield levels.		Do not remove from further consideration on basis of early flood information.
Upper Dalhousie (sand) – boundary not defined	Not sought yet		Seek further information through MIR process
Temple Quarry (Outerston) (sand & gravel) – boundary not defined	Not sought yet		Seek further information through MIR process

7.16 **The MIR preferred for mineral working** comprises search areas at Cauldhall Moor (for coal) and an area without defined boundaries at MIR stage at Temple Quarry (Outerston) for sand and gravel. Airfield Farm is considered as a 'reasonable alternative' for coal as an addition to the Cauldhall Moor area, with Upper Dalhousie also being considered for sand extraction as an addition to the Temple Quarry area. On the information gathered so far, and bearing in mind that these are potential areas of search rather than sites for extraction, none of these potential locations should be excluded from further consideration on the basis of flood risk.

## **8 Linkages to other processes: Local Flood Risk Management Plan and cross boundary matters / River Basin Management Planning**

8.1 The Local Flood Risk Management (Scotland) Act 2009 sets out to meet the requirements of the EU Floods Directive. The Act requires local authorities, SEPA, Scottish Water and other bodies to work together to alleviate flood risk. A series of plans and processes have been established to put flood risk management on a more methodical and co-ordinated footing. This should help to ensure a more efficient approach to bringing forward measures to alleviate flood risk. It is important that other processes such as land use planning do not run counter to the strategy, for example by placing more development on flood plains.

8.2 The approach promoted by the 2009 Act can be described as sustainable flood risk management (SFRM). The Scottish Government guidance 'Delivering sustainable flood risk management' provides guidance to local authorities, SEPA and Scottish Water on fulfilling their responsibilities under the 2009 Act. The guidance establishes five desired outcomes from sustainable flood risk management:

- (i) A reduction in the number of people, homes and property at risk of flooding as a result of public funds being invested in actions that protect the most vulnerable and those areas at greatest risk of flooding.
- (ii) Rural and urban landscapes with space to store water and slow down the progress of floods.
- (iii) Integrated drainage that decreases burdens on our sewer systems while also delivering reduced flood risk and an improved water environment.
- (iv) A well informed public who understand flood risk and take actions to protect themselves, their property or their businesses.
- (v) Flood management actions being undertaken that will stand the test of time and be adaptable to future changes in the climate.

8.3 SEPA has published a National Flood Risk Assessment (NFRA), to help focus efforts on the areas most vulnerable to flooding. The NFRA divides Scotland into a km<sup>2</sup> grid, and assesses river, coastal and surface water flooding together with the potential sensitivity of the users in that area. The NFRA takes into account climate change, and reduces the risk rating for areas defended by flood defences (although as defences can fail or be overtopped, does not remove the risk altogether). Based on the NFRA, SEPA has identified areas, known as Potentially Vulnerable Areas (PVAs) where the impact is sufficient to justify further assessment of flood risk management actions. The setting of



objectives and the appraisal of actions for the PVAs will form the basis on which local authorities, SEPA and Scottish Water develop Flood Risk Management Plans. Three PVAs fall in part within Midlothian: PVA 10/18 Water of Leith, PVA 10/20 Edinburgh Coastal and PVA 10/22 River Esk (Lothian). The Water of Leith PVA covers areas of hillside on the Pentlands with no direct interface with Midlothian's population. The Edinburgh Coastal PVA covers a small area around Damhead and Straiton. The River Esk PVA covers most of Midlothian's population centres.

8.4 To implement the strategy locally, Scotland is divided into 14 Local [Flood] Plan Districts. Flood Risk Management Plans consist of two parts: SEPA will lead the publication of Flood Risk Management Strategies (FRMS) and local authorities will take forward Local Flood Risk Management Plans (LFRMPs). The FRMSs are to set out the best combination of actions to address impacts for each PVA within a Local Plan District, using a nationally consistent approach. The first round of FRMSs are due to be completed by December 2013. The local authorities led LFRMPs will turn actions from the strategy into a work programme. Draft LFRMPs are expected to be published by Dec 2014. Final versions are expected to be published in June 2016 and work to a 6-year cycle.

8.5 Midlothian Council is participating in the preparation of the Local Flood Risk Management Plan for the Forth Estuary area. Flooding is less of a problem in Midlothian than elsewhere in Scotland. A small proportion (2.8%) of Midlothian's land area and 375 properties (less than 1% of the total) are estimated to fall within the 1:200 flood risk zone. In the wider Forth Estuary area 29,000 properties lie in the floodplain, representing 4% of properties. For Scotland as a whole 125,000 properties are in the floodplain (equivalent to 5% of residences and 8% of businesses). The rivers that rise in Midlothian flow on into East Lothian, where they enter lower lying land which is often built-up (around the Esk at Musselburgh, and Tyne at Haddington).

