Tullow, Ardattin and Askamore

Three communities

Two parishes

One Water Conservation Plan

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Chapter 1 - Introduction

1.1 Introduction

Water permeates all aspects of human life. It is not only people who need a supply of good quality water in order to survive; water is essential for the survival and productivity of all life and all eco-systems, including agro-ecosystems. Humans rely on water for range of biological, economic, social and cultural needs. Water is essential not only for basic drinking, cooking, hygiene and ecosystem functioning, but for producing food, energy, and most material products needed for daily life.

Water is linked to the development of all nations, however, increasingly unsustainable development is placing pressure on water resources. For instance it is predicted that global water demand will rise by 50% in the year 2030 (United Nations University - Institute for Water, Environment and Health, 2021). Meanwhile, agriculture, which currently consumes around 70% of global water usage is expected to experience an increase of 70% of demand by 2050.

1.2 Sustainable Development Goals

In 2015 world leaders adopted the 2030 Agenda for Sustainable Development with 17 Sustainable Development Goals (SDGs) that cover an ambitious global agenda. Four of the SDGs that affect water conservation are:

SDG 6 – the "water goal" – is to ensure the availability and sustainable management of water and sanitation for everyone. No. 6 also underpins many other SDGs and achieving No. 6 would go a long way towards achieving much of the 2030 Agenda.

SDG 12 – encourages the world to be responsible with the use of the natural environment and use resources such as clean drinking water in a responsible and fair way.

SDG 13 – the impact of climate change is with us at all times, whether it comes in the form of a long, hot summer like that of 2018 when water conservation came to the fore or from extreme weather events that dump excessive rainfall into the River Slaney, each event has an impact on the production and consumption of water.

SDG 14 - encourages mankind to manage and protect our rivers which provide our drinking water and are habitats for a diverse array of fauna.

1.3 Tullow, Ardattin and Askamore

Responding to the challenges of conserving water in line with the Agenda 2030 Sustainable Development Goals, community members from Tullow and Ardattin in County Carlow and Askamore in County Wexford came together during the months of February, March and April 2021 to undertake water conservation training with Envirico and Veri under a programme funded by Carlow County Development Partnership.

Carlow County Development Partnership is the Local Develop Company in Carlow. The company's purpose is to enable communities in Carlow to realise their social and economic potential. The company achieves its purpose by proactively leading the research, design and delivery of high impact social, economic and environment community projects in Carlow including organising and funding the Carlow Water Conservation Programme.

The aims of the training course provided by Envirico and Veri were threefold:

1) To give participants a broad understanding of the legislative framework and the agencies involved in biodiversity;
2) To give participants knowledge and practical skills in water conservation along with the ability to envision new project ideas in the community and
3) To prepare a Water Conversation Management Plan for the community.

The water conservation projects outlined in this plan come from the individual communities who participated in this plan. Some of the projects are more ambitious than others but it hoped that all of the projects will realise measurable and sustainable water savings in Tullow, Ardattin and Askamore.

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May 2021

Chapter 2 - Tullow, Ardattin and Askamore

2.1 Tullow – A Town Profile

Tullow (Tulach O'Bhfeidhlim – the hill of the O'Bhfeidhlim territory) is the second largest urban centre in County Carlow located in the River Slaney Valley in the midst of rich, fertile agricultural land. The town provides a wide range of residential, community, retail, commercial, recreational and employment functions.

The 2016 Census records that Tullow has a population of 4,673 people consisting of 2,246 males and 2,427 females and growing each year.

Tullow is the ancestral home of Frederick York Wolseley who gave his family name to the Wolseley car. It is known locally as the granite town because of its magnificent stone approach roads as well as its splendid granite public buildings such as The Court House, The Bridge, Tullow Museum and St. Columba's Church and St. Columba's National School.

