Managing water resources sustainably is essential for our health and prosperity. As well as being used for drinking, water is used in industry, for producing energy, and for recreational activities.¹

Flooding can affect us all. Public bodies are working more closely together than ever before to manage the risk and impacts of flooding.²
Why should we do this?

Water is pivotal to Scottish Canals’ business. Without a reliable supply of raw water, we would be unable to operate our canal network and deliver all of its associated multiple economic, social and environmental benefits.

As a responsible business, we need to be prepared for the impact of climate change on water resources. In recent years, Scottish Canals’ operations have been adversely affected by droughts and flood events.

We have statutory duties to protect the water environment and to use water sustainably. By doing so, the canal network can support diverse and important water dependent ecosystems and species. These have their own intrinsic value but also create a sense of place for our canals and attract visitors to enjoy our waterways. We also have duties to supply safe private drinking water supplies at some locations.

Scottish Canals has a constructive role to play in sustainable water management in Scotland. We have the opportunity to facilitate wise drinking and raw water use by our staff and customers and to generate income that can be reinvested in the canal network. Our canals also have the potential to contribute to the alleviation of flood risk in the areas we serve, particularly where development is restricted by the capacity of the waste water system.
Key Drivers

- **Scottish Government National Performance Framework outcomes.** We reduce the local and global environmental impact of our consumption and production.\(^{(3)}\)

- **Scottish Canals Corporate Plan** which sets out our plans for potential flood mitigation and surface water management opportunities under the principle of building stronger communities.\(^{(4)}\)

- **Scottish Canals Asset Management Strategy** is in development and will address how we can be resilient to the impacts of climate change.

- **Flood Risk Management (Scotland) Act 2009** which introduced a new approach that considers whole catchments, all natural types of flooding and supports close partnership working by the organisations that have a responsibility for flood risk management.\(^{(5)}\)

- **National Flood Risk Assessment 2011\(^{(6)}\)** established 14 geographic areas for the purposes of flood risk management planning. These areas cross local authority boundaries, facilitating partnership working and more catchment based decision making. Within these, Potentially Vulnerable Areas (PVA) were identified as the areas with the greatest risk to the impacts of flooding. Parts of the canal network fall within the PVAs.

- **Flood Risk Management Strategies and Local Flood Risk Management Plans** for Scotland which are due for publication in December 2015 and June 2016 respectively.\(^{(7)}\)

- **Scottish Canals Emergency drawdown plans for reservoirs** and other internal governance documents which make reference to water resource management or flooding.

- **The Water Environment (Controlled Activities) (Scotland) Regulations 2011** which licence the use of water to operate the Scottish Canal network.\(^{(8)}\)
Key Drivers

- **The Reservoirs Act 1975** which places duties on owners and operators of reservoirs designed to hold more than 25,000 m$^3$ above the natural level of any part of the land adjoining the reservoir.(9)

- **Scotland’s Water Scarcity Plan Consultation December 2014.** The plan sets out how water resources will be managed prior to and during periods of prolonged dry weather to ensure the correct balance is struck between protecting the environment and providing resource for human and economic activity.(10)

- **The Private Water Supplies (Scotland) Regulations 2006,** the purpose of which is to ensure the provision of clean drinking water. Scottish Canals has a number of private drinking water supplies on its estate.(11)

- **Climate Ready Scotland Scottish Climate Change Adaptation Programme**(12) which sets out Scottish Ministers’ objectives, policies and proposals to tackle the climate change impacts identified for Scotland in the UK Climate Change Risk Assessment as required by section 53 of the Climate Change (Scotland) Act 2009. The *Climate ready buildings and infrastructure networks* section specifically refers to canals.
Rainwater collected in a series of canal reservoirs and lochs high in the catchment flows, via a combination of feeder rivers, streams, artificial channels and pipes, into our canals. For example 70% of the water supply for the Forth & Clyde Canal flows via twin pipes under the M8 motorway in Glasgow, along the original route of the Monkland Canal. The vast majority of the raw water to supply the canal network is gravity-fed so our requirement for pumping is very limited.

Amber means: We are already active in this area but there is room for improvement.
Water – where and how much?

Scottish Canals has three water use licences for the Caledonian, Crinan and Lowland Canals (Forth & Clyde, Monkland & Union) respectively which authorise the impoundment of water in our reservoirs and abstraction of water to supply the canal network. These are issued under the Water Environment (Controlled Activities) (Scotland) Regulations 2011(8) and controlled by the Scottish Environment Protection Agency (SEPA). The licences set the quantity of water that we use and also conditions for engineering activities in the water environment e.g. sediment management, bank reinforcement, aquatic plant management and dewatering. We are required to monitor water use and report on an annual basis to SEPA. (See table on page 02-08)
Key water facts

- **220km**
  - canal channels

- **332 million litres**
  - of water used per day to operate the canals. Equivalent to just over \( \frac{3}{4} \) of a bathful per person per day in Scotland.

- **13**
  - fresh water abstraction points (Lowlands 6, Caledonian, 4 Crinan 3)

- **19**
  - water supply reservoirs
  - reservoir surface area **8,094 ha** equivalent to **7,494** full sized football pitches.

- **332 million litres**
  - of water used per day to operate the canals. Equivalent to just over \( \frac{3}{4} \) of a bathful per person per day in Scotland.