8.6 The LFRMP is likely to contain an emphasis on whole catchment solutions which seek to restore or replicate natural flood control processes: this may include use of techniques such as upstream detention ponds to attenuate flows. These might be found in areas of low value upland farmland, to preserve more valuable land in downstream areas. This matter will be addressed further as the LFRMP develops, and it is premature to allocate or identify land for this purpose in the MLDP.

8.7 The River Basin Management Plan (RBMP) has been prepared to meet the requirements of the EU Water Framework Directive (WFD). This Directive is concerned with ecology rather than flooding, but there are linkages between the processes. For example, ecological restoration can help restore more natural run-off patterns to slow the passage of flood waters. The WFD seeks to prevent any deterioration in water bodies' ecological status and for water bodies to achieve high or good status over time (a water body is the general term to encompass all parts of the water environment, including artificial waters and groundwaters). Water bodies are assessed in terms of their ecological condition and classified into 5 bands (bad, poor, moderate, good, and high). The first RBMP runs from 2009-2015, with targets for each water

body - it is not expected that all water bodies will achieve good status in the first cycle. Most of the North and South Esk in Midlothian are classed as either poor or moderate. This is in part due to weirs and other morphological changes. SEPA administer a restoration fund, and there may be potential to consider ecological improvements alongside sustainable flood risk management measures.

## **9 Policy Matters and Questions**

9.1 The policy approach to flooding will generally be that set out in the SPP Risk Framework (Appendix 2). The Council will seek to embed reference to the need for climate change to be taken into account in preparing FRAs, in detailed guidance (probably in supplementary guidance). Section 7 sets out the Council's preferred development strategy and reasonable alternatives. There is a need for further information for some of these sites (identified in the text), and the Council will seek to address this through the MIR process. This is not a matter exclusively for the site promoters.

9.2 As well as allocating sites, land use planning can play a role in helping to implement the principles of sustainable flood risk management. These might also link to the wider objectives of green networks and River Basin Management Planning, and may be taken forward as supplementary guidance. The current local plan has policies supporting the safeguarding of buffer strips by watercourses in new development, and the opening up of culverts. This has a dual function of contributing to SFRM and providing networks of biodiversity value.

9.3 SFRM favours an integrated approach to drainage. Current policies favour the establishment of SUDS features and the retrofitting of SUDS features. In many cases arrangements regarding drainage have permitted development rights (for example in most cases the conversion of a garden to parking space does not require planning permission), and there is no locus for the planning system to become involved. However, the Scottish Government guidance considers that *'integrated drainage must be a key consideration in planning decisions, so that sustainable drainage is embedded into the fabric of our urban and rural landscapes.'* A particular issue in Midlothian is the use of underground tanks for surface drainage; the Scottish Government principles to support integrated urban drainage seek to minimise the amount of drainage going underground, but such solutions are often preferred by developers.

9.4 Midlothian Council welcomes any comments on this first SFRA. Through the engagement process for the MIR, Midlothian Council will seek further information, particularly for those locations selected for the preferred strategy (identified in section 7), where more information is required. Respondents may also wish to consider the following general questions:

**Do you agree with Midlothian Council's definition of the functional flood plain?**

**Do you have any information about flood risk at the sites identified in section 7?**

**Aside from the selection of sites, do you have any views on how planning policy might promote sustainable flood risk management (for example in its approach to drainage, and policies that tackle flood risk while benefiting the wider environment)?**

## Appendix 1 Consolidated Record from Midlothian Council Flood Prevention and Land Drainage Reports

In their response to Midlothian Council on proposed development sites, SEPA advises that the Council may wish to consider any additional information it holds with regards to fluvial flooding and other sources such as pluvial, groundwater or sewer. The following incidents/risks were recorded/identified by Midlothian Council (Commercial Services), as reported in the 2009, 2007, 2005, 2003 and 2001 biennial flood reports (prepared under previous legislation, viz. Flood Prevention and Land Drainage (Scotland) Act 1997), as well as incidents notified to meetings of the Midlothian Flood Liaison Action Group (FLAG).

