

Transport and Environment Committee

10.00am, Tuesday, 28 October 2014

Water of Leith Basin

Item number 7.2
Report number
Executive/routine
Wards

Executive summary

This report gives detail on siltation in the Water of Leith Basin and provides advice on the Council's obligations. The report also details the various parties which have an interest in the basins and how their operations affect siltation and water levels.

The silt level in the Water of Leith has continued to build up since the docks were impounded in 1969.

The Council has undertaken surveys to model the impact of flooding to the Leith area around the Water of Leith.

The report demonstrates that it is not anticipated that the Water of Leith will flood out of bank at the Water of Leith Basin, until approximately the 1 in 200 year flood event. The 1 in 200 year event, is a flood event that statistically has a 0.5 percent likelihood of occurrence in any year.

The Friends of the Water of Leith Basin has expressed concerns in relation to this siltation, from flooding and amenity perspectives.

Links

Coalition pledges [P28](#)
Council outcomes [CO19](#)
Single Outcome Agreement [SO4](#)

Water of Leith Basin

Recommendations

- 1.1 It is recommended that Committee:
 - 1.1.1 approves that further investigations be undertaken in 2015/16 and the level of flood risk be re-evaluated; and
 - 1.1.2 notes the content of this report in respect of the responsibilities of the various parties, the operation of the docks, flood risk and siltation in relation to the Water of Leith Basin.

Background

- 2.1 Silt has built up in the Water of Leith Basin since the docks were formed in 1969. Prior to the docks being formed, the Water of Leith flowed directly into the Firth of Forth and was faster flowing. As the river is now retained at a higher level to permit the Docks to function, this has resulted in the water flowing slower and silt being deposited in the Water of Leith Basin.
- 2.2 Forth Ports impound the river, as this is necessary to undertake its routine business. This is permitted and the Forth Ports Authority Order Confirmation Act 1969 gives it the right to do this but it must not allow water to exceed a given level. Forth Ports does this by closely monitoring flows in the river and weather forecasts and if the need arises, it will release water into the Firth of Forth.
- 2.3 There are culverts adjacent to the dock gates, which allow water to flow into the Firth of Forth during normal flows. It should be noted that these culverts cannot operate when the sea level is higher than the level of water inside the docks.
- 2.4 “The Friends of the Water of Leith Basin” has expressed concerns in relation to this siltation from flooding and amenity perspectives.
- 2.5 A company called Water of Leith 2000 owns the Water of Leith Basin.
- 2.6 The effects of the operation of the Docks and the siltation were considered in the development of the Water of Leith Flood Prevention Scheme.

- 2.7 The Council has powers under the Flood Risk Management (Scotland) Act 2009, to serve notice on landowners to take action to reduce the risk of flooding but does not have the power to compel them to act. The Council can act to reduce flood risk but cannot recover costs.
- 2.8 A study undertaken in the development of the Water of Leith Flood Prevention Scheme suggests the risk of flooding of the adjacent area, from the river flow, is approximately at the 1 in 200 year event level. This risk is considered to be sufficiently low such that the Council would not seek to reduce the risk further.
- 2.9 It is intended to re-evaluate the flood risk in this area in 2015/16 and this will include surveying the silt deposition in this area.

Main report

Layout of Basin and Docks

- 3.1 The Water of Leith originally discharged into the Firth of Forth before the construction of Leith Docks. The river now discharges into Leith Docks at Tower Street opposite Victoria Dock. Flow from the docks then discharges into the Firth of Forth, through the culverts in the sealing dam. Forth Ports own and operate these docks.
- 3.2 There is a sealing dam which retains water levels in the docks at low tide and excludes sea water from the docks at high tide. A shipping lock is located at the eastern end of the sealing dam. A plan of Leith Docks is shown in Appendix A.
- 3.3 The operation of the docks is such that the river is effectively dammed (impounded) in part and the level of the water in the docks is held at a near constant level. The impact of the retention of the river at this higher level in the docks extends as far as West Bowling Green Street bridge.
- 3.4 A consequence of this impoundment is slower flowing water in this stretch of the river and this has resulted in the deposition of silt. Figure 2 in Appendix B details the stretch of the Water of Leith that is affected by siltation.

Responsibilities

- 3.5 The Scottish Environment Protection Agency (SEPA) is Scotland's environmental regulator.
- 3.6 In relation to flooding SEPA is responsible for the provision of flood warnings and helps local authorities identify sustainable actions to manage flooding.
- 3.7 SEPA is the Competent Authority as defined in the Flood Risk Management (Scotland) Act 2009 [FRM(S)A 2009] and has various other roles that relate primarily to the delivery of information and co-ordination of flood risk management in Scotland.

