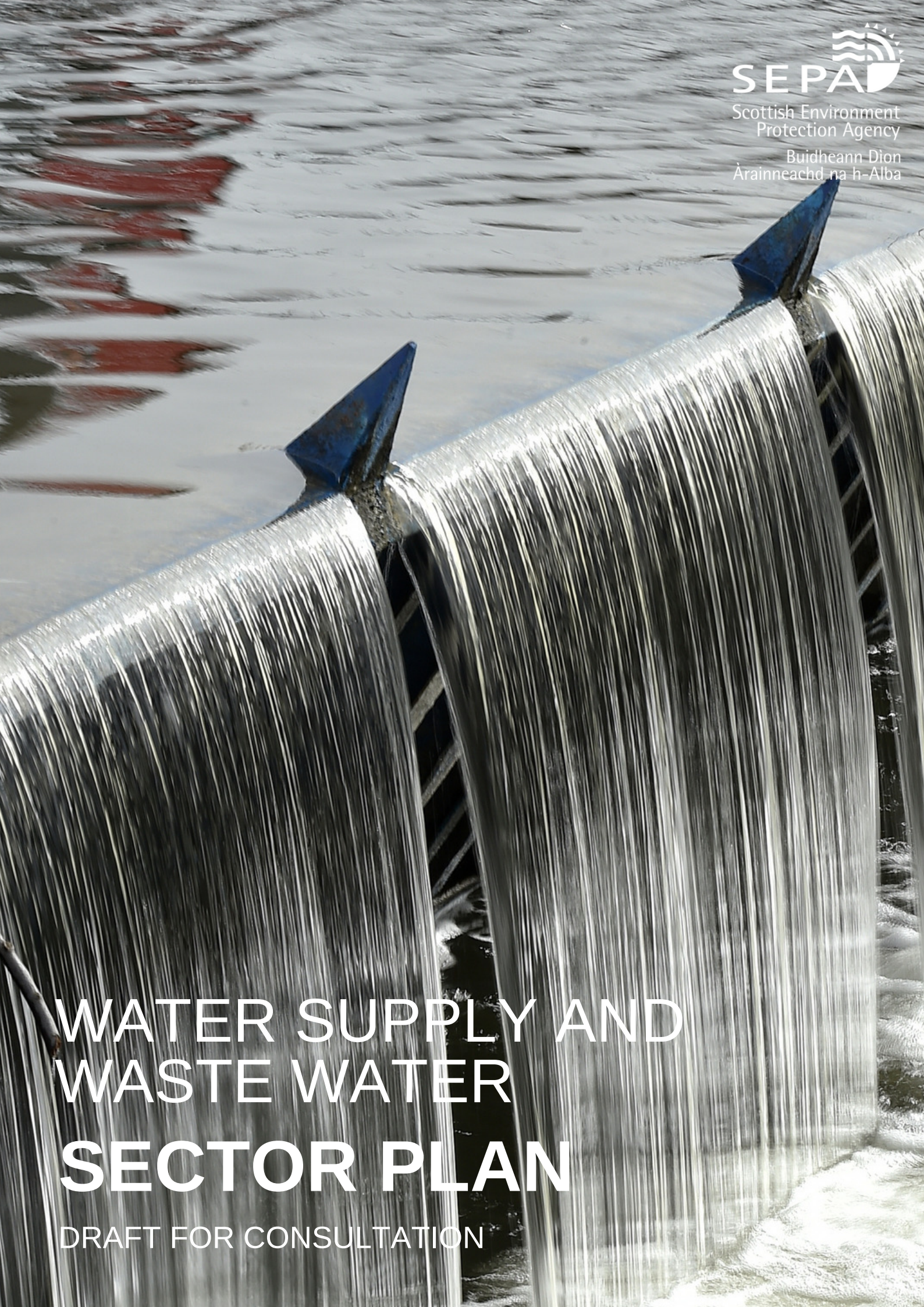


SEPA
Scottish Environment Protection Agency
Buidheann Dìon Àrainneachd na h-Alba

WATER SUPPLY AND WASTE WATER **SECTOR PLAN**

DRAFT FOR CONSULTATION

Contents

Why we are consulting

The draft sector plans are our initial ideas on where we can make the most significant impact. Getting feedback early in the process from our communities, partners and stakeholders is important and your feedback is critical to the success of our sector planning approach. If you think that we have got something wrong, missed a critical opportunity or not been as transparent as possible, please let us know your thoughts.

We aim to get these plans finalised in the first months of 2019 and then push on to implement them. Your views will also help to shape the prioritisation for the implementation, which will be completed following the consultation period.

The consultation is open until Friday 15 February 2019. Have your say, by completing the online consultation survey available from https://consultation.sepa.org.uk/sector-plan/water-waste-water-treatment

SEPA has a strong track record of regulating to improve the Scottish environment. We are proud of what we have achieved since we were set up just over two decades ago in 1996. We know we need to do more over the next two decades to build on this success. Much more.

The mounting scientific evidence about climate change, plastics in our oceans, the pressure on our freshwater and more shows us that humanity must rise to tackle major environmental challenges. This scientific knowledge underpins SEPA's strategy for how we will regulate - One Planet Prosperity. If everyone in the world lived as we do in Scotland, we would need three planets. There is only one.

So, we will regulate to help Scotland prosper within the means of our one planet. Successful businesses in future will be those that use low amounts of water, materials and carbon-based energy and create little waste. Prosperous societies will be comprised of these businesses. This can be Scotland.

In every sector we regulate, this means we will have two simple aims. We will:

1. ensure that every regulated business fully meets their compliance obligations;

2. as many regulated businesses as possible will go beyond the compliance standards.

This draft sector plan outlines how we will do this in regulating the water supply and waste water sector.

Water is essential to life itself as well as every aspect of our society and economy. The global pressures on our fresh water resources are enormous and will continue to grow. How a society manages the provision of its water supply and its waste water services will be a key determinant of how successful it is. Ultimately, even a water-abundant nation such as Scotland will have to unlock innovation on a grand scale.

So, in the future management of water, what will success look like? In short, we'll use less of it and we'll waste none of it. We are a long way from achieving this, but many people and organisations have made a start and Scotland has a global reputation for its expertise in water management. SEPA is determined that, as Scotland's environment protection regulator, we will support this focus on both excellence and innovation in water and wastewater management. How we propose to play our role is spelt out in this draft sector plan.

This draft plan is ambitious. It spells out how we will use traditional environmental protection agency (EPA) regulatory tools, such as permits and enforcement, in clearer and more powerful ways. It sets out some completely new ways, such as novel partnerships, that we will develop and use to support innovation in this sector.

We would love to hear what you think of our draft plan. Once it's finalised, we are going to push on and implement it. So if you think we've got something wrong, missed something out or not been as transparent as possible, please let us know your thoughts. We want to get this right and then get on with it.

Terry A'Hearn
SEPA Chief Executive Officer

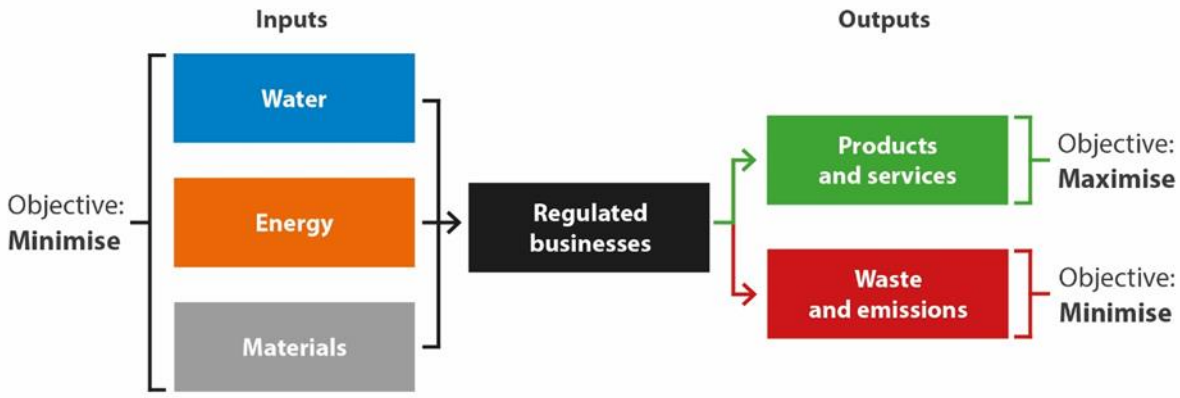
1. Introduction

For SEPA to help create a prosperous Scotland that lives within the means of one planet, we need to radically change the way we work. In the past, our approach to regulation has been grounded in the different set of rules we manage to protect the environment. This has helped us to deliver, for example, improvements in water quality. However, it will not enable us to make the transformational changes needed to tackle today's problems.

We are moving instead to ground our regulation in working across whole sectors. In this way we can systematically identify the compliance issues that need to be tackled by the sector. But mere compliance and small scale incremental change will not be enough. We want to help operators and sectors to implement successful innovation and support them in their ambitions to do more than they are required to by regulation. We call this "moving beyond compliance": helping already high performing operators to do more for the environment because it makes sense for them. We will also identify where the biggest opportunities are for us to help the sector to go beyond compliance. In both ways this will help those we regulate operate successfully within the means of one planet.

All those we regulate in a sector use water, energy and raw materials to produce the products and services they sell. In doing so, they also create waste and emissions. We can think of these as environmental flows that need to be managed by operators (Figure 1).

Environmental flows (Figure 1)



We want to help as many operators as possible to manage these flows effectively and reduce their use of natural resources and creation of waste in ways that enable them to meet their legal obligations, drive further improvements and be successful. To do this, we are preparing sector plans for every sector that we regulate.

Sector plans are at the heart of everything we do, shaping the interactions with every sector and the operators in them. Through them, operators will get the relationship that their attitude and performance earns. Those that demonstrate a commitment to good environmental performance and deliver solid outcomes will receive powerful support through guidance and advice. Those that demonstrate behaviour which leads to significant or chronic non-compliance can expect SEPA to use the most appropriate enforcement tools to bring them into compliance.

This is our plan for the water supply and waste water sector. It details how SEPA is going to regulate the sector and work with it to protect and improve the environment. The plan covers both public and private water supply and waste water treatment. Its focus is on building a circular economy that helps minimise the impact of the sector on the environment and strengthens Scotland's resilience to climate change.

What's covered?

Public water supply and waste water

- The abstraction, treatment and distribution via public water mains of drinking water to households and businesses.
- The management of any liquid wastes or solids generated during water treatment.
- The collection in public foul sewers or combined sewers[1] of sewage and other waste waters, including trade effluents.
- The treatment of such waste waters at waste water treatment works.
- The storage, recovery of resources from; recycling; or disposal of solids and liquids generated during treatment.

Private water supply and waste water

- The abstraction, treatment and piping of drinking water by households and businesses not connected to public water mains.
- The management of any liquid wastes or solids generated during water treatment.
- The treatment of sewage by households or businesses not connected to public foul sewers or public combined sewers.
- The recovery of resources from; recycling; or disposal solids and liquids generated during the treatment process.

[1] Combined sewers are designed to collect rainfall run-off as well as sewage and other waste waters.

2. Our vision for the water supply and waste water sector

Our aim is to help Scotland create a truly circular economy for its water supply and waste water sector. Under this vision:

- **Scotland will be a low water use country with respect to water supply, able to reliably meet its water needs in a changing climate and protect the natural environment.**
- **The drainage of towns and cities will have been re-designed to cope with the intense rainfall expected from climate change; minimise sewage spills; and enhance the attractiveness of urban landscapes.**
- **The sector will have minimised its use of energy and other resources and be converting sewage and other wastes into valuable resources.**

Few other sectors are of such fundamental importance as the water supply and waste water sector to every person in the country's health and well-being; to the quality of large parts of the natural environment; and to Scotland's economic success. And yet it is easy to take water supply and waste water services for granted, whether or not they are public or private.

Over the next few decades, climate change will have increasingly profound effects on water demand; water availability; raw water quality; the risk of sewer and surface water flooding during intense downpours; and the operation of waste water treatment works, including as a result of sea level rise and weather extremes. In parts of the country, some of these effects will be compounded by population growth. The enormity of the challenge these effects pose for the sector cannot be understated.

Our vision is a vision for addressing these challenges and, at the same time, driving down the sector's greenhouse gas emissions. Realising our vision will be hard; it will take time; and it will involve difficult choices. But realising it is of greater urgency than ever before. Unless action is accelerated now, the country will be left dangerously underprepared and exposed as the climate changes.

The sector has a big and important role to play in delivering the transformation needed. However, it cannot do it alone. To succeed, major change has to happen in other sectors, such as housing, town planning and rainwater drainage; and a wide range of business sectors. One of the things we can do is to help bring the different sectors together.