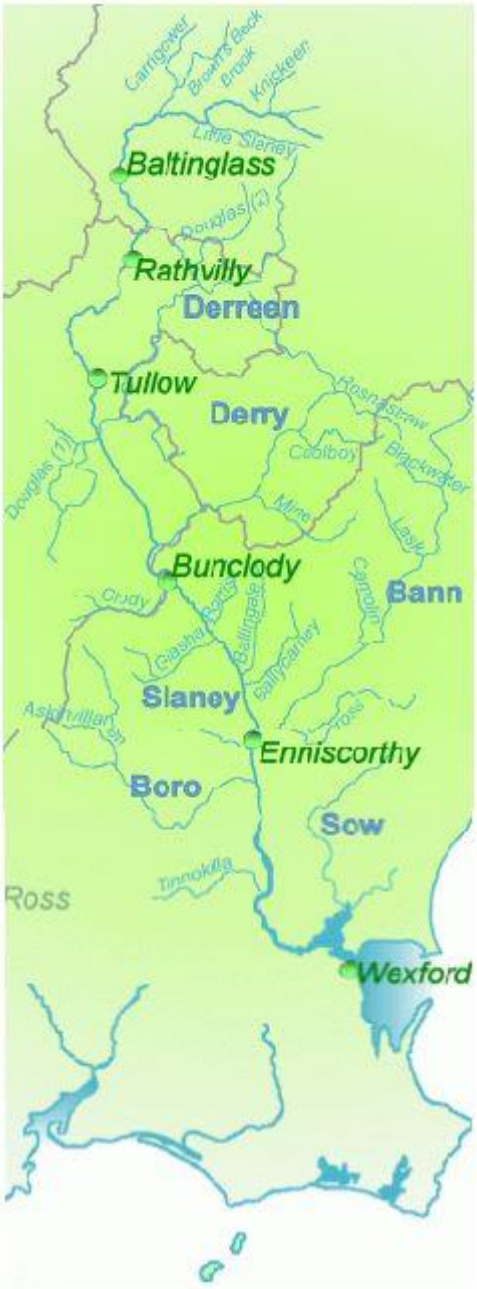
A fine Carrara marble statue of Fr. John Murphy of Boolavogue dominates The Market Square. Fr. Murphy was one of the leaders of the 1798 Rebellion who was captured just outside Tullow and was executed on the Market Square on 2nd July 1798. The establishment of Mount Wolseley Hotel, Spa and Country Club in 1995 gave a massive boost to the tourist potential of Tullow and includes an 18 hole championship Parkland course designed by the late Christy O'Connor Jnr.

2.2 The River Slaney

The central feature of Tullow town is the River Slaney. The Slaney rises on Lugnaquilla Mountain in the western Wicklow Mountains and flows through counties Wicklow, Carlow and Wexford before entering St. George's Channel at Wexford town, a journey of some 117.5 km.

The Slaney has several tributary rivers which include the Derry, the Clody, the Bann, the Sow, the Boro and the Derreen which flows along the eastern side of Tullow and joins the Slaney at Aghade a short distance from Ardattin Village.

The River Slaney is part of the Slaney and Wexford Harbour Catchment Area which drains a total of 1,981 square km. The total population of the catchment is 106,203 with a population density of 54 people per square km.



The northern part of the catchment area is underlain by granite bedrock which runs southwest and forms the Blackstairs Mountains which mark the western boundary of the catchment. The southern part of the catchment is underlain by metamorphic rocks with a band of volcanic bedrock, running through the centre of the catchment (catchments.ie, 2021).

A fine granite stone Water Bailiff's Hut overlooks the River Slaney adjacent to the Civic Officers in Tullow town. A water bailiff was an officer responsible for patrolling a stretch of water to protect the fishing rights belonging to the landlord. His job was to deter poachers from taking trout and salmon from the River Slaney. The local landlord, Mr. Doyne, build this small shelter, to protect the water bailiff from the cold weather. Note how small the shelter is – no chance of lying down on the job!

2.3 Flood Events

There has been a series of flood events on the River Slaney at Tullow during the past 60 years. The worst flood event in recent memory occurred in November 1965 when the Slaney burst its banks and caused severe damage in the town following intense rainfall. Approximately 60 properties were flooded to depths in excess of 1.5 metres. Garages, The Slaney Hotel and some shops had to be evacuated while one poor butcher lost 20 pigs and some cattle in the flood (CFRAM, 2015).