- 3.8 Forth Ports is responsible for the operation of the docks and this is governed by the Forth Ports Confirmation Act 1969.
- 3.9 In relation to flooding, the City of Edinburgh Council manages existing flood defences and inspects and maintains watercourses to reduce the risk of flooding. In some circumstances it offers flood protection products (but has no duty to do so); and works with emergency services in response to severe flooding.
- 3.10 Under the FRM(S)A 2009 the Council has a duty to assess flood risk. If it is considered that there is a real risk of flooding the Council can serve notice on the landowner, however, the Council does not have any powers to compel any landowner to take action. The Council does have the necessary powers to take entry and take any actions it considers necessary to mitigate the risk of flooding, however these costs cannot be recovered.
- 3.11 The Environmental Protection Act 1990 section 79 – Statutory Nuisances and Inspections thereof, gives the Council powers to take action where an environmental situation may be prejudicial to health or is causing a nuisance.
- 3.12 “Water of Leith 2000” is a water based development company which offers business accommodation on barges that are moored in the Water of Leith Basin. “Water of Leith 2000” owns this stretch of the river and the responsibility for the siltation rests with the owners of the river.
- 3.13 “The Friends of the Water of Leith Basin” is a group which has a general interest in the promotion of the area in and around the Water of Leith Basin. This group is active in conservation and general amenity value of the area.

Operation of the Docks

- 3.14 It is critical to the operation of the docks that water levels are maintained at a high and near constant level. The operation of the docks is governed by the Forth Ports Confirmation Act 1969 and Forth Ports cannot cause or permit the water in the Port of Leith to rise above 3.047 metres (m) Above Ordnance Datum (AOD) except at any time when the sea level outside the harbour has also risen above 3.047m AOD.
- 3.15 The sealing dam which retains water levels in the docks has a top level of approximately 4.0m AOD.
- 3.16 Forth Ports operates a flood bypass culvert adjacent to the lock gates to maintain water levels in the Port of Leith. This culvert effectively routes water around the dock gates, allowing normal flows to discharge into the Firth of Forth. Forth Ports introduced this facility following the flooding in April 2000. This culvert can only be brought into operation provided the sea level is below the level of water in the Docks.
- 3.17 Provided the sea level is below that within the dock, water can be discharged to the sea through the flood bypass culvert. This culvert bypasses the lock gates.

- 3.18 It should be noted that if the sea level is above the level of water in the Docks, the Docks are effectively providing a coastal defence.

Flood Risk

- 3.19 SEPA has produced and published Flood Maps which can be found on its website. The map for the Leith Area shows the area upstream of the docks to be at a medium risk of flooding from the river. A medium flood risk equates to a 1 in 200 year flood event.
- 3.20 The Council originally promoted the Water of Leith Flood Prevention Scheme in 2003 and flood prevention work has been undertaken upstream on the Water of Leith, to protect business and residential properties.
- 3.21 A feature of the Water of Leith Flood Prevention Scheme is the creation of additional storage in the reservoirs in the headwater of the river. This additional storage reduces flows in times of flood and has resulted in a reduction in flood risk to all areas on the river, including the Water of Leith Basin.
- 3.22 The first phase of the flood defence works, within the city, was complete in May 2014, with protection being provided between Bonnington Mills and Veitch's Square.
- 3.23 The second phase of works is currently at the planning stage. A separate report on Phase 2 of the Water of Leith Flood Prevention Scheme is being considered by this Committee.
- 3.24 The stretch of the river from Bonnington Mills to the Docks was also considered in the development of the Water of Leith Flood Prevention Scheme. The Council's consultant, Arup was instructed to establish if the flood prevention infrastructure at Leith Dock, was sufficiently robust to protect properties potentially at risk at the Water of Leith Basin and at Leith Docks. Arup was also asked to give consideration to the impact of siltation.
- 3.26 Arup concluded that the flood risk at Leith Docks is dependent upon the flow in the river and the level of the tide. The level of the tide impacts on Forth Ports' ability to discharge water in the Firth of Forth.
- 3.27 The river modelling, undertaken by Arup, suggests that minor flows are likely to occur out-of-bank at the 1 in 200 year event, including an allowance for climate change. The extent of this flooding was not mapped but it was noted that adjacent property floor levels were above this level. However, SEPA has undertaken this mapping and has concluded that the area near the Water of Leith Basin, is at risk of flooding from a 1 in 200 year flood.