The 2009 biennial report included a log of all incidents reported by the public, which accounts in part for the elevated number of incidents in 2008/09. The cause of these logged incidents is not always given, but where remote from watercourses it is likely that they relate to surface water flooding in most cases. This type of flooding is often caused by a temporary restriction which can be resolved through maintenance. Where recorded flood locations are in proximity to candidate development sites, this is recorded in the notes column; although given the nature of surface water flooding the value of this information is limited. Those sites that were considered to be an ongoing risk in the last biennial report are shaded with a grey background. Some of the flood incidents have full 12 digit grid references, where no grid reference was given an 8 digit grid reference has been inferred from the geographical description – these are approximate only. In some cases, for example where the geographical description refers to a long section of road, no grid reference has been entered.

Location	Grid Reference (mostly approx.)	Date	Description	Notes
Auchendinny, B7026 at Auch. Bridge	325414E 659567N	October 2005	Surface water flooding	
Auchendinny, The Brae	imprecise	October 2008	Not stated	
Bilston, Roslin Road	imprecise	February 2008	Not stated	
Borthwick, Borthwick Mains	3370 6611	December 2008	Not stated	
Bonnyrigg, Cockpen View	3302 6643	January 2008, October 2008 (x2)	Not stated, but likely to be Surface water flooding	
Bonnyrigg, Eldindean Terrace	imprecise	July 2009	Not stated	
Bonnyrigg, High Street	3308 6653	July 2004, September 2004,	Surface water flooding	

		October 2005, December 2006, February 2008, March 2008		
Bonnyrigg, Hopfield (various points in new development)	3310 6645	2012	Surface water drainage, SuDS scheme reported ineffective	Reported by Councillor through planning workshops
Bonnyrigg, Moffat Avenue	3305 6648	July 2008, August 2008, March 2009	Not stated, but likely to be Surface water flooding	
Bonnyrigg, Polton Avenue	imprecise	October 2008	Not stated, but likely to be Surface water flooding	
Bonnyrigg, Sherwood Crescent	imprecise	July 2008	Not stated	
Bonnyrigg, Waverley Crescent	imprecise	July 2008	Not stated, but likely to be Surface water flooding	
Bonnyrigg, Waverley Road	3312 6654	October 2005	Surface water flooding	
Bonnyrigg, Wolsey Avenue	3315 6650	October 2005, August 2008	Surface water flooding	
B7003, Roslin Glen Road	imprecise	October 2008	Not stated	
Carrington, Capielaw Road	imprecise	December 2008	Not stated	
Cousland, A6124 Inveresk Road at Chalkieside	3371 6685	September 2009 and ongoing risk	Fluvial Flooding	Restriction of water area by bridge may potentially cause flooding. Silt and debris removal carried out at this location.
Cousland, Hadfast Road	imprecise	November 2007, October 2008 (x2)	Not stated, but likely to be Surface water flooding	
Dalkeith, Abbey Road	imprecise	July 2009	Not stated	
Dalkeith, Allan Terrace	3335 6674	July 2007, July 2008	Surface water flooding	
Dalkeith, Dalhousie Road	imprecise	October 2005	Surface water flooding	
Dalkeith, Easthouses Road	imprecise	July 2007	Surface water flooding	

Dalkeith, Kippielaw Gardens	3344 6667	July 2007	Surface water flooding	
Dalkeith, Kippielaw Road	imprecise	July 2007	Surface water flooding	
Dalkeith, Lugton at A6106	3327 6676	Summer 2012	Surface water flooding combined with compromised ground conditions	Extreme rainfall, with old mine workings causing landslip at road formation.
Dalkeith, Musselburgh Road	3336 6677	July, August 2008, June 2009, July 2009	Not stated	
Dalkeith (may refer to Eskbank or Newbattle), Newbattle Road	imprecise	January, February, August 2008	Not stated	
Dalkeith, Parkside Place	3330 6672	March 2009, June 2009 (x2)	Not stated, but likely to be Surface water flooding	
Dalkeith, Spalding Crescent	3339 6672	November 2007, February 2008	Not stated, but likely to be Surface water flooding	
Dalkeith, Thornybank Industrial Estate	imprecise	July 2007	Surface water flooding	
Dalkeith, Waterfall Park	3338 6668	July 2009	Not stated	
Dalkeith Ward (rural), A6106 Millerhill Road	imprecise	December 2006, July 2009	Not stated, but likely to be Surface water flooding	
Dalkeith Ward (rural), A7 between Sheriffhall and Danderhall	imprecise	November 2007	Not stated, but likely to be Surface water flooding	
Dalkeith Ward (rural), A7 at Summerside	3317 6681	October 2002	Surface water flooding	Remedial repair work and manhole installation carried out November 2002.
Dalkeith Ward (rural), A7 at Todhills	3310 6687	June 2008	Not stated, but likely to be Surface water flooding	
Dalkeith Ward (rural), A7 at Wisp	3303 6694	July 2009	Not stated, but likely to be Surface water flooding	
Dalkeith Ward (rural), A772	imprecise	June 2008	Not stated	
Dalkeith Ward (rural), B6414 at	3348 6679	July 2009	Not stated, but likely to be Surface	