Source – tullowmuseum.com

Other major flood events at Tullow are summarised in the table below:

History of Flood Events at Tullow

Date	Peak Flow	Flood Mechanism
November 1997	61.60 (m^3/sec)	Intense rainfall
November 2000	72.30 (m^3/sec)	Intense rainfall
November 2002	55.2 (m^3/sec)	Heavy and prolonged rainfall with 10 days of flooding
August 2008	47.10 (m^3/sec)	Heavy and prolonged rainfall with 9 days of flooding
January 2010	301.20 (m^3/sec)	Heavy and prolonged rainfall

Source - (CFRAM, 2012)

The Office of Public Works data recording station at The Bridge Tullow, recorded a "highest flood on record" to date for the period 2003 when on Saturday 19th January 2010, the River Slaney set a record of 2 metres (Office of Public Works, 2021). The median flood level at Tullow Bridge is 1.58 metres, which does not affect the town.

2.4 Flood Alleviation Works

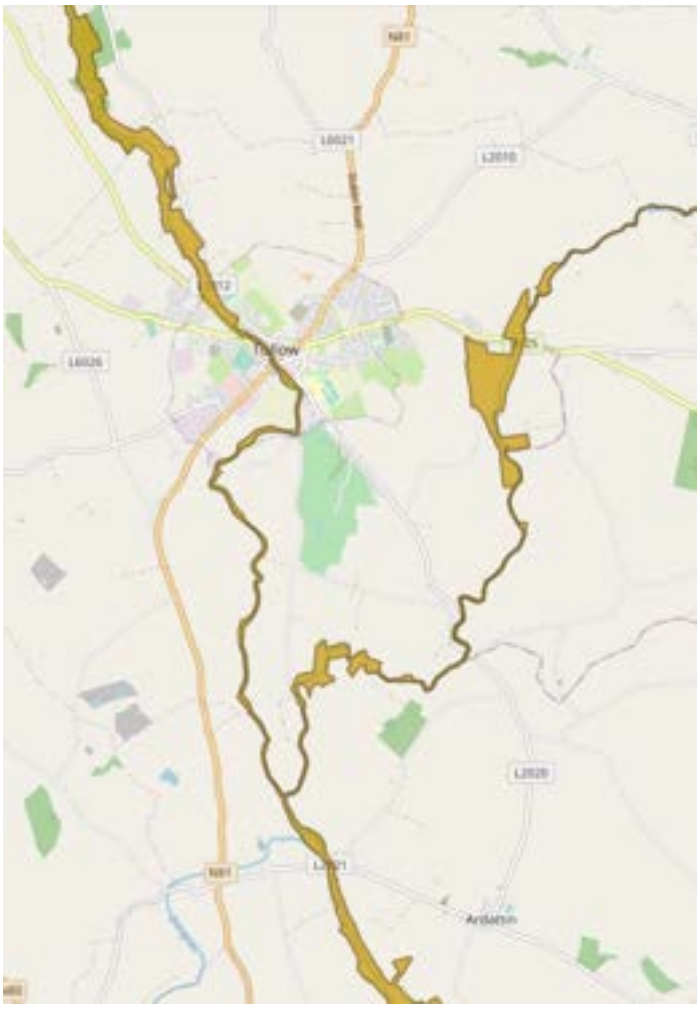
In 2011, the Tullow Flood alleviation scheme was implemented by Carlow County Council with funding received from the Office of Public Works. The works comprised of the construction of walls, berms (clay banks) and flood gates along the River Slaney. At the same time an upgrade was carried out on the drainage system along the Thomas Traynor Road (Tullowbeg) along with the installation of pumps and sumps. The flood relief scheme has prevented any flooding of Tullow since its construction in 2011.

The Area Engineer's office has an automated alarm system in place which alerts the office of any potential flood risk. The flood risk is measured against the river flood levels at Rathvilly. The floods at Rathvilly take 2-3 hours to reach

Tullow which gives Council outdoor workers time to erect flood barriers. In practice the barriers are erected when the weather forecast predicts heavy rainfall.