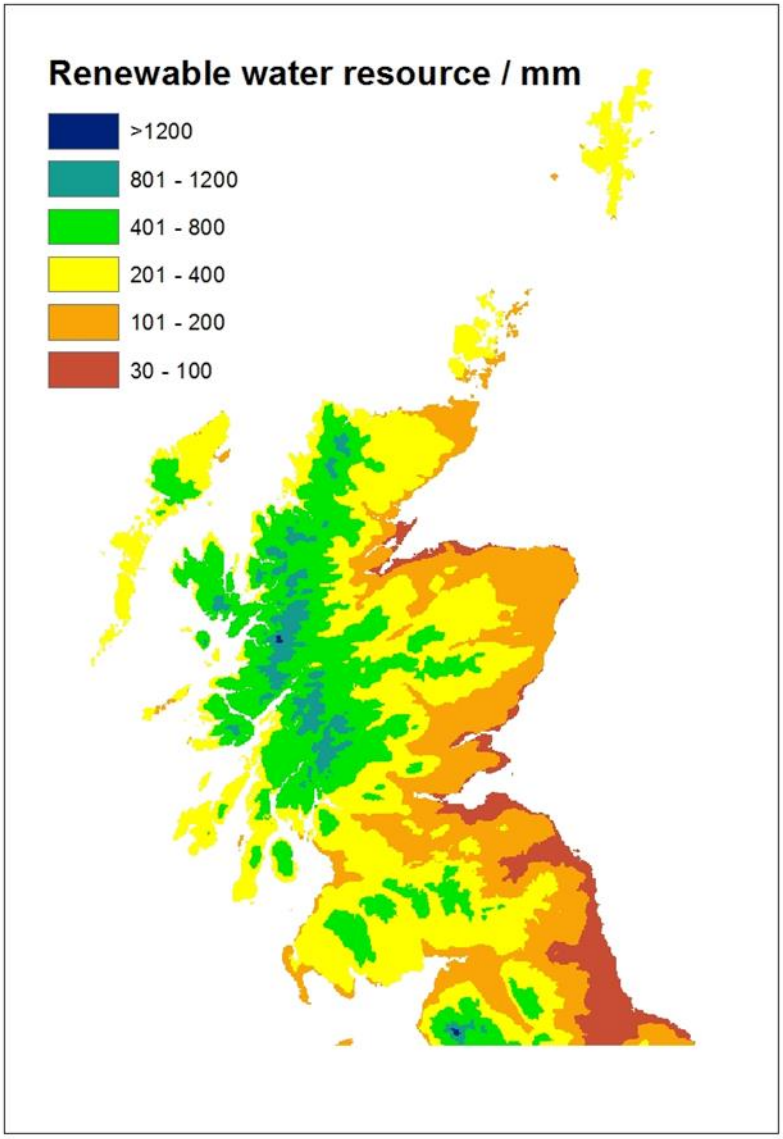
Our vision is also very much for a sector that has turned challenges into opportunities: A sector that is generating wealth not waste through maximising the recovery of resources from sewage and cycling them back into a circular economy. It is an ambition that will help Scotland to be a world leading 'Hydro Nation'[2], recognised and valued for its expertise in resilient water supplies; resource recovery from waste waters; 21st century rainwater drainage; strong environmental protection; and effective, risk-based regulation.

[2] www.gov.scot/policies/water/hydro-nation/

Water supply

Low water use, low pressure on natural environment	Resilient	Low energy input	Low chemical input

Renewable water resource (Figure 2)



Scotland gets more than its fair share of rain. But the quantity that can be used without exhausting reserves and impacting the natural environment varies considerably across the country. There is much less renewable water resource available in the east because rainfall here is lower and evaporation much higher.

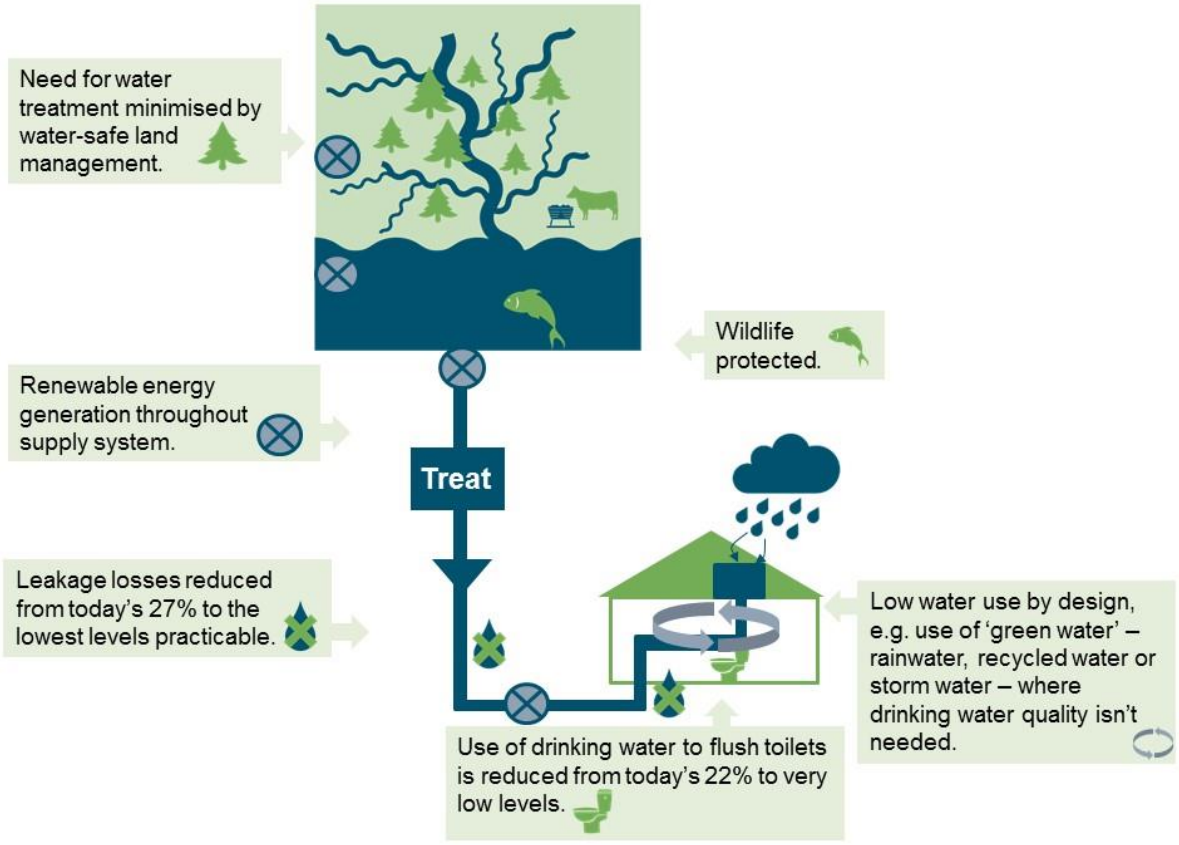
Climate change is expected to result in warmer, drier summers across the country. By the middle of the century, the frequency of droughts severe enough to put water supply at risk is projected to double.

Unless managed, demand for water supply is likely to rise, as water use tends to increase markedly in warm weather. Competition for water sources from other sectors, such as agriculture, is also likely to rise.

Demand is also likely to increase as the number of people living in Scotland grows. A 5% rise in the population has been projected by 2041. People are also expected to move from parts of the west to the east, concentrating population growth in parts of the country with the lowest renewable water resource.

Smaller public and private supplies with limited storage are likely to become increasingly vulnerable as the climate changes, particularly during peak demand in hot weather. During the dry summer of 2018, a number of private water supplies failed and households had to rely on bottled water.

What might future water supply look like? (Figure 3)



In a low water use society, the status of the environment is not threatened by over-abstraction in long, dry periods of weather, such as those Scotland is increasingly likely to experience under climate change; water supplies are resilient; and the energy and chemical costs of providing supplies are kept at a minimum.

Leakage

Scottish Water has made significant reductions in leakage from public water mains over a number of years and has reduced its carbon footprint as a result. Locating and repairing the remaining leaks is becoming progressively harder. To continue making the same progress in reducing leakage, new innovative ways of finding and fixing leaks will be needed. Progress can also be made by using the opportunities provided during other infrastructure projects, such as major roadworks, to find and fix leaks.

As much as 25-30% on average of leakage can be from the pipework within private premises rather than leaks in the public distribution network. Action to reduce this leakage could make use of opportunities provided when homes are being refurbished or when lead pipes are being replaced. Many people are likely to be unaware of the extent of leakage in homes and business premises. Raising awareness could help stimulate action but new ways of incentivising and enabling action are likely to be needed to bring about major reductions in the scale of these leaks.

Water usage by households and businesses

Information and advice, whilst important, tends to have only a modest effect on people's water usage. Low water use building designs, including, for example, designs that use 'green water' (rainwater; recycled water or storm water) where drinking water quality is not required, could deliver greater reductions in water usage per property. New developments offer a real opportunity to work with developers to encourage them to embed these approaches and establish new standards for buildings that will stand the test of time.

The immediate benefits of reducing leakage and inefficient usage are going to be greatest in areas that are already water stressed or likely to become increasingly so as the climate changes or their populations rise; and where levels of energy and chemical use in treatment and distribution are highest.

We will work with Scottish Water, local authorities, Scottish Government, the Drinking Water Quality Regulator and other partners to encourage and support the development of a strategy for low water use, including for making it easy for people to be water efficient.

Raw water quality

More intense rainfall under a changing climate is likely to increase the risk of run-off of pollutants from farmland into rivers and reservoirs with potential consequences for the amount of energy, chemicals and expert management needed to produce clean, safe drinking water. Climate change may also enable an expansion of intensive agriculture increasing risks to some sources of private and public supplies.

We will contribute to protecting supplies from diffuse pollution by working with land managers, other regulators and farm advisors to ensure required water-safe land management practices are followed.

Sewer networks

Losses of sewage minimised	Cityscapes enhanced	Heat energy recovered	Climate change resilience high

Around 53,000 kilometres of underground sewers carry waste waters from homes and businesses to public waste water treatment works. Around 40% of sewers also carry rainwater drainage.

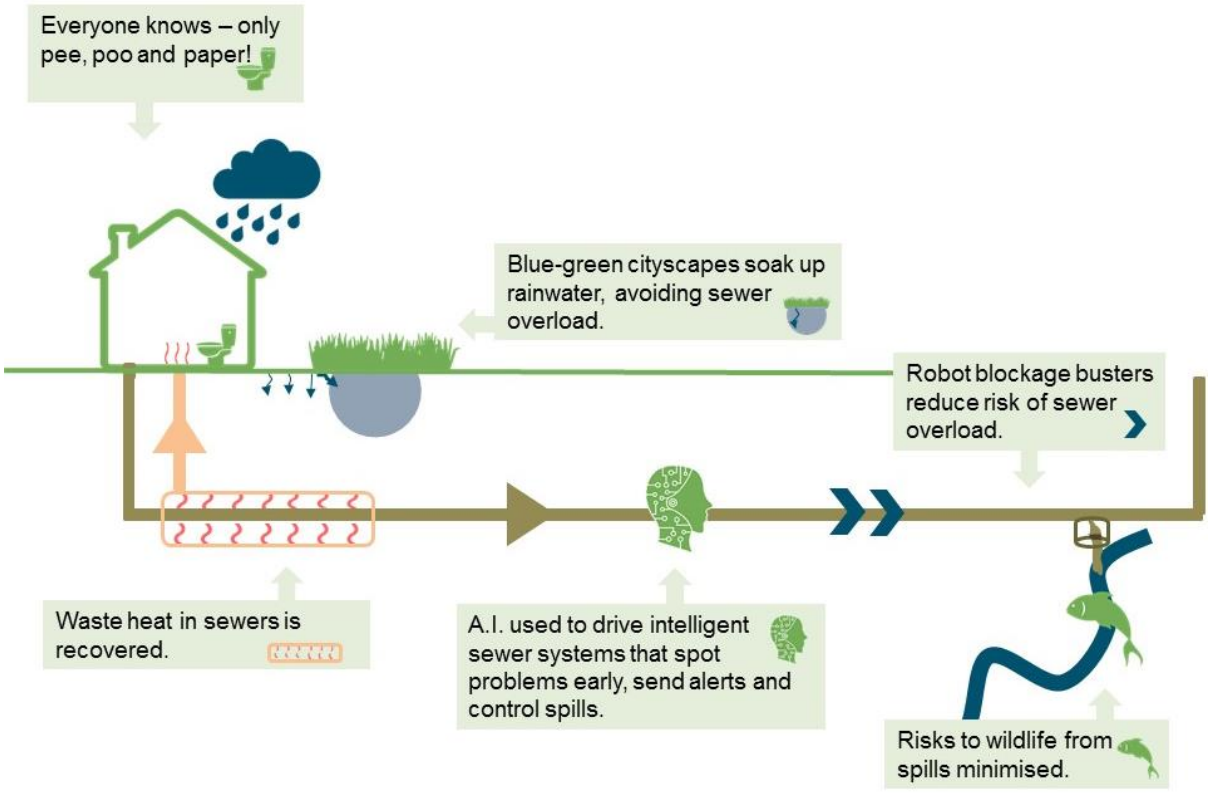
The sewer network includes around 4,000 outlets designed to allow combined sewers to spill into the water environment during heavy rainfall to prevent the sewers backing up and flooding streets and properties.