DCC			water flooding	
Dalkeith, Woodburn Avenue	3340 6670	July 2009	Not stated, but likely to be Surface water flooding	
Dalkeith, Woodburn Gardens	3342 6673	July 2007	Surface water flooding	
Dalkeith, Woodburn Park	3340 6673	July 2007, February 2008, July 2008, July 2009	Surface water flooding	
Dalkeith, Woodburn Road	3339 6672	August 2008	Not stated, but likely to be Surface water flooding	
Damhead, Pentland Road at Roseneath Cottage	3255 6665	Unspecified past incidents, ongoing risk	Fluvial Flooding	West Pentland Culvert carries unnamed burn from Boghall to Pentland Burn, siltation a problem and can overflow in wet weather.
Damhead (or Bilston), Seafield Moor Road	imprecise	November 2007	Not stated	Location unclear, watercourses under road in culverts, but also potential for pluvial flooding.
Danderhall, Maul Burn culvert	imprecise	Within period Nov 2001 to Nov 2003	Fluvial flooding caused by debris in culvert, aggravated by rising water table in area.	Culvert clearance and regrading carried out November 2002.
Dewarton	3379 6642	July 2009	Not stated	
Easthouses, Lothian Drive	3342 6658	July 2007	Surface water flooding	
Easthouses, Mary Burn culvert at Roanshead Crescent	3341 6654	Risk	Fluvial Flooding	Burn enters culverts under road, protected by grille, but susceptible to blockage.
Easthouses, Maryburn Road	3343 6658	July 2007	Surface water flooding	
Eskbank, A7 at Hardengreen Roundabout	3319 6660	August 2004	Surface water flooding	
Eskbank, Elginhaugh Bridge	3321 6672	December 2007,	Not stated, but likely to be Surface	

		July 2009	water flooding due to overcharging of gullies	
Gorebridge, Ashbank	3351 6611	December 2008	Not stated	Rural location, pluvial run off, also watercourse.
Gorebridge, Barleyknowe Crescent	3343 6624	July 2007	Surface water flooding	
Gorebridge, Barleyknowe Gardens	3342 6627	February 2008	Not stated, but likely to be Surface water flooding	Steep slopes in Gorebridge may contribute to pluvial flooding
Gorebridge, Barleyknowe Road	imprecise	January 2008 (x2), August 2008, October 2008, December 2008	Not stated, but likely to be Surface water flooding	Steep slopes in Gorebridge may contribute to pluvial flooding
Gorebridge, Barleyknowe Terrace	3343 6626	January 2008	Not stated, but likely to be Surface water flooding	Steep slopes in Gorebridge may contribute to pluvial flooding
Gorebridge, Birkenside Road	3345 6607	December 2006	Surface water flooding	
Gorebridge, Burnside Road	imprecise	December 2008, July 2009	Not stated, but likely to be Surface water flooding	
Gorebridge, Greenhall Road	imprecise	July 2008	Not stated, but likely to be Surface water flooding	Steep slopes in Gorebridge may contribute to pluvial flooding
Gorebridge, Hillside Crescent	imprecise	November 2007	Not stated, but likely to be Surface water flooding	Steep slopes in Gorebridge may contribute to pluvial flooding
Gorebridge, Hunterfield Road	imprecise	August 2008 (x2)	Not stated, but likely to be Surface water flooding	
Gorebridge, Lady Brae	335151E, 661758N	December 2006 & Persistent until 2009	Surface water flooding	New drainage provision in connection with housing construction appears to