3.28 The above is based upon Forth Ports maintaining the maximum water level in the dock at 3.047m AOD. However, it should be noted that Forth Ports receive flood warnings from SEPA and has the ability to discharge water as described under 'Operation of the Docks'. Forth Ports operates the dock gates and the overflow culvert in an appropriate manner. It retains the water at a given level and monitors water levels (having access to telemetry and receive flood alerts) and weather forecasts. Forth Ports then draw the water level down if necessary. It should also be noted that, should flooding occur, this would have an impact on the docks, therefore, it is in the interest of Forth Ports, to manage the situation appropriately.

Siltation

3.29 The area of the river which has been subjected to siltation is shown in Figure 2, which is contained in Appendix 2. This siltation has occurred as a direct result of the impoundment of the river at the Docks.

3.30 Forth Ports dredges the area of the harbour under its control for the requirements of ship movements. This does not include the Water of Leith Basin, where the presence of bridges prevents access by conventional dredgers.

3.31 The Water of Leith Basin is owned by "Water of Leith 2000" and the responsibility for the siltation rests with it as owner of the river at this location. It should be stressed that the Council has a duty to assess flood risk and can serve notice under the FRM(S)A 2009, although it does not have any powers to compel landowners to take any action.

3.32 At present, it is considered that flood risk in the area is primarily affected by other factors, such as combinations of river flow with tidal surge, and the operation of the bypass culvert by Forth Ports. It is the impounded water level in the docks and the ability to discharge water into the Firth of Forth that dictates normal water levels in the Water of Leith Basin. The volume of water the culvert can pass into the Firth of Forth is heavily influenced by the seal level. However, it was recommended that removing silt should be considered were the depth of silt to increase by 250mm above the levels recorded, when the study was undertaken in the development of the Water of Leith Flood Prevention Scheme in 2003. It should be noted that the predicted still water level with an additional 250mm of silt, is still below the top of bank, as it is customary to give an allowance of 300mm known as freeboard, to allow for uncertainties such as wave action.

- 3.33 Surveys were undertaken on behalf of the Council to establish the extent of siltation in 2003 and 2010. The 2003 survey was necessary to develop the mathematical model of the watercourse in developing the Water of Leith Flood Prevention Scheme. The 2010 survey was limited in its extent and it is difficult to estimate the amount of siltation that has built up since 2003 with any accuracy. Accordingly, it is proposed to engage a consultant in the next financial year to survey the extent of the siltation and re-evaluate the effect of the siltation. This re-evaluation will include further modelling of the Water of Leith Basin and assess what, if any, mitigation measures are necessary.

Amenity

- 3.34 The Council has the powers to take action where an environmental situation may be prejudicial to health or is causing a nuisance. Such situations include, but are not limited to, any accumulation or deposit. Where the statutory nuisance is on private land, it is the responsibility of the owner to resolve the nuisance being caused and if the owner does not comply, then the Council can take legal action against the owner to resolve.

Measures of success

- 4.1 Additional storage has been created in the reservoirs on the headwaters of the Water of Leith. The result of this is to reduce the flow in the river during a severe storm, thus minimising the risk of flooding to all downstream of the reservoirs, including those at the Water of Leith Basin. The peak flow in the river during the 1 in 200 year event (plus climate change), is reduced from approximately 177 cubic metres per second, to 98 cubic metres per second, as a result of the work undertaken at the reservoirs.

Financial impact

- 5.1 An allowance of £45,000 will be made in the Flood Revenue Budget 2015/16 to undertake the survey of silt at the Water of Leith Basin and the investigations by consultants.

Risk, policy, compliance and governance impact

- 6.1 If the recommendation to undertake further investigations in 2015/16 and to re-evaluate the level of flood risk is approved, this will ensure that any properties in the area adjacent to the Water of Leith Basin that are risk, will be identified.
- 6.2 Should any properties be identified the situation can be assessed and if necessary appropriate action can be taken.

Equalities impact

- 7.1 Consideration has been given to the relevance of the Equality Act 2010 and it is considered that a full Equality and Rights Impact Assessment (ERIA) is not required at this stage. Following the investigations in 2015/16, if it is established that works may be required, further consideration will be given to Equalities, as any work required would likely be disruptive to the area.

Sustainability impact

- 8.1 The study carried out in developing the Water of Leith Flood Prevention Scheme, already includes an allowance for climate change.
- 8.2 An Environmental Assessment will be required, if it is established that work to mitigate the risk of flooding is necessary.
- 8.3 The relevant approvals will be sought from Marine Scotland and SEPA, if it is established that it is necessary to remove silt.