Sewer flooding or spills from the overflows can also occur as a result of blockages in the sewers. Blockages are very common and usually the result of businesses or households using sewers to dispose of fats, oils, greases, sanitary products, wet wipes and other products. Scottish Water deals with around 100 sewer blockages every day.

Pollution of the water environment can result from overflows when the proportion of sewage compared to rainwater in the sewer is high. The vast majority of pollution incidents today are due to blockages leading to spills. Scottish Water has worked hard to clear blockages through cleaning and maintenance. To make a real step change now requires:

- tackling the source of the problem by persuading product manufacturers to adjust product specifications or better inform consumers about safe disposal; and businesses and the public to change behaviours;
- improving network monitoring and understanding, for example using artificial intelligence, to help identify where blockages are developing so that faster and preventative action can be taken; and spills can be controlled and diverted to where they will have the least impact.

What might future sewer networks look like? (Figure 4)



As the climate warms, the air is able to hold more moisture. This means that there is a higher risk of the type of heavy rainfall that can cause flooding of streets and spills of sewage. By 2100, some projections indicate that the quantity of rain falling during downpours could increase by 45 to 55%. Population growth will add further to the volume of waste water that has to be conveyed in combined sewers. Pollution incidents and chronic pollution problems caused by spills where sewer capacity is exceeded are likely to rise substantially if action is not taken.

Re-designing how towns and cities are drained is going to be key to protecting the environment where people live and work; and managing the risk of flooding of streets and properties. But it will require a major transformation in how drainage in towns and cities is currently planned and delivered.

21st century drainage will need to significantly reduce the volumes of rainwater that drain into the sewer network. To do this, towns and cities will need to create and use ‘blue-green infrastructure’, such as greenspaces, wetlands and porous surfaces, to soak up, store and safely convey rainwater. To be effective, they will need to do this in a systematic way across entire drainage areas, taking account of rainwater drainage and waste water drainage networks.

An added benefit of maximising the use of blue-green infrastructure to soak-up and manage rainwater is that doing so will enrich the biodiversity of towns and cities and add to their attractiveness for residents and visitors.

No single organisation can deliver this transformation. It will require partnerships and new ways of working between local authorities, Scottish Water, developers and property owners. It is likely to need new incentives to stimulate and support the scale of change that that will need to be made over the coming decades.

We will work with Scottish Water, local authorities, developers and other partners to support, and help facilitate, action to build 21st century drainage solutions into new developments and into those towns and cities that are at risk of environmental pollution and sewer flooding as climate changes and their populations grow.

Waste water

Resource recovery	Pollution controlled at source	Value added

Today’s waste water collection and treatment systems developed to safely dispose of sewage and other waste waters. They provide a vital role in protecting public health and the environment.

There are over 1,800 public waste water treatment works and an estimated 250,000 private systems in Scotland. The majority of the latter serve domestic properties but include some bigger systems serving caravan parks; hotels; other business premises; and even large workforces, such as at nuclear facilities.

Most of the public waste water treatment works are operated by Scottish Water but 20 large works are run on behalf of the public by private companies under the Private Finance Initiative.

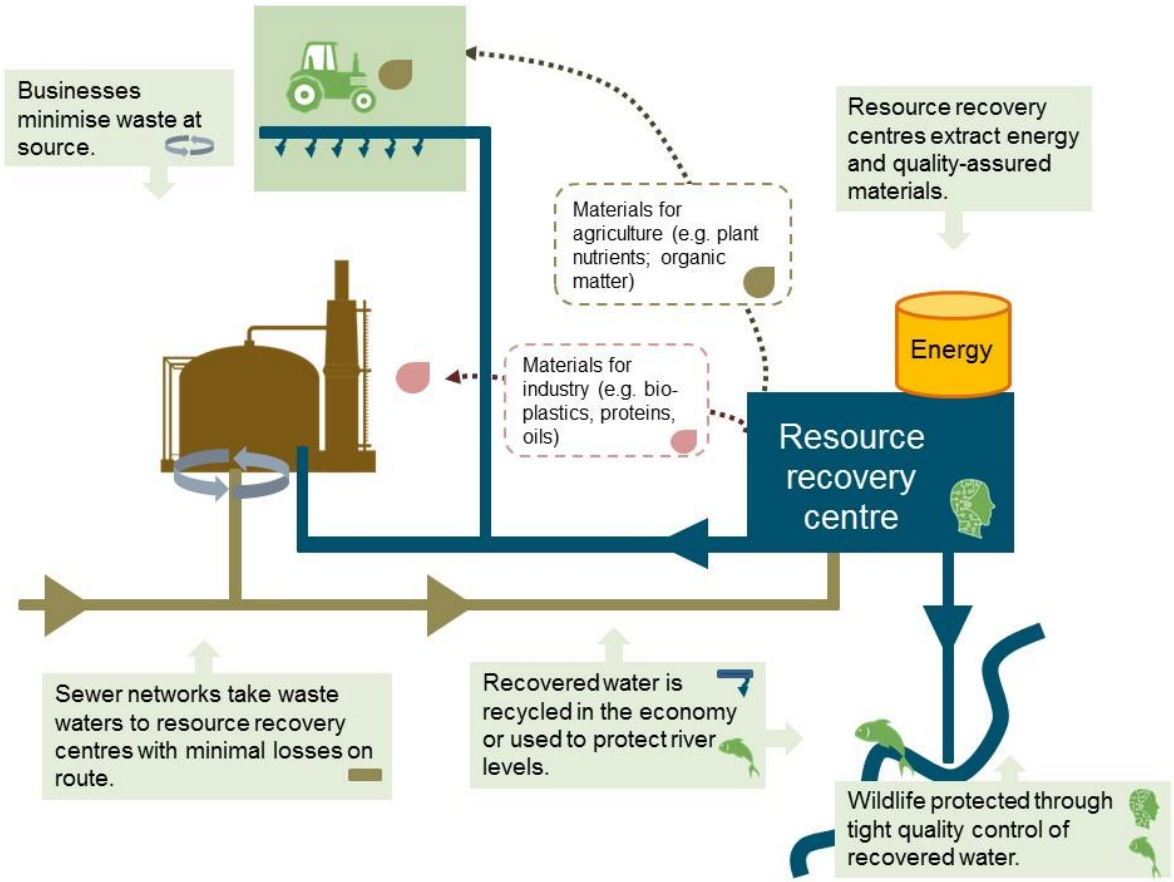
A significant proportion of the small systems discharge to land via a drainage field. However, nearly all other waste water treatment systems discharge their final effluent to rivers, estuaries or the sea.

Waste water treatment also produces solid, organic waste, called sludge. Up until the late 1990s, around three quarters of the sludge produced was dumped at sea. Today, over 70% of sludge produced at public waste water treatment works is recycled by spreading on agricultural land or re-used in land reclamation. Water treatment works (i.e. works where water supplies are treated to meet required drinking water standards) also produce sludge.

This sludge makes up around 25% of the combined total. Currently, about 99% of sludge from water treatment works is re-used in land reclamation.

To live within the means of One Planet, societies need to maximise the recovery and utilisation of resources. Our vision is for waste water treatment works and sludge works to become resource recovery centres in a circular economy. This will make preventing pollution a value maximisation process. Businesses that discharge trade effluents to sewer also have an important role to play by also taking action to minimise waste and maximise resource recovery at source.

What might future for waste water management look like? (Figure 5)



Changing focus to minimising waste and resource recovery will involve making fundamental changes in current infrastructure; and the development and introduction of new technologies.

Ultimately, this transformation has the potential to be cost-neutral or even generate income for the sector and for those businesses that reduce waste in their discharges to sewer. However, it is likely to require significant upfront work and investment to:

- develop and trial new technologies for recovering different materials from waste;
- retrofit those technologies;
- help develop markets for, and distribute, the recovered materials.

It will also require parallel work to understand the risks posed to the environment and options for recovering value from wastes, by pollutants that have not been previously investigated or subject to controls but are emerging as a potential threat.

We will work with Scottish Water to:

- help identify opportunities for it to work with businesses from other sectors in recovering, distributing or utilising resources from wastes, including businesses discharging wastes to the public sewer;
- where we can, ensure the way we regulate helps support and facilitate resource recovery.

Appropriate treatment of wastes and protection of the environment will continue to be core requirements. However, to achieve our vision of minimising energy and other resource use, the sector will need to find, and switch to, new ways of treating wastes to high standards using passive or low energy techniques. Where we can help facilitate, for example by bringing parties together, we will work with Scottish Water and other partners to help encourage and support this shift.

Private water supply and waste water systems

Much of our vision for the sector outlined above also applies to private water supplies and waste water systems. However, there are some important differences in the approach needed. The vast majority of private water supplies and private waste water treatment systems serve individual houses or small groups of houses. In the main, even the larger private systems are managed by operators that lack the breadth and depth of expertise and resources available to Scottish Water and the Private Finance Initiative operators of waste water treatment works.

Technology

Small private water supplies in the future will ideally rely on well-constructed boreholes to abstract clean, safe groundwater. Use of this source improves resilience of supplies to climate change and reduces the levels of water treatment needed. Novel designs and approaches to establishing borehole sources could help minimise the energy needed to pump water to the surface.

Many of those on private supplies currently obtain their water from shallow wells or watercourses and have done so for many years. They will require advice, help and support if they are to make the switch to more resilient and less vulnerable groundwater sources. Our vision for private supplies won't be realised in the short term and likely require new ways of incentivising and supporting change.

Under our vision, private waste water systems will also have transitioned to emerging technologies, such as dry toilets and passive treatment systems. Systems serving small communities and businesses would be making use of technologies[3] that can recover resources such as energy, water and nutrients for local re-use. Many of those operating private systems are likely to need incentives and substantial support before the adoption of new technologies is likely to become widespread.

[3] www.crew.ac.uk/publication/water-resource-balancing

Management

The environmental performance of privately operated waste water treatment systems and water supplies tends to be significantly worse than that of the public sector. To achieve effective protection of the environment, we think an entirely new, nationally-created means is needed of ensuring the appropriate design, inspection, maintenance and, where necessary, upgrade of private water supply and waste water systems.

This new system would need to ensure that:

- new or upgraded systems are designed to be as reliable, low maintenance and low resource intensive as possible;
- inspections, maintenance and any necessary upgrades are compulsory and carried out to appropriate standards;
- there is a means of sufficiently and sustainably financing inspections, maintenance and upgrades.

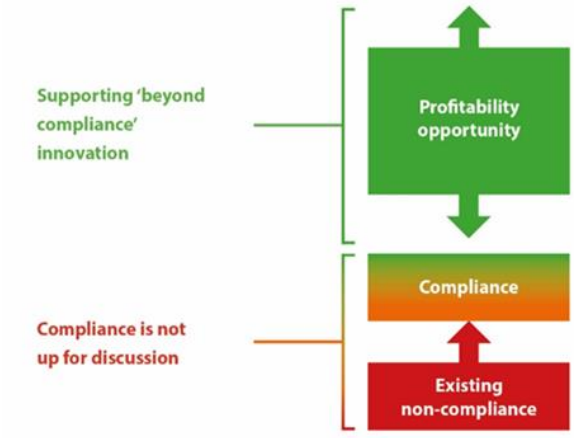
Our objectives

The objectives of this sector plan are to:

- ensure all operators and sites in the sector reach and maintain full compliance with Scotland's environment protection laws; and
- help the sector to move beyond compliance.

This is illustrated by the sector roadmap (Figure 6).