				have resolved this problem.
Gorebridge, at Masonic Hall Car Park	3344 6617	July 2009	Not stated, but likely to be Surface water flooding	
Gorebridge, Powdermill Brae	imprecise	October 2007	not stated	Reported flood event in 7 <sup>th</sup> biennial report
Gorebridge, Springfield Place	3347 6613	July 2009	Not stated, but likely to be Surface water flooding	
Howgate, A6094 bridge at unnamed Lead Burn tributary	3248 6850	Unspecified past incidents, ongoing risk	Fluvial Flooding	Blockage of trash screen can cause flooding
Howgate, Howgate Road	imprecise	December 2006	Surface water flooding	
Lasswade, Bilston Burn at vicinity of confluence with North Esk.	328757 664872	October 2002	Fluvial Flooding	Relief culvert constructed late 2003, no further reported problems.
Lasswade, Elm Row	3305 6662	March 2008	Not stated	
Lasswade, Farm Avenue	3298 6660	July 2009	Not stated, but likely to be Surface water flooding	
Lasswade, Lasswade Road	imprecise	October 2008	Not stated	
Lasswade, School Green	3304 6661	Summer 2012, July 2008, October 2007, November 2000, April 2000 and other past incidents, ongoing risk	Fluvial Flooding	Bridge arches restrict flow and can lead to flooding immediately upstream.
Lasswade, Wadingburn Road	329985E, 661183N	Persistent until August 2009	Sewer/surface water Flooding	CSO modified by SW, problem appears to be resolved.
Lasswade, Wadingburn Road	329188E, 665814N	Frequent until May 2009	Surface water flooding	Replacement gulley section appears to have resolved



				this problem.
Lasswade, Wadingburn Road	3303 6662	Risk	Surface water flooding	SW culvert, built to reduce risk of overflow at Lasswade Culvert, but back charges in high rainfall with risk of flooding in locality of King's Acre Golf Course Junction.
Loanhead, Dryden View	3272 6653	July 2009	Not stated, but likely to be Surface water flooding	
Loanhead, High Street	imprecise	October 2005, July 2009	Surface water flooding	
Loanhead, Mayburn Terrace	3277 6663	July 2009 (x2)	Not stated	
Loanhead, McKinley Terrace	3272 6654	October 2008	Not stated, but likely to be Surface water flooding	
Loanhead, Mayburn Vale	3276 658	1998	Caused by rubble blockage, not clear if fluvial or surface water channel	
Loanhead, Paradykes Primary School	3277 6657	January 2007	Not stated, but likely to be Surface water flooding	
Loanhead, Park Avenue	3275 6653	February 2008	Not stated, but likely to be Surface water flooding	
Loanhead, Polton Road	3287 6648	Unspecified past incidents, ongoing risk	Surface water flooding	Surface water from Loanhead area can flood carriageway at culvert.
Mayfield, Bevan Road	3350 6644	July 2007	Surface water flooding	
Mayfield, Bogwood Road	imprecise	July 2007	Surface water flooding	
Mayfield, Chester View	3347 6644	November 2007	Not stated, but likely to be Surface water flooding	Steep slopes in Mayfield exacerbate pluvial flooding
Mayfield, D'Arcy Road	imprecise	January 2008	Not stated, but likely to be Surface water flooding	Steep slopes in Mayfield exacerbate pluvial flooding

Mayfield, Easthouses Road	imprecise	January 2008	Not stated	
Mayfield, Hughes Crescent	3356 6645	December 2006, January 2008, March 2008	Surface water flooding	
Mayfield, Kippielaw Park	3347 6655	July 2007	Surface water flooding	
Mayfield, Langlaw Road	3348 6655	July 2007, March 2008, July 2009	Surface water flooding	
Mayfield Lyme Grove	imprecise	July 2007	Surface water flooding	
Mayfield, Watt Grove	3354 6643	July 2009	Not stated, but likely to be Surface water flooding	Pipe blockage repaired 2008
Mayfield, Waverley Street	3346 6645	July 2008, August 2008	Not stated, but likely to be Surface water flooding	
Mayfield, Willow Road	3354 6646	July 2007, August 2008	Surface water flooding	
Midlothian East ward (rural), B6368 at Woodcote Mains	3458 6608	September 2009	Not stated	
Midlothian South ward (rural) A7 at Harvieston Mains	3348 6602	January 2008	Not stated	
Midlothian South ward (rural) B6372 Newlandrig to Dewarton	imprecise	September 2009	Not stated	
Midlothian South ward (rural), C55 road at Parduvine	330221E 660805N	Not stated	Surface water flooding	Mitigation works, viz road level change, new drainage system programmed in 7 <sup>th</sup> biennial report.
Midlothian West ward (rural) A6094 at Drummond Moor	imprecise	December 2008	Not stated	
Midlothian West ward (rural) A701 at Bush	imprecise	October 2008	Not stated	
Newbattle, at B703/Ochre Burn bridge	3332 6653	October 2002, October 2005 and	Fluvial Flooding	Ochre Burn enters pipe under B703 at this point,