2.5 Special Area of Conservation

The River Slaney is designed a Special Area of Conservation (SAC, 000781) designated for a number of habitats and species including the freshwater pearl mussel *Margaritifera margaritifera*. The closest known record of freshwater pearl mussel downstream of Tullow bridge is 4.2 kms (at the confluence of the Slaney and the Derreen). Otters *Lutra lutra* have been recorded in Tullow and are regularly sighted by local fishermen, however, the riparian zone along the banks of the River Slaney in Tullow does not offer a suitable habitat for otter breeding or resting places. It much more likely that otters pass through Tullow when commuting (Atkins, 2018). The SAC area is highlighted in orange on the adjoining map. The Slaney is shown on the left flowing through Tullow town while the Derreen (on the right) flows by the town to the east at the Carlow/Wicklow border. The Derreen merges into the Slaney at Aghade.



2.6 Water Treatment Plants serving Tullow

Responsibility for the development and operation of public water services in Ireland lies with Irish Water since January 2014. Irish Water has a Service Level Agreement with Carlow County Council who operate the county's water and waste water treatment plants.

Tullow town's drinking water is supplied by two water treatment plants. Tullow Water Treatment Plant, located on the Ballymurphy Road, Tullow was built in the early 1950's and uses a sand filter to treat water drawn from the River Slaney. The plant produces 712,970 (February 2021) litres of treated water daily which is pumped directly to the reservoir on Tullow Hill.

Rathvilly Water Treatment Plant, located at Patrickswell, Rathvilly, again built in the 1950's, uses a rapid sand filtration system to treat some 6,900,000 litres of water daily which is pumped to several locations including Tullow; Browneshill Reservoir in Carlow town (where the water is blended with water from Sion Cross Water Treatment Plant), Ricketstown Reservoir and Killamaster (Kildare); Ballyconnell (Wicklow) and M.S.D., Carlow.

2.7 Water Storage – Tullow Hill Reservoir

Treated water from the Tullow Water Treatment Plant is pumped to a reservoir at Tullow Hill which can hold up 1,135m^3 litres of water at any given time. The reservoir was constructed in 1933 and extended in 1978. Water from the reservoir is gravity fed to a point at The Coarse (next to the Monastery Boys' National School) where it is split into three different districts:

District 1 is metered at The Cross Keys (outside Frank Byrne's shop) and services connections along the Shillelagh Road to Knocklow Bridge.

District 2 is metered at Tullow Garda Station and services connections along the Dublin Road as far as Bishops Cross.

District 3 is metered at The Coarse and services connections in the town centre and Ardattin village.

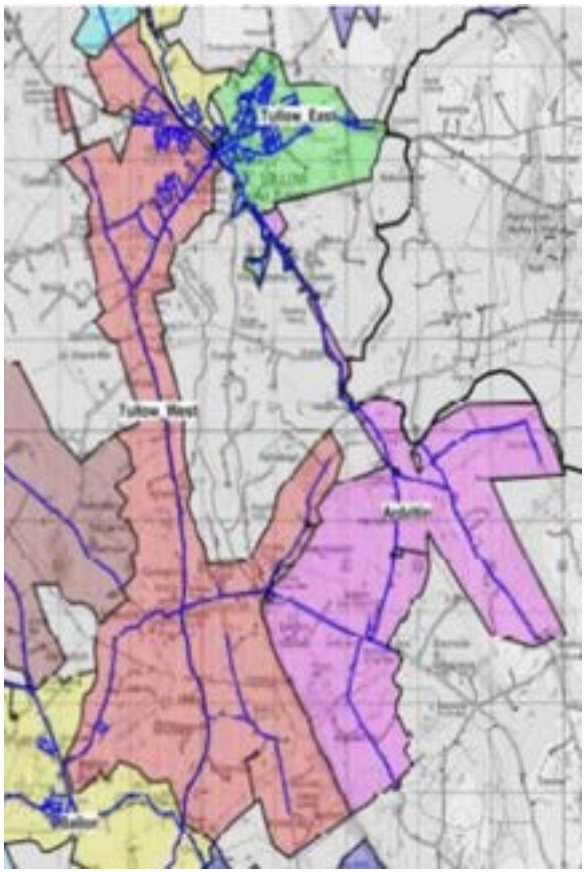
In order to conserve water, pressure reduction valves are used to control the water pressure in Tullow town at night time. Districts 1 and 2 have reduced pressure between 23.00 hours to 06.00 hours while District 3 has reduced pressure between 01.00 and 07.00 hours.