Sector roadmap (Figure 6)

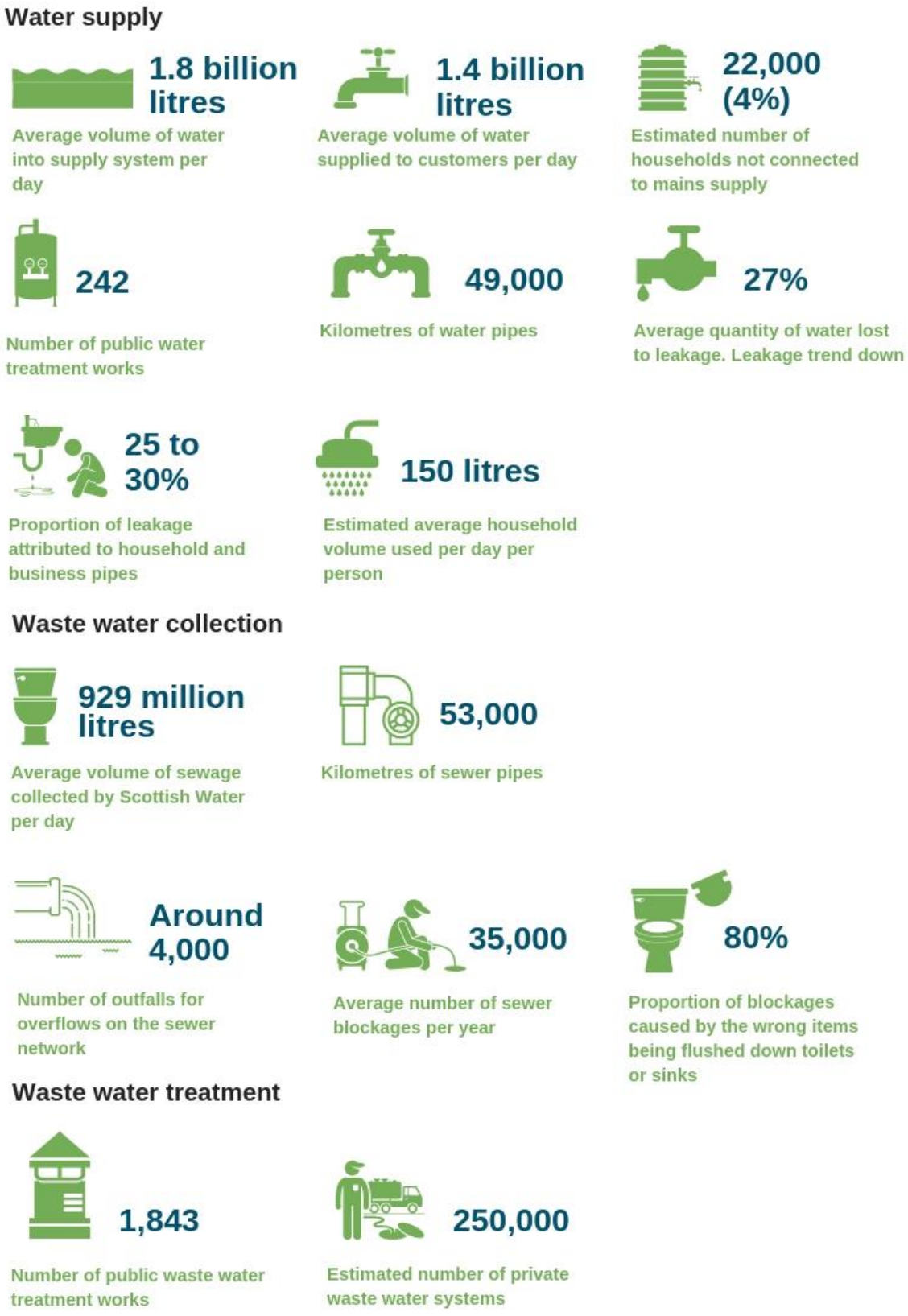


This sector plan sets out how SEPA will work with the water supply and waste water sector. For our vision and objectives to be achieved our staff will work with partners and facilitate liaison between them and the water and waste water sector to create opportunities that link the sector's success with environmental success.

We want to bring together skilled, experienced and innovative people from across the sector to understand key challenges and opportunities to create innovative solutions. If we get this right, it will mean that the environment is not seen as a constraint, but a platform on which economic and social success can be built, putting the water supply and waste water sector on a pathway to becoming a 'one planet' sector.

3. The water supply and waste water sector

Facts and figures (Figure 7)



Sewage sludge

Around 120,000

Sewage sludge generated from public waste water treatment (tonnes of dry solids)

Over 70%

Proportion of sewage sludge re-used on land (dry solids)

Energy and carbon

440 GWh

Amount of electricity Scottish Water operations consume (2017-2018)

- water network - 14%
- water treatment - 21%
- waste water network - 18%
- waste water treatment - 31%
- sludge - 14%
- admin - 2%

923 GWh

Renewable energy Scottish Water hosts and generates

315,000

Scottish Water's carbon footprint in 2017 (tonnes per annum) - Down one-third from 2007

Around 350 GWh

Estimated potential average recovery via anaerobic digestion per year

25 GWh

Amount of energy recovered from sludge via anaerobic digestion per year

Investment

£3.9 billion

Total investment planned by Scottish Water between 2015 - 2021

£647 million

Total investment made by Scottish Water in 2017-2018

4. Environmental impacts and how we manage them

Sector operation	Environmental factors affecting operation	Pressure on environment from operation	Principal regulator of pressure
Water abstraction	▪ Climate change reducing available resource. ▪ Increased demand due to hotter weather or population growth. ▪ Overuse by other abstractors.	**Locally regulated pressures** ▪ Reduced river flows, particularly in dry weather. ▪ Intake weirs or reservoir dams impeding fish migration. ▪ Reservoir safety. ▪ Risks of transferring invasive non-native species in transfers of raw water between river catchments. **Other pressures** ▪ Energy usage in raw water transfers.	SEPA
Water treatment	▪ Land use effects on raw water quality. ▪ Pollution incidents. ▪ Climate change increasing likelihood of intense, poor quality run-off from land.	**Locally regulated pressures** ▪ Discharge of chemicals used in water treatment. ▪ Management of sludge from water treatment. **Other pressures** ▪ Energy use in treatment	SEPA
Water distribution	▪ Climate change – extreme cold or very dry weather leading to burst pipes. ▪ Erosion and land slips leading to pipe breaks.	**Other pressures** ▪ Energy use (pumping and maintenance).	
Waste water sewer networks	▪ Tree root growth penetrating sewers leading to blockages or pipes fracturing. ▪ Land erosion/subsidence damaging sewers. ▪ Climate change - increases in rainfall intensity leading to increased combined sewer overflows and sewer flooding; and	**Locally regulated pressures** ▪ Pollution and littering from combined sewer overflows or sewer leakage. ▪ Connections to sewer, including trade effluent discharges. **Other pressures** ▪ Sewer flooding in properties, roads etc.	SEPA Scottish Water

	increased quantities of silt entering and accumulating in sewers. ▪ Climate change – hot, dry weather affecting sewer flows and septicity. ▪ Population growth. ▪ Expansion of the area of impermeable surfaces in combined sewer areas leading to more rainwater entering sewers. ▪ Disposal into the sewer of materials that cause blockages, such as fats, oils, greases, wet wipes, sanitary products, etc.	▪ Energy use (pumping and maintenance).	
Waste water treatment and subsequent management of liquid and solid wastes, including sludge	▪ Climate change – extreme cold or very dry weather affecting treatment process. ▪ Climate change - very dry weather affecting available dilution in water environment for discharges. ▪ Climate change - sea level rise and more frequent extreme river floods posing a risk of works being flooded. ▪ Disposal of wastes (into sewer or into private treatment systems) that impair or knock out treatment systems. ▪ Discharge into the sewer of environmentally toxic chemicals (including in household products) that are difficult or very costly to treat. ▪ Soil nutrient status etc with respect to acceptance of sludge applications to land.	**Locally regulated pressures** ▪ Discharges of effluents and storm overflows to the water environment. ▪ Disposal of rags, wipes, sanitary products etc removed in treatment. ▪ Emissions to air from sludge processing. ▪ Run-off from sewage sludge use on land. ▪ Application of sludge to land, including level of contaminants in sludge. ▪ Disposal of sludge to landfill or incineration. ▪ Odour from treatment works; and sludge storage and use. **Other pressures[4]** ▪ Energy use (waste water treatment and sludge transport).	SEPA Local authorities

[4] We are taking part in a project along with Scottish Water and led by UK Water Industry Research aimed at improving understanding of the fate and behaviour of micro-plastics released into the sewers.

Water use

- The sector is highly dependent on the availability and quality of raw water sources; and on the capacity of rivers and the sea to disperse and assimilate waste water discharges.
- Flooding caused by lack of sewer system capacity during intense rainfall is a major issue for Scotland. The risk of flooding is anticipated to increase with climate change.

Energy use

- Water supply and waste water collection and treatment use large amounts of energy. The sector has made big reductions in its carbon footprints but there is potential to do more.

Materials use

- The sector uses large quantities of chemicals and other materials in water and waste water treatment. Much larger quantities are lost to the environment in waste water discharges and sludge disposal.

Environmental regulation of the water supply and waste water sector

Around 80% of environmental legislation in Scotland originates from the European Union. As the UK leaves the EU, changes will, where necessary, be made to domestic legislation to ensure that the standards of environmental protection we enjoy today and the principles upon which they are based are maintained. Therefore, while some of the detail of the legislation we use to regulate may change, our work to protect Scotland's environment will not. Our commitment to tackling non-compliance with environmental laws and, where necessary, taking enforcement action will not diminish as a result of the UK leaving the EU.

We regulate a wide range of activities carried out by the sector. The main activities are summarised below:

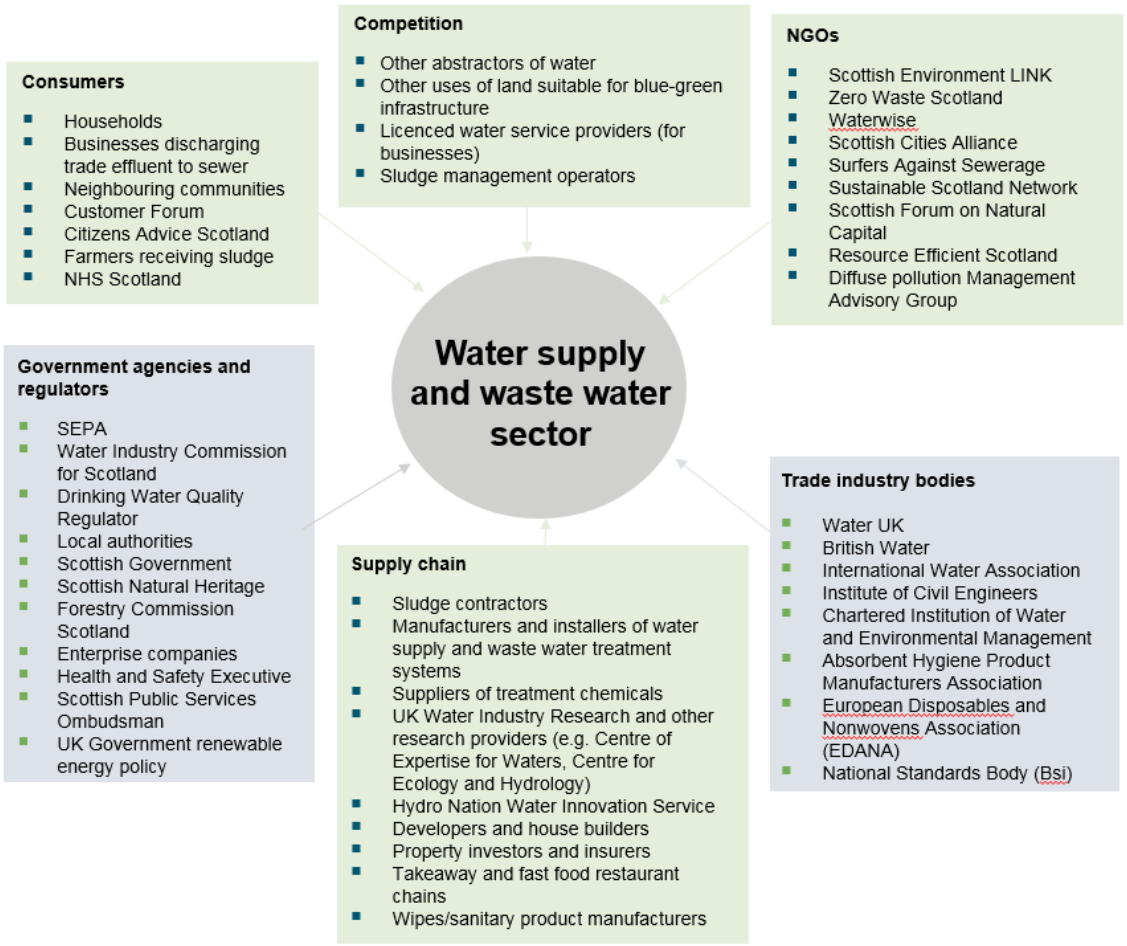
Water supply	
Reservoir safety	Reservoirs (Scotland) Act 2011
Water abstraction; operation of reservoir dams and water intake weirs; borehole construction; water transfers; discharges from water treatment works.	Water Environment (Controlled Activities) (Scotland) Regulations 2011
Waste water collection	
Sewer overflows into the water environment	Water Environment (Controlled Activities) (Scotland) Regulations 2011
Waste water treatment	
Discharges of effluents from waste water treatment systems	Water Environment (Controlled Activities) (Scotland) Regulations 2011
Sludge processing and management installations	Pollution Prevention & Control (Scotland) Regulations 2012 Environment Protection Act 1990
Transport and disposal of sewage rags and debris	Waste Management Licensing (Scotland) Regulations 2011 Pollution Prevention & Control (Scotland) Regulations 2012 Control of Pollution (Amendment) Act 1989
Storage and application to land of sludge	Waste Management Licensing (Scotland) Regulations 2011 Environment Protection Act 1990 Water Environment (Controlled Activities) (Scotland) Regulations 2011

Wider influences on environmental performance of the water supply and waste water sector

Full compliance with environmental regulations will not, by itself deliver the transformational change required to secure our One Planet Prosperity objectives. The Water Supply and Waste Water Sector Plan needs to unlock the potential for the sector to gain strengths in resource efficiency and environmental innovation that will help it to develop a circular economy in water supply and waste water collection and treatment. We need therefore to combine the actions that we can take to influence the behaviour of the sector through our regulatory role with all the other influences. The latter include influence through our role as Scotland's national flood forecasting and flood warning authority; and the country's strategic flood risk authority responsible for preparing Flood Risk Management Strategies[5]. Doing this will be the most effective way to secure full compliance and to help the sector to move beyond compliance.