Consultation and engagement

- 9.1 Consultation has been undertaken with SEPA, in relation to flood modelling and forecasting.
- 9.2 A number of meetings have taken place with “The Friends of the Water of Leith Basin” and SEPA in relation to Flood Risk.

Background reading/external references

Flood Risk Management (Scotland) Act 2009

Forth Ports Authority Order Confirmation Act 1969

John Bury

Acting Director Services for Communities

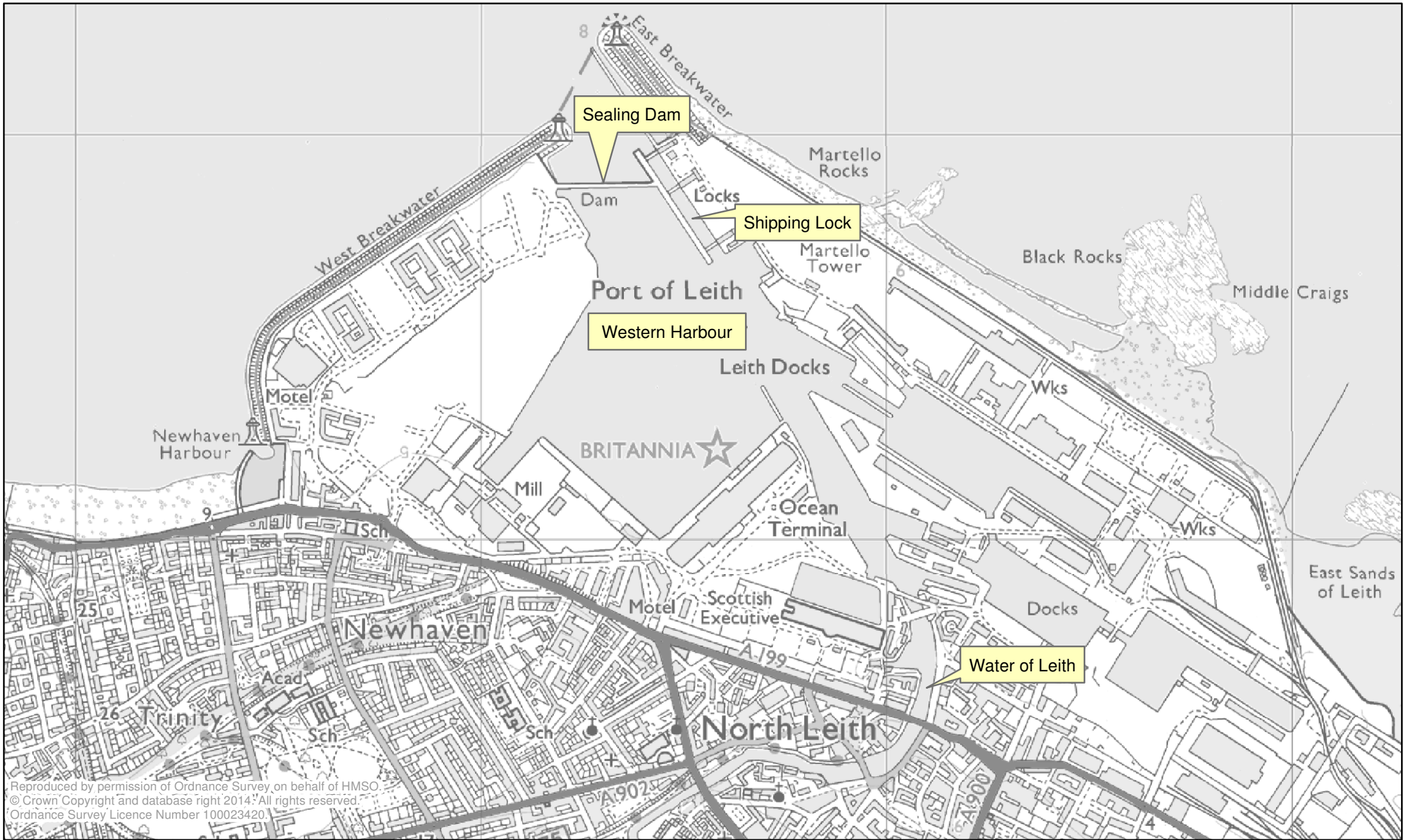
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Links