All parts of Tullow south of Tullow Bridge are fed from the Rathvilly Water Treatment Plant via Cannon's Quarter which has a DMA inlet meter at Moore's Farm entrance.

2.8 Tullow Water Daily Consumption (February 2021)

As stated in 2.6 treated water for the town of Tullow comes from two sources – from the Tullow Water Supply Zone (WSZ) which is water treated at Tullow Water Treatment Plant and from the Rathvilly Water Supply Zone (WSZ) which is water treated at Rathvilly Water Treatment Plant.

The Tullow Water Supply Zone (WSZ) is broken down into two district metering areas (DMA) – Tullow East DMA which supplies connections north of Tullow Bridge and Ardattin DMA. The remainder of Tullow south of Tullow Bridge is serviced by the water coming from the Rathvilly Water Treatment Plant in the North Regional Water Supply Zone which includes the Tullow West DMA. The District Metering Areas are set out on the attached map:



Tullow East DMA is coloured green, Ardattin DMA is violet and Tullow West DMA is coloured salmon.

Tullow East DMA has 23.81 kilometres of water mains supplying 1,339 properties; Ardattin DMA has 18.32 kilometres of water mains supplying 112 properties while Tullow West DMA has 33.96 kilometres of water mains supplying 869 properties. Statistics from the three DMAs are set out in Table 2.

Table 2 - Typical Daily Water Usage for each District Metered Area servicing Tullow and Ardattin at February 2021

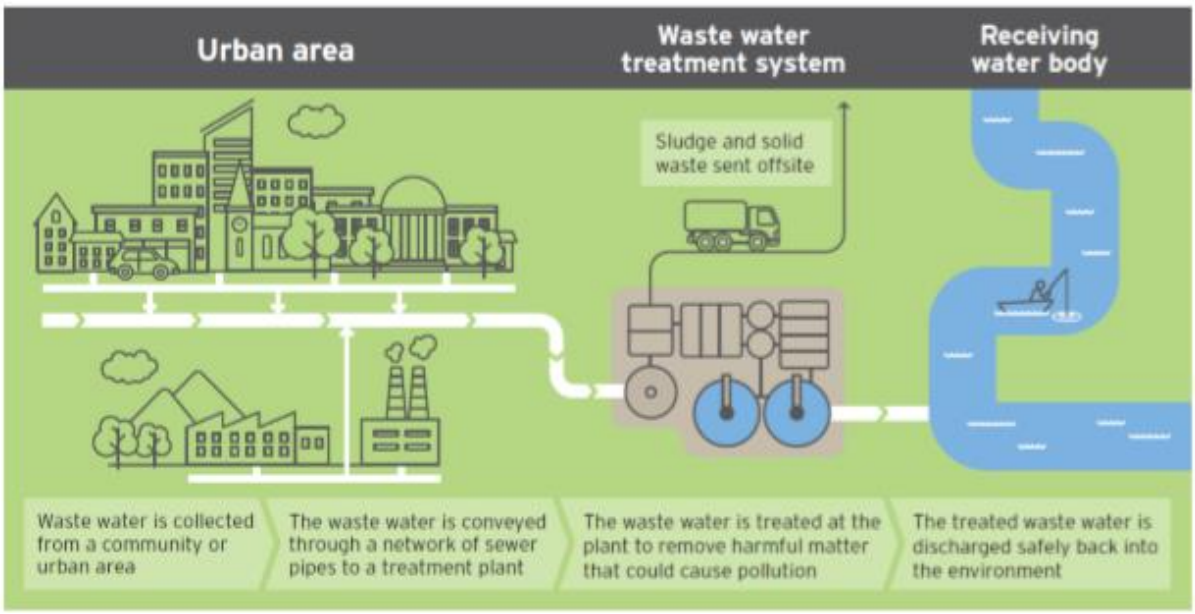
	Tullow East DMA (North of the Bridge)		Ardattin DMA		Tullow West DMA (South of the Bridge)	
Type	**Number**	**m3/day**	**Number**	**m3/day**	**Number**	**m3/day**
Metered Domestic Connections	905	310.78	52	17.02	600	224.88
Unmetered Domestic Connections	241	87.00	26	9.39	117	42.24
Metered Non-domestic Connections	144	144.38	29	14.67	81	73.19
Unmetered Non-domestic Connections	49	34.30	5	3.50	71	49.70
Sub Total	**1,339**	**587.43**	**112**	**44.58**	**869**	**390.01**
Water taken for Operational Use		9.89		.83		6.42
Water taken Illegally		4.81		.40		3.12
Sub Total		**602.13**		**45.80**		**399.55**
System and Background Losses		19.13		82.16		446.69
Total		**610.29**		**127.96**		**846.24**
Percentage Losses		**3.13%**		**64.20%**		**52.78%**
Pipelines in Kms		**23.81**		**18.32**		**33.96**