Working with the sector, we will place this more sophisticated way of operating at the heart of our work. Figure 8 summarises the main organisations that influence and are influenced by the water supply and waste water sector and identifies those that we are likely to work with in both the short and longer term. As we implement the plan we will consider the opportunities these relationships provide and how we would like them to develop.

Key influences on the water supply and waste water sector (Figure 8)



[5] http://apps.sepa.org.uk/FRMStrategies/

Scottish Water is in a unique position to go beyond compliance and help drive the creation of a circular economy, including by working with others within the sector; businesses discharging trade effluents to sewer; local authorities and housing developers. And it is already involved in a wide range of beyond-compliance initiatives, including working with us:

- on projects supported by Scottish Government to tackle pollution at source by tracking down waste water misconnections[6];
- to find new ways to increase resource recovery from waste water;
- to develop a route map for changing the way towns and cities are drained; and
- on a study investigating the sources and environmental risks posed by toxic substances entering sewers.

We will continue to do everything we can to help and support Scottish Water drive and champion the transformation to a circular economy. The primary influences on Scottish Water are:

- investment planning and prioritisation;
- price reviews;
- Scottish Water's key performance indicators.

The investment planning and prioritisation process for Scottish Water is in the process of changing, increasing the opportunity for us and other stakeholders to discuss, and advise on, priorities.

We will continue to actively engage in developing the new investment planning and prioritisation framework with the aim of ensuring investment is sufficient to deliver environmental priorities and contribute to building a circular economy

In support of this, we will work with Scottish Water, the Water Industry Commission for Scotland and Scottish Government to help ensure price reviews and the Government's budget decisions are able to take account of environmental priorities and investment opportunities that would help transform the sector and its resilience to climate change.

[6] Waste water misconnections are when sewage from properties is connected to drains meant only for rainwater. Misconnections can occur during home improvements when new plumbing is connected to the wrong drain.

5. Tackling non-compliance and taking opportunities to go beyond

Compliance in the sector

Working in partnership is the only way that we can help achieve our vision for the sector. This includes maintaining, and building on, the strong relationship we already have with Scottish Water. At the same time, we will continue to regulate firmly, fairly, independently and transparently. This is as important for the sector as it is for us because it is part of how public trust is built.

Compliance with environmental laws is non-negotiable and all operators in the sector need to comply. Overall, the environmental performance of the sector is good and improving.

There is much to celebrate in Scottish Water's environmental performance in particular. It has made considerable progress in protecting and improving the environment and its compliance last year was strong in comparison to many of the sectors we regulate. However, public trust can easily be eroded by incidents and persistent problem sites. Compared with public waste water collection and treatment, environmental performance of private waste water systems is significantly poorer.

This section summarises the performance of the public and private segments of the sector in terms of:

- pollution incidents and intermittent discharges;
- compliance with licence conditions;
- achievement of environmental standards and objectives established under Scottish laws.

Pollution incidents

We expect Scottish Water and other operators to prevent and reduce pollution incidents, and work to minimise damage when incidents do occur. Incidents can lead to the release of harmful substances into air, land or water, and some can cause significant harm to the environment. We categorise all incidents based on their impact. A category 1 incident has a serious, extensive or persistent impact on the environment, people or property and may, for example, result in a large number of fish deaths. Category 2 incidents have a lesser, yet significant impact. Category 3 incidents have a minor or minimal impact on the environment, people or property with only a limited or localised effect on environmental quality.

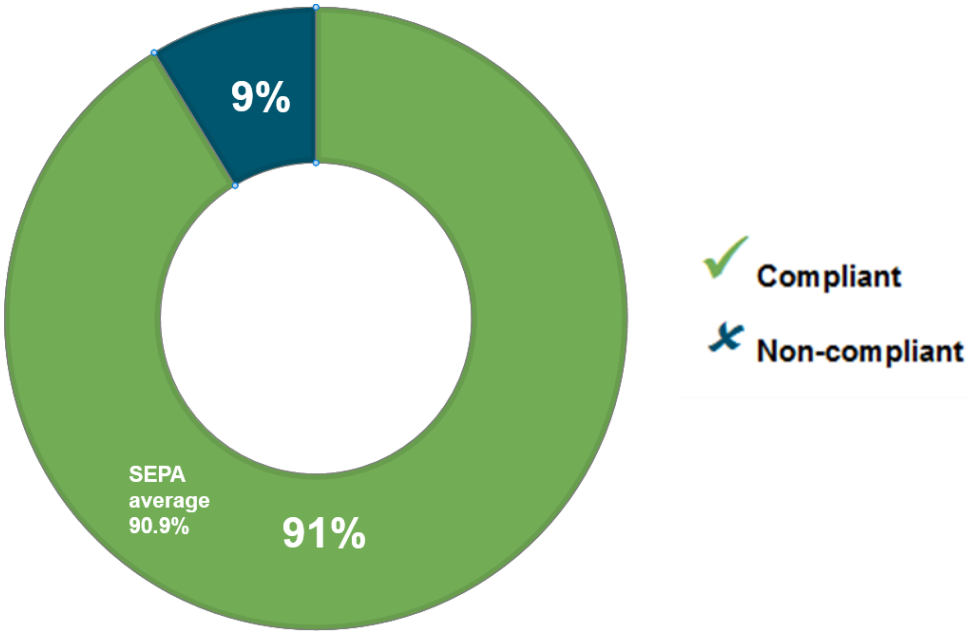
In 2017, for the first time in a number of years, Scottish Water was not responsible for any category 1, serious pollution incidents. This is a welcome improvement but more still needs to be done. There were still five category 2, significant incidents, and over 200 category 3 incidents. Even though the number of significant incidents is small, any incident can cause distress to local communities; blight rivers and beaches; and damage the sector's reputation.

Compliance with licence conditions

Licence conditions typically include:

- Limits restricting the scale of an activity to the capacity of the environment to accommodate it without deterioration (e.g. limits on the quantities of substances that can be present in in treated waste water discharges).
- Actions needed to ensure sites are operated in ways that minimise or mitigate risks to the environment (e.g. provision of a fish pass at a dam; managing and operating storm tanks to prevent the highly polluted, first flush of storm water from combined sewers from bypassing treatment).
- Monitoring and reporting requirements to ensure the performance of the site is understood and issues are being addressed.

Compliance against licence conditions for the sector as a whole (public and private) 2017-2018 (Figure 9)



We routinely assess licence compliance performance where the risks to the environment of non-compliances would be greatest. The results of these assessments are available on our website[7].

For small water supply and waste water sites, we undertake targeted surveys to help identify risks of cumulative impacts, such as to the quality of bathing waters. We also investigate performance where complaints are received from the public.

The size of the sector in terms of the numbers of assets that we regulate, such as waste water treatment works, and the potential risks to the environment mean that we put a

[7] http://apps.sepa.org.uk/compliance/

considerable amount of effort into working with the sector to ensure it maintains and improves its environmental performance.

Around 32% of our chargeable[8], regulatory effort in 2017-2018, including related environmental monitoring, was concentrated on the water supply and waste water sector. This included assessing around 8,500 influent and effluent samples provided by Scottish Water[9]; collecting and analysing around 1,300 of our own samples; and carrying out risk-based assessments of environmental quality.

Achievement of environmental standards and objectives

Water quality in Scotland today is better than at any time in over a century. Much of this is down to the investment over the last few decades in modernising, and improving the management of, public waste water collection and treatment systems.

However, there is still more the sector needs to do to achieve required environmental standards and objectives. The latter include improvement objectives for bathing waters and other water bodies established in Scotland's river basin management plans. The actions the sector needs to take to achieve these objectives will be reflected in licence conditions in due course.

Summary of the sector's performance in 2017			
		Public water supply and waste water	Private water supply and waste water
Pollution incidents and unsatisfactory intermittent discharges	Number of recorded significant pollution incidents (Category 2)	5 0.9 per 10,000 km of sewer	0
	Number of recorded minor pollution incidents occurred (Category 3)	211 40 per 10,000 km of sewer	103
	Number of recorded chronic water quality impacts from intermittent discharges[10]	21 4 per 10,000 km of sewer	n/a

[8] i.e. we recover the cost of the work through our charging scheme for regulated businesses and organisations
[9] Private Finance Initiative operators have been required to provide monitoring data to us from the start of 2018 whereas Scottish Water was required to do so from 2017.
[10] Studies are underway to identify if there are water quality or litter impacts from other intermittent discharges from sewer networks.

	Number of recorded chronic sewage litter impacts from intermittent discharges	213 40 per 10,000 km of sewer	n/a
Licence compliance	Proportion of the number of licences assessed that were non-compliant.	7% 88 out of 1,199	15% 41 out of 265
Achieving environmental standards & objectives	Number of water bodies where action by the sector is likely to be needed to achieve the required environmental improvements.	112	2
	Number of designated bathing waters where action by the sector is likely to be needed to achieve the required environmental improvements.	6	8

Scottish Water is responsible for the safety of 265 large reservoirs (reservoirs holding over 25,000 m^3). We work closely with Scottish Water to check, and support it to maintain, compliance with safety requirements.

Where are the opportunities to go further?

We believe that those societies and economies that are low resource use, low energy use, low water use and low waste will be the most successful in the 21st century. Sectors that are the most innovative will best rise to the challenges of our time, such as over use of resources and climate change, and create sustainable economic growth.

To do this, every operator must reach full compliance with environmental laws. But mere compliance and small scale incremental change will not be enough. At SEPA, we want to help the water supply and waste water sector to implement successful innovation and support it to do more than is required by regulation.

We call this ‘moving beyond compliance’: helping already high performing operators to do more for the environment because it makes sense for them.

There are a number of important ways that the sector could go further. Many of these can only be realised by building partnerships with other public bodies, developers and businesses.

Water

Working with local authorities and Scottish Government to encourage developers, the construction industry and its suppliers to include low water use designs as standard in developments.

Encouraging and supporting households and businesses to minimise unnecessary and inefficient use of water.

Driving down leakage, with a focus on water supplies that are most vulnerable to climate change or rises in population; or that require particularly large amounts of energy or chemicals to treat and distribute water.

Working with local authorities and developers to encourage and facilitate the creation and use of wetlands, greenspaces and porous surfaces in towns and cities to soak up and manage rainwater to keep it from overloading sewers and flooding streets and properties - and at the same time create attractive cityscapes for communities to enjoy.

Using treated waste water in productive ways by returning it to parts of the environment that need more water or by distributing it to support water uses that do not require high quality drinking water.

Energy

Further building on the amount of renewable energy hosted and generated by the sector, including by maximising opportunities to extract energy from wastes, such as utilising waste heat in sewers to help heat homes and businesses; and generating energy from the anaerobic digestion of sludge.

Saving energy needed to treat and pump water and waste water by protecting waters used as supplies from pollution; reducing leakage and demand for treated water; and developing and installing low or energy neutral treatment systems.

Materials

Maximising opportunities for sustainably recovering resources, such as nutrients, cellulose, proteins, oils, bio-plastics and grit, from sewage and other waste waters and cycling those resources back into productive uses.

Working with upstream businesses discharging wastes to sewer to encourage them to reduce wastes at source and recover valuable resources.

Operators of private water supply and waste water systems reducing chemical treatment needs and improving supply resilience by switching to good groundwater sources using properly constructed boreholes.

Improved evidence

Working with partners to improve understanding of emerging environmental risks and the opportunities for the sector to help in addressing them, including pollution from micro-plastics; and the development of anti-microbial resistance.

What actions are we going to take?