		other unspecified past incidents, ongoing risk		has been known to flood due to lack of capacity or blockages. Sixth biennial report advised maintenance work carried out, and additional drainage installed. CLOSE TO POTENTIAL DEVELOPMENT SITE NE4
Newbattle, at Newbattle Bridge	3331 6656	Unspecified past incidents, ongoing risk	Fluvial Flooding	Privately owned 'Bow and Arrow Bridge' arches restrict flow and can lead to flooding in locality.
Newbattle, Newbattle Road	imprecise	January 2008.	Not stated	
Newtongrange, Bryans	3338 6647	July 2008	Not stated, but likely to be Surface water flooding	
Newtongrange, Suttieslea Road	3340 6647	August 2008	Not stated, but likely to be Surface water flooding	
Newtongrange, The Beeches	imprecise	January 2008	Not stated	May be linked to B703/Ochre Burn problem described above.
Newton Village	3317 6695	September 2004, June 2008		
North Middleton, Borthwick Road	imprecise	December 2008	Not stated	
North Middleton, Castlelaw culvert at A7	3352 6595	Risk	Fluvial Flooding	Culvert carries watercourse under A7, corner of field seen to flood and thought to be linked to excess water exiting manhole cover.
Pathhead, Crichton Avenue	3393 6642	July 2007	Surface water flooding	

Pathhead, Crichton Terrace	3394 6641	July 2007	Surface water flooding	
Pathhead, Ford Bridge (C34)	3388 6644	Unspecified past incidents, ongoing risk	Fluvial Flooding	Deposits of gravel at bridge have caused the Tyne Water to flood the road
Pathhead, Ford Village, Edgehead Road	3388 6644	July 2007	Surface water flooding	
Penicuik, A701 Bridge at the Loan Burn (more general problem along Loan Burn)	3234 6604	Multiple past incidents, ongoing risk	Fluvial Flooding	Blockage of trash screen can cause flooding. Modifications along Loanburn course viz. have been made viz. re-siting trash screen, raised bankings where overtopping is a risk.
Penicuik, A701 Telford Bridge	323594E 659567N	October 2005	Surface water flooding	
Penicuik, B6372 at Pomathorn	3241 6594	April 2000	Surface water flooding causing roadway collapse	
Penicuik, Beeslack underpass	3242 6614	December 2006, November 2007	Not stated, but likely to be Surface water flooding	
Penicuik, Bog Road	3232 6602	August 2008	Not stated, but likely to be linked to fluvial problems related to Loan Burn	
Penicuik, Carlops Crescent	3234 6605	December 2006	Surface water flooding	
Penicuik, Clerk Road	imprecise	August 2008	Not stated	
Penicuik, Charles Street	3234 6614	March 2008, August 2008	Not stated, but likely to be Surface water flooding	Slopes of Pentland Hills can exacerbate risk of pluvial flooding in parts of Penicuik
Penicuik, Eastfield Drive at Loan Burn	3236 6608	Risk– but no recorded incidents	Fluvial Flooding	Burn enters pipes under roads, protected by trash screens, but susceptible to

				blockage if maintenance regime not upheld.
Penicuik, Eskmill Road	imprecise	July 2009	Not stated	
Penicuik, Eskvale Crescent	3243 6604	October 2007	Not stated, but likely to be Surface water flooding	
Penicuik, Glencross Gardens	3223 6603	December 2006	Surface water flooding	
Penicuik, Greenhill Park	322844E, 660496N	Persistent in inclement weather	Surface water flooding	Limited land drainage measures installed, further additional land drainage measures required
Penicuik, Greenlaw Grove	3243 6623	August 2008	Not stated, but likely to be Surface water flooding	
Penicuik, John Street	imprecise	October 2005, August 2008, July 2009	Surface water flooding	
Penicuik Lawhead Burn (Lawhead Ditch Culvert)	3225 6609	Risk	Potential for fluvial flooding	Restricted pipe/culvert conveying burn is potential risk. Mobilisation of gravel/trash increases risk. MC presumes SW owns this asset.
Penicuik Lawhead Burn (Rullion Road Culvert)	3226 6608	Risk	Potential for fluvial flooding	Restricted pipe/culvert conveying burn is potential risk. Mobilisation of gravel/trash increases risk. MC presumes SW owns this asset.
Penicuik, Mauricewood Road	imprecise	April 2000, February 2008, June 2009	Not stated	