Source – Extracted from Irish Water Leakage Management System (March 2021)

2.9 Waste Water Treatment Plant

Tullow is served by a Waste Water Treatment Plant (WWTP) with a plant capacity of 4,000 PE (population equivalent). The current load (2018) entering the plant for treatment is for a population equivalent of 5,978 people. Treated waste water from the plant is discharged into the River Slaney.

According to Irish Water, waste water at Tullow WWTP goes through three stages of treatment; (i) primary treatment with an inlet screen and grit clarifier; (ii) secondary treatment with diffused aeration/clarification and (iii) nutrient removal using a ferric sulphate dosing system (Irish Water, 2019). In 2018, 591 tonnes of cake sludge was removed from the plant and treated at Mortarstown Waste Water Treatment Plant.



The Tullow waste water treatment plant is described by the Environmental Protection Agency as an area where waste water discharges are the main significant pressure on water bodies (River Slaney) at risk of pollution – Annual Report 2019.

Plans are being progressed to extend the Tullow WWTP to a greater capacity with a population equivalent of 9,000. Design of the upgrade has been brought to an advanced stage and construction is scheduled for 2022.

2.10 Fauna

DTA Tullow Tidy Towns Committee has sought a grant from the Community Water Development Fund 2021 to carry out a Habitat and Biodiversity Study of 1.2 kms of the River Slaney above and below the bridge during the course of 2021. The table below outlines many of the fauna seen by local fishermen who fish the River Slaney in and around Tullow town.

Table 3 – Fauna

Fish	Birds	Others
Atlantic Salmon	Herons	Frogs
Brown Trout	Kingfishers	Mink
Sea Trout	Mute Swans	Otters
Eels	Mallard Ducks	Foxes
Minnows	Cormorants	Brown Rats
Three Spined Sticklebacks	Moorhen	Hedgehogs
Ten Spined Sticklebacks	Little Egret	Squirrels
Stoneloach	Grey Wagtail	Shrews
		Bats
		Common Newt

2.11 Invasive Species

DTA Tullow Tidy Towns Committee commissioned a Habitat Survey and Biodiversity Report in August 2015. The report found that there were three invasive species in the study area all of which were found adjacent to the River Slaney. Japanese Knotweed was found next to the path adjacent to Tullow Museum. Himalayan Balsam was found along the length of the River Slaney in Tullow, while Cherry Laurel was recorded in small quantities on one of the two

islands (mill race islands) next to the Inner Relief Road (Doyle & Corrigan, 2016).

Carlow County Council commissioned INVAS Biosecurity to treat the Japanese Knotweed and to pull the Himalayan Balsam. The Cherry Laurel was not considered a threat in 2016, however, it has since spread across the island and requires urgent attention.

A new invasive species – *Allium triquetrum* or Three-cornered garlic/leek – was spotted in Tullow Town Park and on the islands in the River Slaney during the course of the development of this plan.