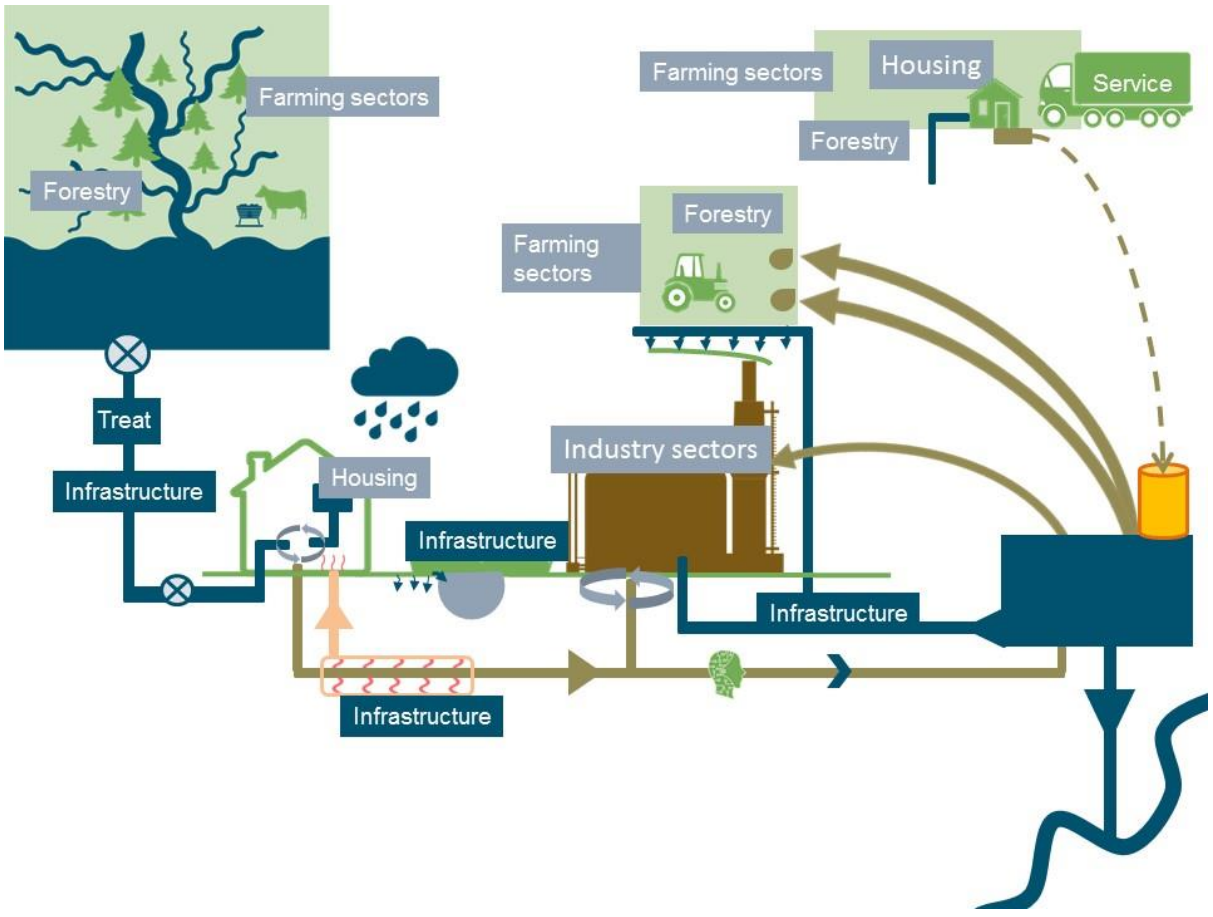
This section describes how we think we could best support and facilitate the development of a circular economy in the sector and further improve its environmental performance. We would like your views on the actions we are proposing, including your views on where we should focus our effort initially (see section 6).

We are in the process of planning our work in relation to a wide range of other sectors as well as the water supply and waste water sector. Because resources are finite, we will have to phase and programme different actions in this plan and other sector plans over a period of time. Section 6 sets out where we think we should focus first in terms of our work with the water supply and waste water sector but how we prioritise will be informed by the findings of this consultation. We will aim to publish a finalised plan in March 2019.

Cross-sector working

Achieving the goals of this plan will require substantial effort by a wide range of sectors beyond the water supply and waste water sector. We have already developed plans for a number of the sectors that we regulate and we are in the process of developing more. We will coordinate our work across all the relevant sectors to help achieve the outcomes we are seeking in this plan.

Cross-sector working (Figure 10)



Decision-making

This plan has multiple goals. These include significantly reducing the use of energy, water and other resources; increasing protection of the environment and people's health; and building resilience against the effects of climate change.

All of these goals are important if societies are to live and flourish within the means of one planet. To achieve them will require a new approach to decision-making, one that ensures that each goal is considered when choices are being made.

There will always be some things that need to be done urgently to address serious risks to people or the environment and where win-win solutions are not available. However, we will seek to ensure that the norm for how we regulate the sector and how work with it and other stakeholders enables and encourages choices that reflect the goals of this plan and maximise benefits to people and the environment.

Making the right choices about investments in long-lived, capital assets, such as treatment works and housing developments, is especially important. Such choices get locked in so they need to stand the test of time. In contributing to the development of the new investment planning and prioritisation framework for Scottish Water, we will help identify, and make the case for, investment choices that take account of all our goals.

New ways of making choices

As part of our sustainable growth agreement with Scottish Water, we are working to develop new ways of identifying the most sustainable options for protecting the environment, including how to better take account of the benefits to communities of options that involve creating natural assets, such as greenspaces and wetlands.

Alongside the general actions described above on cross-sector working and decision-making, we are proposing a number of other outcome-targeted actions that we think would help in achieving our vision for the sector. These are summarised in the following table. We will consider how best to programme these actions over time as we finalise the plan.

Outcomes sought	Actions
Environmental pollution risks are being avoided or controlled at source wherever possible. Reduced quantities of toxic chemicals and other pollutants entering the water environment.	We will work with Scottish Water, manufacturing sector businesses, local authorities, retailers, consumer groups and other relevant parties to promote and encourage actions to minimise pollution risks at source, including: ▪ helping target and support work to tackle pollution caused by the misconnection into surface water drains of heavily contaminated rainwater run-off from industrial yards and estates and waste water from households and businesses; ▪ using our influence in company boardrooms to encourage manufacturers to reduce or eliminate

	the use of environmentally toxic substances in everyday products that end up in the sewer system; and to support efforts by Scottish Water to encourage businesses discharging trade effluents to sewer to minimise those discharges and recover valuable resources; ▪ continuing to work with land managers in water supply catchments to help reduce pollution risks to raw water quality; ▪ helping Scottish Water in engaging with food sector businesses to encourage action to avoid the disposal of fats, oils and greases into drains; and with manufacturers of products that result in sewer blockages, such as wet wipes, to encourage action to avoid the disposal of such products into sewers.
Sewer networks are well understood and sewer spills are being minimised. **Greenspaces, wetlands and other blue-green infrastructure have become key and valued components of the drainage systems of Scotland's towns and cities.**	▪ We will work with Scottish Water, local authorities and other partners to help create and implement a road map for transforming the ageing drainage systems of Scotland's towns and cities into future-proofed and intelligent 21st century drainage systems. ▪ We will seek to ensure the road map prioritises towns and cities most at risk of sewer and surface water flooding over the next two or three decades as the climate changes and their populations grow.
More and more resources are being recovered from waste waters and put to use.	We will continue and expand the work[11] we have started with Scottish Water to promote and facilitate the development and implementation of new ways of expanding the range and value of resources recovered from the sector's wastes, including by helping where we can to engage the support of local authorities, researchers and businesses in other sectors.
New developments are benefiting from circular economy solutions for water supply, drainage and waste water.	We will work with developers, local authorities, Scottish Water, construction industry bodies and investors to encourage and support the inclusion of low water use designs; 21st century drainage; and the recovery of heat and other resources from waste in major housing and infrastructure development, including developments on derelict and vacant land.

[11] www.sepa.org.uk/media/360985/scottish-water-sga.pdf

Scottish Water and Private Finance Initiative operators are delivering strong, environmental performance.	We will work with Scottish Water, Private Finance Initiative operators, the Water Industry Commission for Scotland, the Customer Forum, Citizens Advice Scotland and Scottish Government to help create the right performance framework, and inform decisions on the funding needed, for the sector to: ▪ maintain and strengthen compliance with licence conditions; ▪ take the actions required to achieve the environmental outcomes set under Scotland's laws[12], including the objectives of Scotland's river basin management plans; ▪ develop and implement strategies for building a circular economy in water supply and waste water. We will make sure that: ▪ the licence conditions against which we assess compliance are, and remain, relevant and necessary for protecting the environment; ▪ how we regulate and work with the sector provides the flexibility and support operators in the sector need to be able to comply with environmental requirements and contribute to achieving environmental outcomes using solutions that minimise resource use, maximise resource recovery and, where possible, build natural assets for communities, such as greenspaces and wetlands.
Scotland is progressing towards being a low water use country with respect to water supply.	We will work with Scottish Water and other partners to identify priorities for, and promote the development of, a low water use strategy for water supply that reflects: ▪ the risk to the water environment posed by current demand during dry weather; ▪ the capacity of the water environment to meet forecast demand, considering climate change and population growth; ▪ scope to reduce demand; ▪ levels of leakage, energy use and chemical use.

[12] For example, the environmental objectives of the river basin management plans are established under the Water Environment and Water Services (Scotland) Act

	We will work with Scottish Water and local authorities to help encourage and facilitate the delivery of innovative low water use designs to address water resource issues in an area.
Communities, small businesses and the environment are benefiting from well-performing and reliable private water supply and waste water systems.	We will work with Scottish Government and other partners to develop a means of ensuring private water supply and waste water systems are inspected, maintained and, where necessary, upgraded to ensure the environment is protected; and the systems are easy to maintain; use less energy/chemicals; and provide for resource recovery. We will strengthen our regulatory framework for new private waste water discharges to ensure the protection of bathing waters, shellfish waters and watercourses. We will work with Scottish Government, local authorities and Scottish Water to support improved forward planning for, and design and future maintenance of, water supply and waste water services for growing communities that are not on the public system.

6. Where we are proposing to focus our work initially

We need to programme the suggested actions in this plan over a period of time. The actions below represent our initial thinking of where we should focus our efforts first.

1. Improve the quality of bathing waters

- We will work with Scottish Water, operators of private waste water discharges and others to ensure every effort is made to reduce risks from waste water in those bathing waters that are not consistently meeting required water quality standards.

2. Contribute to shaping investment and performance priorities for Scottish Water

- We will work with partners to ensure the new investment planning and prioritisation framework for Scottish Water takes account of environmental priorities; and enables Scottish Water to contribute to the development of a circular economy for the water supply and waste water sector.

- We will work with Scottish Water to promote adoption of key performance indicators that are aligned with environmental performance requirements; encourage solutions that maximise environmental and social benefits; and drive progress towards a circular economy in water supply and waste water.

3. Deliver on the commitments we made in our Sustainable Growth Agreement[13]

- We will work with Scottish Water to complete the three, circular economy innovation projects identified in our Sustainable Growth Agreement with Scottish Water.

- In support of the project on 21st century drainage, we will work with relevant local authorities, Scottish Government and Scottish Water in developing effective geographical drainage partnerships; and we will assess whether we could help support work to deliver 21st century drainage by making changes to the way we regulate sewer networks.

4. Seek to create an exemplar of One Planet water supply and waste water collection and treatment

- We will work to encourage and support a developer to make innovative low water use designs; 21st century drainage solutions; and the recovery of heat, water and other resources from waste integral parts of at least one large new development.

5. Work to build a new approach to managing private waste water discharges

- We will implement a simplified and strengthened approach to how we authorise proposed new private waste water discharges (see Annex). This new approach will strengthen the protection of bathing waters and shellfish waters.

- We will assist Scottish Government and other partners to devise and trial new ways to ensure domestic private waste water treatment systems are professionally inspected, maintained and, where necessary, upgraded. For the purpose of any trials, we will identify where private waste water discharges are posing a risk to bathing waters.

[13] www.sepa.org.uk/media/360985/scottish-water-sga.pdf

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If you are a user of British Sign Language (BSL) the Contact Scotland BSL service gives you access to an online interpreter enabling you to communicate with us using sign language.

http://contactscotland-bsl.org/

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Annex

Private sewage systems for new houses and extensions to existing houses

Strengthening and streamlining how we regulate

This document sets out our proposals for simplifying and strengthening the regulatory framework we use to ensure that small, new housing developments[1] and house extensions have appropriate sewage systems for protecting the water environment.

Virtually all new housing developments relying on private sewage systems, and most extensions adding more bedrooms to houses already on private sewage systems, need an authorisation from us. This is because the vast majority of private sewage treatment systems discharge to land or water.

For small scale developments, we already provide simple, up-front guidance on the sewage systems that will be required in a range of circumstances. However, some circumstances are not well covered in this guidance. Working out what treatment system is needed in these cases can involve lengthy discussions between us and developers.

Our existing guidance needs strengthening most with respect to situations where a single, inadequate sewage treatment system could pose a risk of significant pollution. We believe providing better guidance on what is required in these situations will improve protection of the environment by helping developers and homeowners choose, and design in, the right sewage systems at the outset of their projects.