Penicuik, Milton Bridge	imprecise	June 2009	Not stated	
Penicuik, Philip Place	3233 6615	July 2009	Not stated, but likely to be Surface water flooding	
Penicuik, Teviot Grove	3239 6611	January 2008	Not stated	
Penicuik ward (rural), A701 at Leadburn	3235 6554	August 2008	Not stated	
Poltonhall, Polton Gardens	3302 6653	July 2009	Not stated, but likely to be Surface water flooding	
Poltonhall, Springfield Mill	3287 6647	Risk area	Fluvial flooding	Highlighted as a risk area in meetings of the Flood Liaison Action Group Flag. Derelict Mill site has subsequently been cleared and become nature area.
Rosewell, Carnethie Street	imprecise	January 2005, October 2005	Surface water flooding	
Rosewell, Gorton Place	3287 6628	November 2007	Not stated, but likely to be Surface water flooding	Major committed development sites in locality, may lead to new drainage pattern.
Roslin, Roslin Bridge	3270 6626	Unspecified past incidents, ongoing risk	Surface water flooding	Gullies on bridge too small, and surface carriageway levels poor – causes ponding on bridge

## Appendix 2: Scottish Planning Policy (SPP) Risk Framework for Flooding

### RISK FRAMEWORK

**Little or No Risk** - annual probability of watercourse, tidal or coastal flooding is less than 0.1% (1:1000)

- No constraints due to watercourse, tidal or coastal flooding.

**Low to Medium Risk Area** - annual probability of watercourse, tidal or coastal flooding in the range 0.1% - 0.5% (1:1000 - 1:200)

- These areas will be suitable for most development. A flood risk assessment may be required at the upper end of the probability range (i.e. close to 0.5%) or where the nature of the development or local circumstances indicate heightened risk. Water resistant materials and construction may be required depending on the flood risk assessment. Subject to operational requirements, including response times, these areas are generally not suitable for essential civil infrastructure such as hospitals, fire stations, emergency depots etc. Where such infrastructure must be located in these areas or is being substantially extended it should be capable of remaining operational and accessible during extreme flooding events.

**Medium to High Risk** - annual probability of watercourse, tidal or coastal flooding greater than 0.5% (1:200)

- Generally not suitable for essential civil infrastructure such as hospitals, fire stations, emergency depots etc., schools, care homes, ground-based electrical and telecommunications equipment unless subject to an appropriate long term flood risk management strategy. The policy for development on functional flood plains applies. Land raising may be acceptable.
- If built development is permitted, appropriate measures to manage flood risk will be required and the loss of flood storage capacity mitigated to produce a neutral or better outcome.
- Within built up areas, medium to high risk areas may be suitable for residential, institutional, commercial and industrial development provided flood prevention measures to the appropriate standard already exist, are under construction or are planned as part of a long term development strategy. In allocating sites, preference should be given to those areas already defended to required standards. Water resistant materials and construction should be used where appropriate.
- In undeveloped and sparsely developed areas, medium to high risk areas are generally not suitable for additional development. Exceptions may arise if a location is essential for operational reasons, e.g. for navigation and water based recreation uses, agriculture, transport or some utilities infrastructure and an alternative lower risk location is not achievable. Such infrastructure should be designed and constructed to remain operational during floods. These areas may also be suitable for some recreation, sport, amenity and nature conservation uses provided adequate evacuation procedures are in place. Job-related accommodation (e.g. caretakers and operational staff) may be acceptable. New caravan and camping sites should not be located in these areas. If built development is permitted, measures to manage flood risk are likely to be required and the loss of flood storage capacity minimised. Water resistant materials and construction should be used where appropriate.

### Appendix 3: Summary of Flood Risk Assessments Carried Out in Midlothian

Flood Risk Assessments (FRAs) are sometimes specified in connection with development proposals (whether applications or changes to development plans), at locations where there is concern over flood risk. SEPA in their role as a consultee on planning applications advise on the methodology and assumptions used in FRAs, and act as an independent regulator to ensure that they are robust and not skewed to suit a particular developer interest. The coverage of FRAs is necessarily haphazard, reflecting the distribution of applications over time. The preparation of the LFRMP may entail more comprehensive FRA coverage at areas of higher risk.