- **3**
  - water use licences for the supply of raw water to the network.

- **10,580**
  - measurements of water level and flow reported per annum.

- **3**
  - water supplies to third parties including to Helix Park Lagoon, Falkirk.

- **167 billion**
  - litres of water in our reservoirs equivalent to over 2 billion bathfuls or 394 per person in Scotland.

**Water used to operate Scottish Canals’ network**

- **49ML/d** 15%
  - Lowlands
- **97ML/d** 29%
  - Caledonian
- **186ML/d** 56%
  - Crinan
Water use licences

Compliance with the canal water use licence conditions is assessed by the Scottish Environment Protection Agency on an annual basis. The assessment is based on over 10,500 reported records of water flows and levels in the canal network per annum. This data is collected manually and automatically.

<table>
<thead>
<tr>
<th>Year</th>
<th>Caledonian Canal</th>
<th>Crinan Canal</th>
<th>Lowland Canals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>2013</td>
<td>Excellent</td>
<td>Broadly Compliant</td>
<td>Excellent</td>
</tr>
<tr>
<td>2014</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

(Assessment conducted by the Scottish Environment Protection Agency)

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Drinking water supplies

In 2013/14, the sites using the greatest volume of drinking water across the network were:

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual water consumption m³</th>
<th>Average daily water consumption m³</th>
<th>Domestic use equivalent (no. of people) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falkirk Wheel visitor centre</td>
<td>8,291</td>
<td>23</td>
<td>151</td>
</tr>
<tr>
<td>Bowling moorings, Forth &amp; Clyde Canal</td>
<td>5,537</td>
<td>15</td>
<td>101</td>
</tr>
<tr>
<td>Grangemouth Sea lock moorings, Forth &amp; Clyde Canal</td>
<td>4,071</td>
<td>11</td>
<td>74</td>
</tr>
<tr>
<td>Dochgarroch moorings, Caledonian Canal</td>
<td>2,933</td>
<td>8</td>
<td>54</td>
</tr>
<tr>
<td>Falkirk Wheel moorings, Forth &amp; Clyde Canal</td>
<td>903</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Scottish Canals headquarters, Glasgow</td>
<td>327</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: Values from metered sites. We do not have estimates of the quantities of drinking water used at non-metered sites. * domestic equivalents based on average daily domestic use of 150 litres/per person. Cost information not available and will be part of baselining.

The majority of Scottish Canals’ drinking water for our operational buildings and boating customers comes from mains supplies. We have four private drinking water supplies on the Caledonian Canal.

We have water-efficient dual flush toilet cisterns at the Falkirk Wheel visitor centre, in our offices and operational buildings which reduces the drinking water demand.
Flood control

Network management

Historic evidence indicates that the flooding risk from canals themselves is very low compared with other sources of flooding. From the water management perspective, the canal network is, in effect, a large, open drainage system. Inputs to the network from our reservoirs are controlled and monitored by our experienced staff, taking account of weather forecasts. To maintain the correct levels, each canal has a number of overflow structures such as weirs. Each of our water supply reservoirs has an emergency drawdown plan. As part of this Strategy, we will be developing a Scottish Canals climate change adaptation plan to inform how we will manage future flooding risks to our infrastructure and operations. (See Theme 1)
Flood control

Wider flood risk management
At a local scale, the canal network receives clean surface water run-off from a number of developments on adjacent land (to be more than 50 locations). By accepting this water, Scottish Canals reduces the pressure on the waste water network.

On a broader, and up to catchment, scale, Scottish Canals is currently working on a number of initiatives to enhance the sustainable urban drainage and flood alleviation potential of the network.

• The Metropolitan Glasgow Strategic Drainage Partnership, which is an exemplar of sustainable water management at a catchment scale. Scottish Canals supports this initiative and through it will make a wider contribution to regeneration. \(^{(13)}\)

• Scottish Canals is represented on the Scottish Government’s Flooding Policy Stakeholder Group.

• The North Glasgow integrated water management project which aims to promote regeneration in the area through the development of biologically diverse sustainable urban drainage systems that connect with the Forth & Clyde Canal. The feasibility study is now complete. \(^{(14)}\)

• Climate Ready Clyde: Scottish Canals is a partner in this regional climate change adaptation strategy and action plan for Glasgow and the Clyde Valley. \(^{(15)}\)
What will we do?

Faced with the potential impact of climate change, we need to plan for this change, build resilience into our water resource and infrastructure management and contribute to the wider goal of sustainable flood risk management in Scotland.

### Strategic aims

- **2S.1** Scottish Canals to contribute to flood risk adaptation and mitigation in Scotland.
- **2S.2** Scottish Canals to use raw and drinking water resources sustainably.

### Targets

- **2T.1** Position Scottish Canals as a strategic water asset across Scotland.
- **2T.2** Position the canals as a first choice for taking surface water from developments less than 300 metres from our network.
- **2T.3** Develop the North Glasgow Integrated Water Management system up to 2017.
- **2T.4** Develop new surface water connection and potential integrated water management systems across Scottish Canals.
- **2T.5** Achieve ‘excellent’ SEPA Compliance Assessment Scores for 3 canal water use licences annually 2015-25.
References