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| Coalition pledges | P28 – Further strengthen our links with the business community by developing and implementing strategies to promote and protect the economic well being of the city |
| Council outcomes | CO19 – Attractive Places and Well Maintained – Edinburgh remains an attractive city through the development of high quality buildings and places and the delivery of high standards |
| Single Outcome Agreement | SO4 – Edinburgh’s communities are safer and have improved physical and social fabric |
| Appendices | A – Layout of Docks B – Layout of Water of Leith Basin |

Appendix A (Dock)

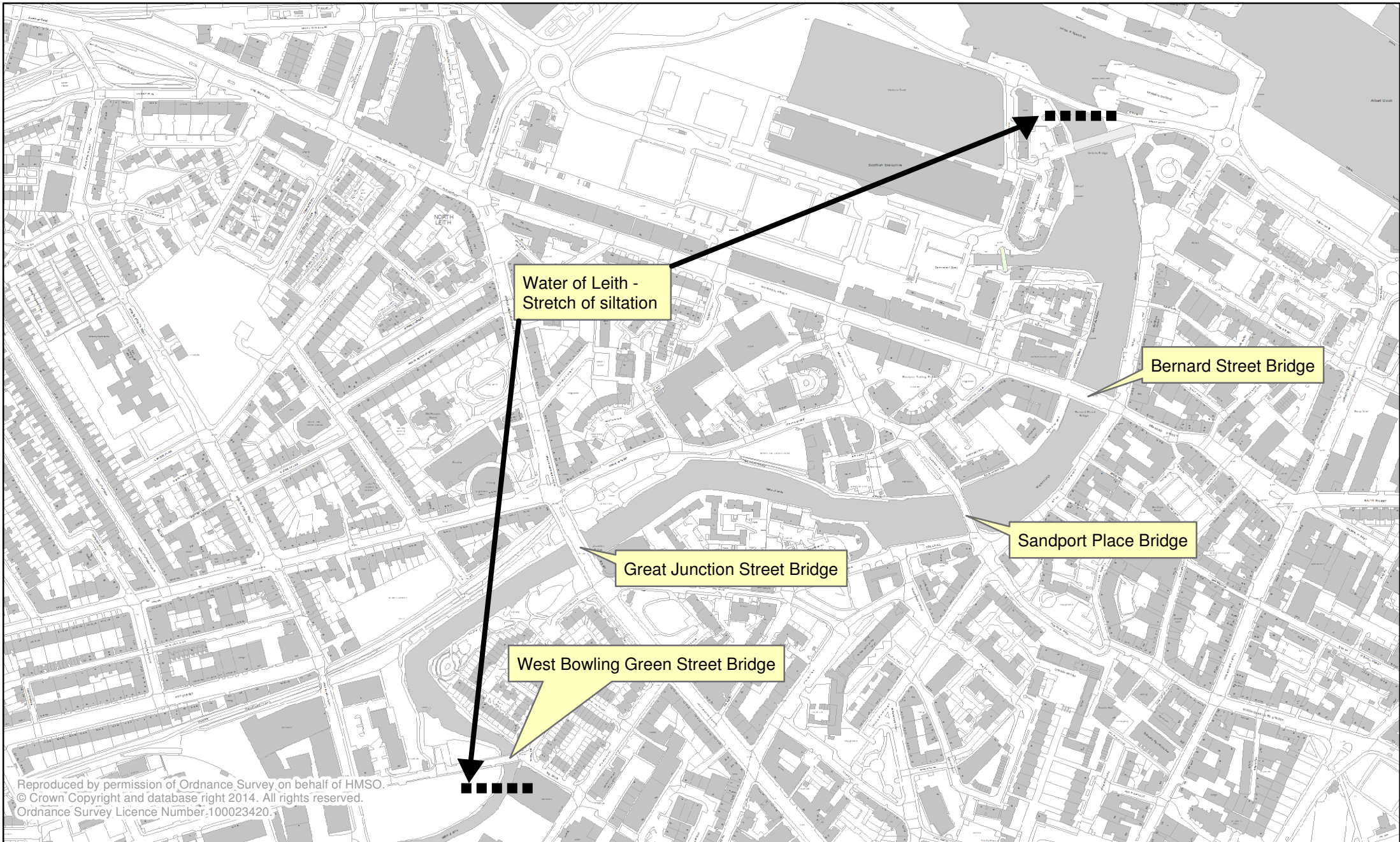


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0 125 250 500 Metres

Appendix B (Basin)



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0 50 100 200 Metres

Note : The length of the watercourse between the dashed lines is prone to siltation.