Location	Grid Reference	Description of development	Findings
Leadburn, The Beeches	32346560	Proposal to allocate land for low density rural housing	Site acceptable for proposed development in terms of flood risk – subsequently allocated through 2008 MLP.
Penicuik, Valleyfield	32376597	Housing (subsequently built)	Site acceptable for proposed development, less than 1:100 flood risk. Used different input assumptions to a contemporary FRA, that did not include climate change allowance.
Lasswade, Kevock Caravan Park	33026658	Conversion of caravan park to permanent housing, granted on appeal, not developed.	FRA carried out in 2011. Found that parts of the site were within 1:200 year plus climate change flood risk outline. SEPA recommendation that no housing should be built within flood risk outline and that finished floor levels be set at least 0.6m above 1:200 year + CC + freeboard level have been incorporated as draft conditions in the Reporter's Report. No public roads shall have finished levels lower than 0.3m above the 1:200 year + CC + freeboard level.
Ironmills, Dalkeith, SQA site	33276674	Demolition of SQA offices and construction of housing (under construction at 01/13)	FRA carried out and site found to be at low to medium risk of flooding (1:200-1:1000). Recommendations set out regarding desirable minimum floor levels (39m AOD)
Former Dalkeith High School site, Dalkeith	33366672	Early consideration of new uses on this brownfield site only – no settled proposal	Early response from SEPA (5/08/11). Supported exclusion of NE of site. Considered that changes to landform and embankments would need further assessment. Considered that landform may elevate risk of surface/pluvial flooding. Considered that flood risk in the vicinity of the playing fields was unclear. Advised that any new bridge should be required to demonstrate no detriment to storage capacity or ability of channel to convey water. Supported Midlothian Council proposal that FRA be carried out.



## Appendix 4: Glossary and Guide to Abbreviations

Flood Prevention and Land Drainage (Scotland) Act 1961	Legislation now superseded by FRM (2009). This Act contained powers and duties for local authorities to assess watercourses and bring forward flood prevention schemes. This regime was seen as overly bureaucratic as duplicate permission to carry out a flood prevention scheme was required under flood prevention legislation, and again under the Town and Country Planning Act – the new system gives deemed planning permission where a scheme is approved under the Flood Risk Management Act.
Flood Prevention (Scotland) Act 1997	Legislation now superseded by FRM (2009). This Act contained powers and duties for local authorities to prevent or mitigate flooding on non-agricultural land. Under this Act, Biennial reports were prepared which set out flood incidents, measures taken in respect of flooding, and further measures thought to be necessary.
Flood Risk	Flood risk can be expressed as the likelihood of flooding occurring over a time period, or as a percentage risk over a single year. Up to a 1:200 year risk (0.5% annual risk) most forms of development are acceptable. Up to a 1:1000 year risk (0.1% annual risk) consideration would have to be given to the suitability of certain sensitive uses (Appendix 2 gives more detail).
FRA - Flood Risk Assessment.	A process aimed at determining flood risk at a location, and assessing its suitability for the intended purpose.
Flood Risk Management (Scotland) Act 2009	This Act (described further in Section 8), consolidates and replaces previous flood legislation. There are general duties on local authorities to exercise their functions with regard to the principles of sustainable flood risk management.
FRMS - Flood Risk Management Strategy	SEPA-led strategy, which will set out the best combination of actions to address flood problems identified in the PVA.

Functional Flood Plain	Land where water has to flow or be stored at times of flood. This can be seen as a natural resource whose loss may exacerbate flooding elsewhere.
IRCFM - Indicative River and Coastal Flood Risk Maps	Maps prepared by SEPA (most recently in 2006), indicating land at 1:100 year (1%), 1:200 year (0.5%), 1:1000 year (0.1%) risk of flooding. Maps are indicative: no allowance for climate change or flood defences.
MLDP - Midlothian Local Development Plan	Document setting out policies and proposals for the use of the land. Planning applications should be determined in accordance with the MLDP unless material considerations suggest otherwise.
LFRMP - Local Flood Risk Management Plan	Local Authority led plans which will set out, for each local flood risk planning area, how the strategy will be implemented in greater detail. Midlothian is part of the Forth Estuary.
MIR - Main Issues Report	In advance of publishing the proposed MLDP, planning authorities are required to prepare a Main Issues Report for consultation. The MIR should indicate what the Planning Authority sees as the main issues with regard to the use of the land, and is intended as the principal consultative phase of the process.
NFRA - National Flood Risk Assessment	Broad level assessment (gives overall ratings at 1km <sup>2</sup> level) for whole of Scotland, taking into account climate change and flood defences.
PVA - Potentially Vulnerable Area	These are areas where the combination of the likelihood of flooding and the consequences of a flood is sufficient to justify further assessment of flood risk management.
SEPA - Scottish Environment Protection Agency	Scotland's environmental regulator. Broad duties and powers in relation to flood risk, including responsibility for preparation of NFRA and local strategies, and to assist in preparation of LFRMPs. With regard to land use planning, SEPA is one of the identified 'Key Agencies' for co-operating on development plan preparation. Advises

on individual planning applications (in accordance with SEPA – Planning Authority protocol).

SFRA - Strategic Flood Risk Assessment process

A high level assessment of flood risk prepared to inform the development plan (see section 1 for background).

SPP - Scottish Planning Policy

Statement of national planning policy set down by Scottish Government as the basis for the development plan (strategic and local development plans).

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