2.12 Ardattin – A Village Profile

Ard Aitinn (Height of the Furze); GPS: 52.754059, - 6.706826

Ardattin is a vibrant picturesque country village, 6 kms south of Tullow adjacent to the river Slaney and boasts scenic views of the South Wicklow hills. The area is renowned for its prime agricultural lands. Amenities in the village include:

- Scoil Mhuire Gan Smal, National School
- The Church of the Immaculate Conception
- The Community Hall
- The Handball Alley (built in 1926)
- Ardattin Inn (pub and shop)
- Athletics field and track

There is fishing for salmon and trout on the River Slaney at Aghade bridge and Ballintemple woods. The woods, fields and riverbank offer beautiful trails for walking, running and mountain biking. Ardattin is a short distance from the Wicklow Way in Clonegal and the South Leinster Way which stretches from Kildavin through Carlow, Wicklow and Kilkenny.

The Slaney Valley SAC comprises the freshwater stretches of the Slaney as far as the Wicklow Mountains, and includes a number of tributaries, the estuary at Ferrycarrig and Wexford Harbour. This SAC is located c. 1.8km downstream of Ardattin village (Figure 1). There is a potential hydrological pathway for impacts between the Village and the SAC, due to a watercourse located adjacent to the northern site boundary of the Beechwood drive estate.

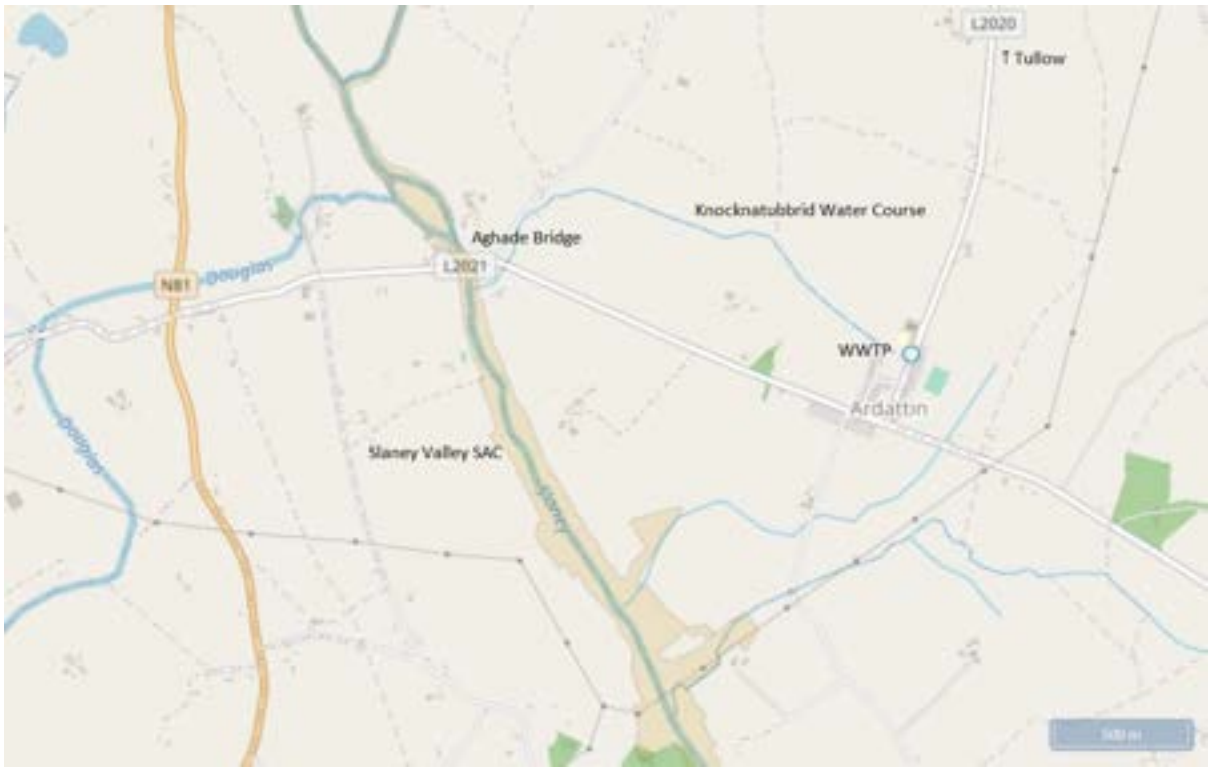


Figure 1. Ardattin water course and WWTP, and Slaney Valley SAC.