This document explains the new guidance we are proposing on sewage system requirements for small scale developments:

a) **Near protected bathing waters:** There are 86 protected bathing waters[2] across Scotland. These are areas of water that are popular for bathing and need special protection to ensure they are safe for people to swim.

b) **Near shellfish water protected areas:** There are 85 shellfish water protected areas[3] in Scotland. Clean water is vital in areas where shellfish are produced to ensure a good quality product which is safe for human consumption.

c) **Where there are only very small watercourses in the vicinity of the development.**

There are many properties that already rely on private waste water treatment systems. Our proposals for ensuring existing treatment systems are maintained and, where necessary, upgraded are outlined in our consultation on our water supply and waste water sector plan.

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[1] Developments that would require sewage treatment capacity for a population equivalent of up to 15
[2] http://apps.sepa.org.uk/bathingwaters/Locations.aspx
[3] www.gov.scot/publications/shellfish-water-protected-areas-maps/

Types of private sewage systems

There are two main types of private sewage systems, those that discharge to land and those that discharge to water. Sewage systems that discharge to land do so by means of a drainage field. If ground conditions are suitable, drainage fields can make use of biological processes in the soil to filter, breakdown and assimilate sewage effluents. To be effective, drainage fields must be designed and sized correctly; and the sewage effluent entering them must already been subject to at least primary treatment in a septic tank. Primary treatment settles out solids.

Sewage systems that discharge effluents to water make use of the capacity of the water environment to disperse pollutants within the effluents. If sufficiently dispersed, the pollutants are broken down and assimilated by natural processes in the water environment without reaching concentrations that could cause harm. Where dispersion is low, treatment systems must do more work to remove pollutants from the effluents before they are discharged.

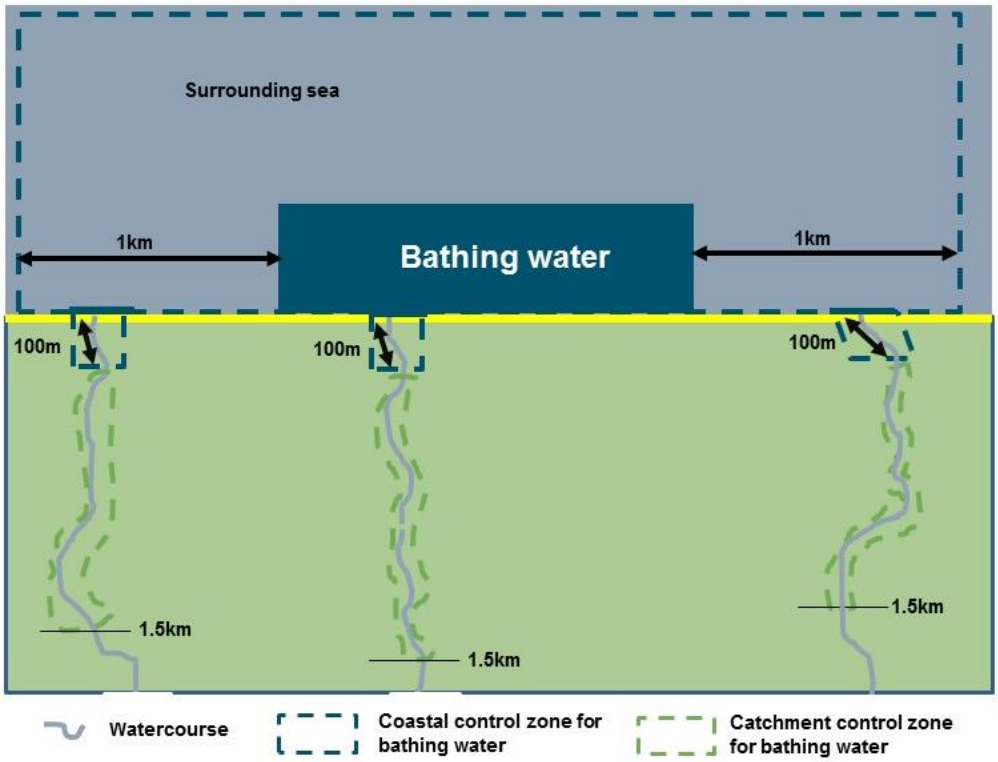
Proposed new guidance: developments near bathing waters

Discharges to water from septic tanks can contain well over 500,000 Escherichia coli (E.coli) bacteria per 100 ml. The standards[4] for E. coli in bathing waters are 500 cfu/100ml[5] or lower. The standards required for another faecal bacteria, intestinal enterococci, are 185 cfu/100ml.

To protect bathing waters, we are proposing to define two control zones around the bathing water; a coastal control zone and a catchment control zone (Figure 1). Where a proposed development sits within these two control zones will determine the level of treatment required of any sewage discharge to water. The differentiation of the two zones means the guidance can take account of the dilution of effluents in watercourses before they reach the sea.

[4] www.legislation.gov.uk/ssi/2008/170/schedule/3/made
[5] cfu stands for colony forming units

Proposed control zones for protecting bathing waters (Figure 1)



Coastal control zone

The coastal control zone would extend 1 kilometre along the coast beyond the edges of the bathing waters. The risk posed by discharges from small developments beyond this is very low because of the dilution and bacterial die-off that would occur before any plumes from the discharges could reach the bathing water. The coastal zone would also extend up the first 100 metres of any watercourses entering the sea within 1 kilometre of the bathing water.

Catchment control zone

A catchment control zone would extend 1.4 kilometres further upstream along any watercourses that flow into the sea within the coastal control zone.

Sewage system requirements

Figure 2 sets out our proposed guidance on the requirements for sewage systems for new developments and housing extensions with respect to the two control zones.

Any discharge into the coastal control zone within 100 metres of the bathing water will require disinfection treatment using specially designed treatment systems. Without such treatment, there is a very high risk that the quality of the bathing water could be impacted.

To deliver effective bacterial removal, disinfection systems need regular, expert maintenance. Rather than take on this responsibility, we strongly recommend that

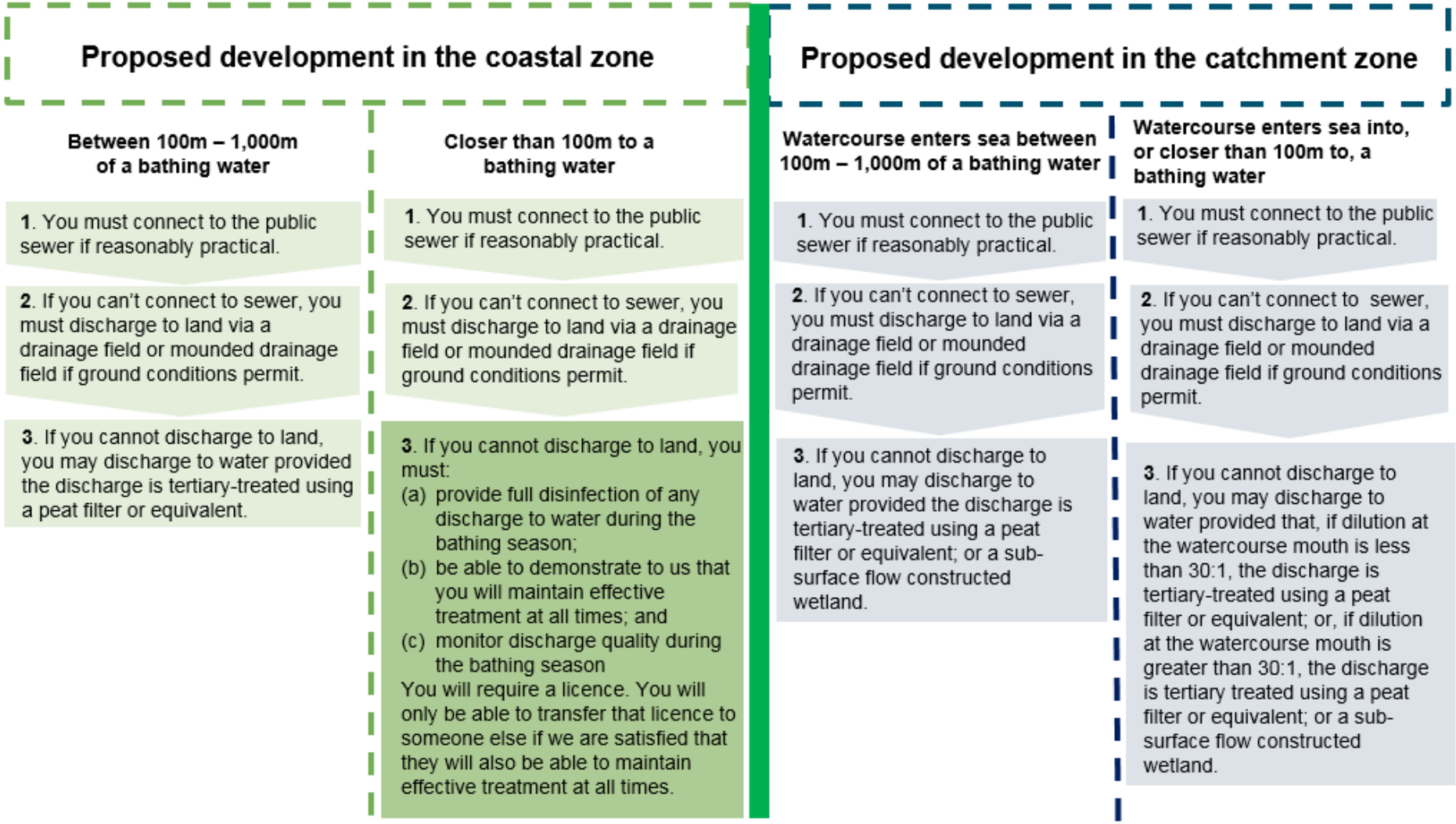
developers and homeowners consider installing a dry toilet system or asking Scottish Water about installing public waste water collection and treatment in the area.

Responsibilities if a disinfection system is used

The person taking on responsibility for a disinfection system would be required to demonstrate to us that they are able to maintain effective treatment at all times. To do this, they would need to have a maintenance agreement with a specialist contractor and, under that agreement, the contractor would have to provide 24 hour emergency breakdown service during the bathing season. The person responsible would also be required to monitor the quality of the discharge during the bathing season to check that the performance of the treatment system is being maintained.

When a property that has a disinfection system is sold, the new owner would be required to demonstrate to our satisfaction that they would also be able to maintain effective treatment at all times before we would allow transfer of the discharge authorisation. To do this, they would need to show that they had a similar maintenance agreement with a specialist contractor.

Proposed guidance on the sewage systems required for new houses or house extensions to protect bathing waters (Figure 2)



Proposed new guidance: Developments near shellfish waters

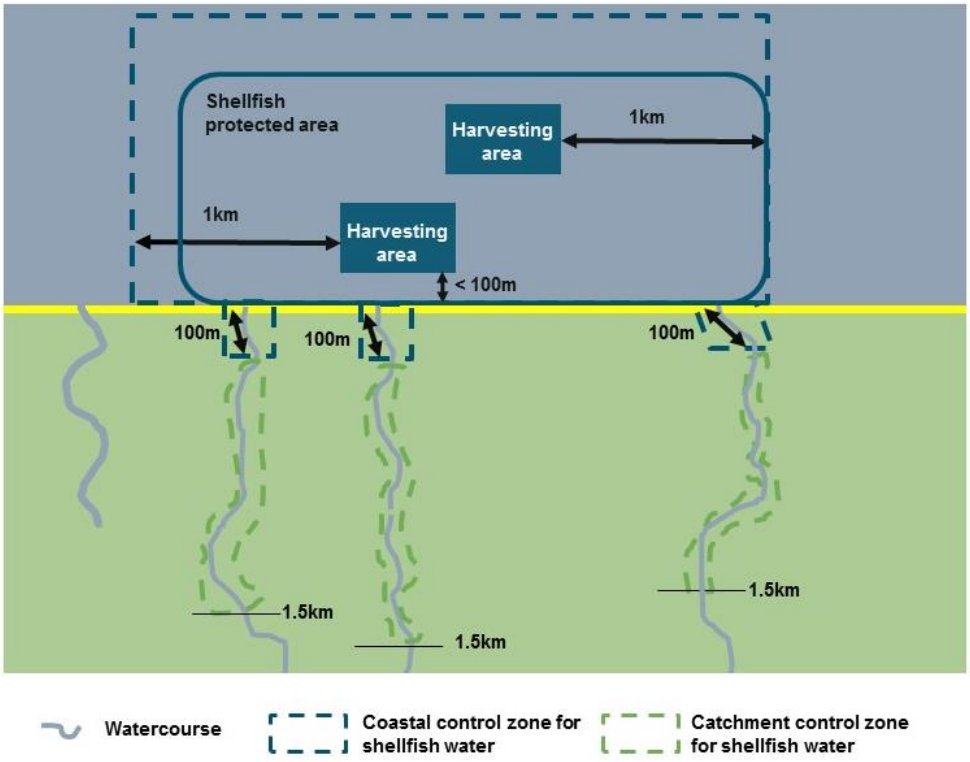
Bacteria taken in from the water by shellfish as they feed can build up and concentrate inside the shellfish. Because of this, the bacterial standards required in the seawater around shellfish harvesting areas[6] are much lower than those required in bathing waters, in the order of 15 to 30 E.coli per 100ml.

Whilst shellfish harvesting areas require the strongest level of protection from sewage discharges, the wider shellfish protected area also has to be protected to help avoid cumulative impacts on harvesting areas and to maintain opportunities for new harvesting areas to be developed.

If shellfish water protected areas lie further than 1km from discharges, dilution and bacterial die-off in the intervening sea will protect the waters from significant risk of bacterial contamination. For shellfish closer in shore, we are proposing to define two control zones. A coastal control zone, which will extend along the coast for a least 1 kilometre beyond the edges of each harvesting area within the protected area; or to the limit of the shellfish protected area if further. The coastal control zone would also extend up the first 100 metres of any watercourses entering the sea along this length of coast (Figure 3).

A catchment control zone would extend 1.4 kilometres further upstream along any watercourses that flow into the sea within the coastal control zone.

Proposed control zones for protecting shellfish waters (Figure 3)

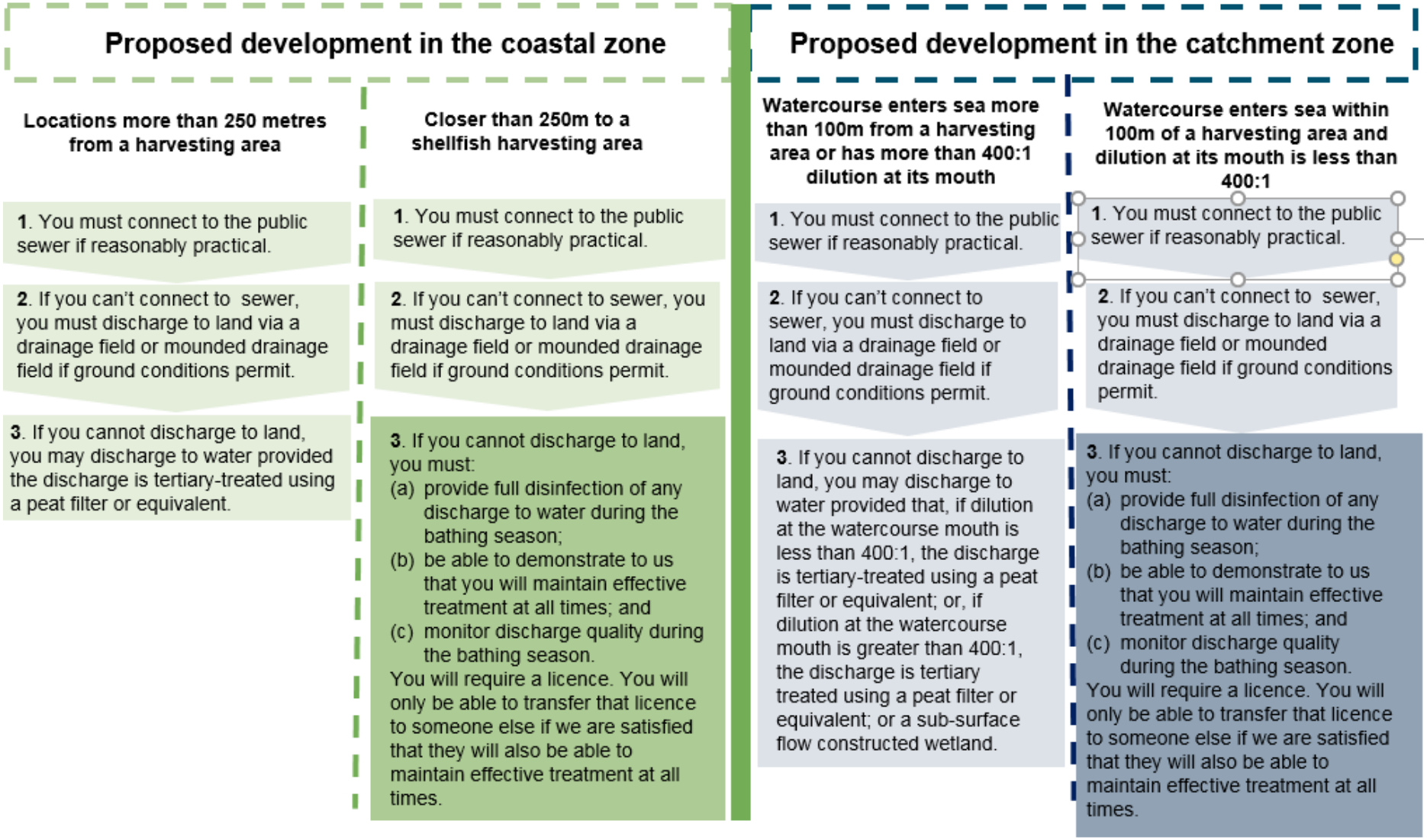


Sewage system requirements

Figure 4 sets out our proposed guidance on the requirements for sewage systems for new developments and housing extensions with respect to the two shellfish water control zones.

[6] http://aquaculture.scotland.gov.uk/data/shellfish_harvesting_areas.aspx

Proposed guidance on the sewage systems required for new houses or house extensions to protect shellfish water (Figure 4)



In some locations in the coastal and catchment control zones, disinfection systems would be required if wishing to discharge to water. Without disinfection, there would be a significant risk of bacterial counts exceeding the required limits.

Disinfection systems require regular maintenance by a competent professional. The person taking on responsibility for the system would be required to demonstrate to us that they are able to maintain effective treatment at all times. To do this, they would need to have a maintenance agreement with a specialist contractor and, under that agreement, the contractor would have to provide 24 hour emergency breakdown service throughout the year. The person responsible would also be required to monitor the quality of the discharge.

When a property that has a disinfection system is sold, the new owner would be required to demonstrate to our satisfaction that they would also be able to maintain effective treatment at all times before we would allow transfer of the discharge authorisation. To do this, they would need to show that they had a similar maintenance agreement with a specialist contractor.

Rather than take on this, we strongly recommend that developers and homeowners consider installing a dry toilet system instead or asking Scottish Water about installing public waste water collection and treatment in the area.

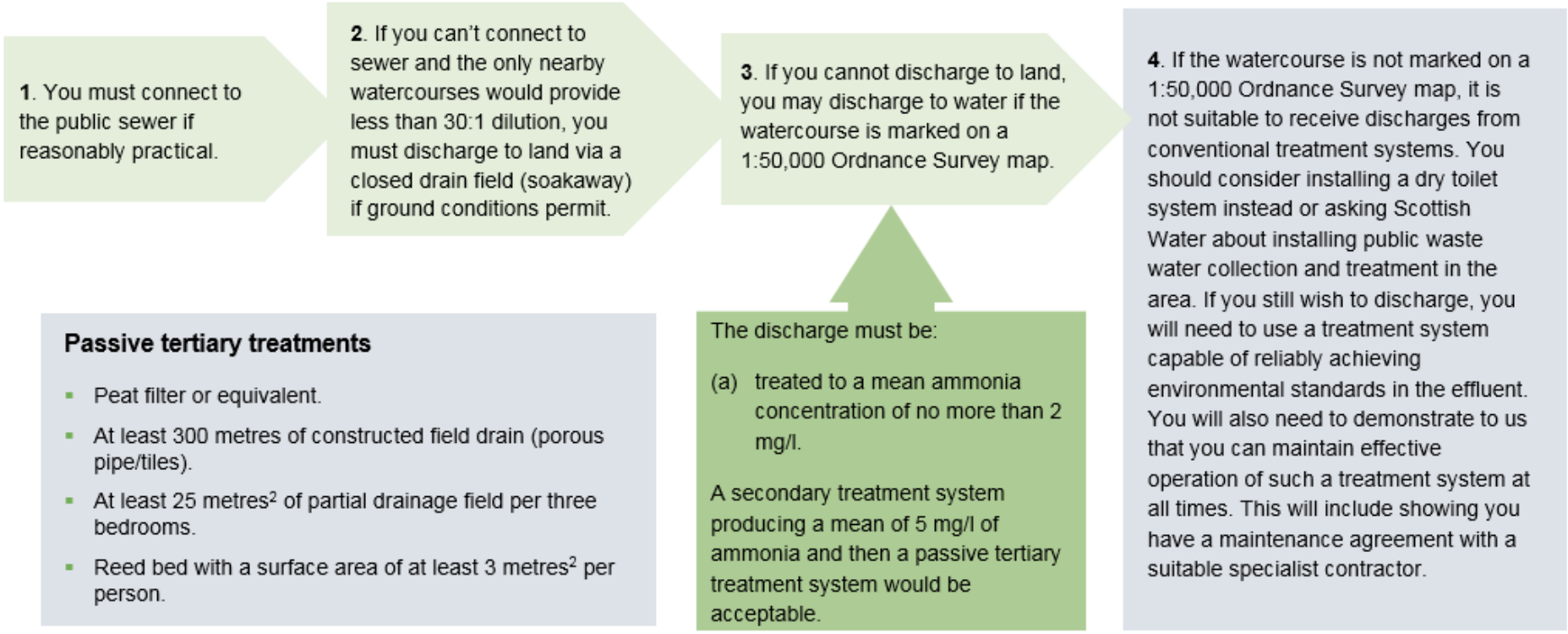
Proposed new guidance: Developments where the only nearby watercourses are very small

Very small watercourses offer little dilution to effluents from treatment systems. This means that treatment systems have to produce a high quality effluents to avoid polluting the water environment. Where treatment systems don't do this, the quality of the watercourses is at significant risk of being impacted. If the watercourses lie close to other properties or public places, amenity impacts are also likely, including as a result of odour. High performance treatment systems require expert maintenance to keep them working effectively.

Our current guidance does not provide information on requirements for sewage systems where the only nearby watercourses offer a dilution of less than 30:1. We are proposing to introduce the guidance in Figure 5 to fill this gap.

Watercourses that are so small that they are not shown on an Ordnance Survey 1:50,000 map offer no or very little dilution for effluents, particularly during settled weather. If discharges are made to such watercourses, concentrations of pollutants in the effluent prior to discharge will need to approximate environmental standards (e.g. 0.6 mg/l ammonia; 5 mg/l biochemical oxygen demand) to avoid risking significant pollution. Because of the risk posed by such discharges and the unusual level of treatment needed, such discharges would require a licence-level authorisation from us.

Proposed guidance on the sewage systems required for new houses and house extensions where the only nearby watercourses would provide less than 30:1 dilution (Figure 5)



Glossary of terms

Disinfection	Any tertiary treatment system that is certified as producing an effluent with a very low bacterial concentration. Normally, disinfection treatments should be certified as achieving less than 30 E.coli cfu/100 ml of effluent. Systems only certified to higher counts may be sufficient in some circumstances, subject to confirmation from SEPA.
Drainage field	A network of infiltration pipes arranged in trenches to evenly distribute effluent from a septic tank or package sewage treatment plant for infiltration into the ground. (British Standard 6297:2007 + A1 2008). *Note: Drainage fields are sometimes referred to locally as "soakaways". A soakaway only constitutes a drainage field where it meets the British Standard referred to above.*
Mounded drainage field	An above ground drainage field constructed using layers of sand, gravel and soil.
Package sewage treatment plant	A wide range of tank-based sewage treatment systems that include a treatment zone where the growth of aerobic bacteria is facilitated. These bacteria breakdown the sewage (secondary treatment). Package plants are certified to produce particular effluent qualities.
Partial drainage field	A drainage field designed to allow effluent to drain into the ground when levels in the watercourse are low, and into the watercourse when groundwater levels are high (and hence when watercourse levels should also be high).
Peat filter	Absorbent peat media through which effluent from a septic tank or package sewage treatment plant is percolated. Acts as tertiary treatment when effluent has already been subject to secondary treatment.
Peat filter equivalent	A filter treatment system using an alternative to peat as the filter media but able to deliver an equivalent final effluent concentration of bacteria as a peat filter.

Septic tank	A tank, usually with one or two chambers, that holds sewage for a short period of time, allowing solids to settle as sludge on the bottom of the tank (primary treatment). (European Standard EN 12566)
Sub-surface flow constructed wetland	A bed of soil, sand or gravel populated with wetland plants into which effluent from a septic tank or package sewage treatment plant is distributed in such a way that the water level stays below the top of the bed.
Tertiary treatment system	A tertiary treatment system receives effluent that has already been treated by a secondary treatment system, such as a package sewage treatment plant or a filter system.

Background information

CREW (2015) Practical measures for reducing phosphorus and faecal microbial loads from onsite wastewater treatment system discharges to the environment. A review

SEPA (2016) Regulatory Method (WAT-RM-03) Sewage Discharges to Surface Water

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