Known as Knocknatubbrid watercourse on EPA mapping, it flows in a northwest/westerly direction for c.1.8km before its confluence with the River

Slaney just south of Aghade Bridge. No EPA monitoring data is available for this minor watercourse. The nearest EPA monitoring point for the Slaney upstream is at 'Ford 3km d/s of Tullow Br' (Station Code: RS12S021400), which recorded moderate status (Q-value of 3-4) when monitored in 2016. The nearest monitoring point on the Slaney downstream of its confluence with Knocknatubbrid is at Kilcarry Bridge (Station Code: RS12S021600) which also recorded moderate status in the same year (EPA, 2019).

Land use surrounding Ardattin comprises mostly non-irrigated arable land and permanent pasture (Figure 2). There is an area of broad-leaf forest downstream at Altamont and Ballintemple, adjacent to the Slaney.

Figure 2. Ardattin land use map.

Houses within Ardattin village are connected to public water mains, which is supplied by the Central Regional Water Scheme. Houses within the Beechwood drive estate are connected to a Waste Water Treatment Plant (WWTP). There is currently a planning application under consideration to construct 12 additional units in the estate. As current effluent loading is at design capacity in the adjacent WWTP (80 pe), the existing Plant would not have capacity to accept the loading that would be generated from the proposal. The housing development will not be occupied until the adjacent existing WWTP is upgraded to provide adequate capacity to handle increased loading, or until a standalone WWTP is constructed and commissioned. Carlow County Council is currently examining funding options to either upgrade the existing Plant or provide an adequate stand-alone Plant (AA Screening of Proposed Housing Development, Ardattin, Co. Carlow. Lisa Dowling MCIEEM Nov 2019). Stand-alone houses in the Village have individual septic tanks or Waste Water treatment units.

Water conservation measures previously implemented by Ardattin Tidy Village Group include:

- Installation of rainwater harvesting butts on public buildings in the Village
- Implementation of drought tolerant sustainable planting scheme in community planting areas
- Mulching of all planting beds to reduce watering requirements

2.13 Askamore – A Village Profile

Askamore *(An Easca Mhor - the big moor or marsh)* and its companion *Askabeg (the little moor or marsh)* lie under the western slopes of Sliabh Bhui, a peak of some 430 metres in the central area of north Wexford. There are approximately 270 households and a population of 460, in this area of fertile rolling land, traditionally devoted to a mixture of tillage crops and grass lands.

The area is served by a network of small roads intersecting the area between the main Carnew-Gorey road running west to east, and the Carnew-Ferns road running east-south-east under Sliabh Bhuí and Ballybeg. It was MacMurrough-Kavanagh country for many centuries until the clan was finally driven from their Borris Castle stronghold after the Cromwellian invasion of 1649-1650. In the Civil Survey taken soon after the Cromwellian conquest, the townlands of the area are mostly detailed under the Parish of Carnew, which was the centre

of civil administration of the time. Proprietors listed as of 1640 were Briene Kavanagh, Henry Kenny, Mr. Clebroke and Nicho Loftus.

Askamore Community Centre and Childcare Facility

Askamore has a website run by the Askamore Community Council https://askamorecommunity.wordpress.com/ A wide range of information about the area and useful information about the loop walks can be found on notice boards in the village.

Askamore Group Water Scheme features 12.5 km of mains pipeline and a 105 cubic metre reservoir. This water scheme was upgraded in 2013 with new pipes and meters installed on houses. The scheme's main source of water is a spring at Askamore, boosted by a borehole at Money Cross, with a link to the mains water supply in Carnew as a back-up.

Askamore Reservoir

Chapter 3 - Water Conservation in Tullow

3.1 Water Conservation in Tullow

There have been a number of initiatives, both public and community to conserve treated water in Tullow. Irish Water has a Service Level Agreement with Carlow County Council to manage water and waste water in County Carlow. The utility company has carried out major works in recent years to reduce water leakage from the mains system in Tullow. A number of voluntary bodies in the town have also undertaken water conservation projects, in particular rainwater harvesting.

3.2 Lead Pipe / Cast Iron Pipe Replacement Programme 2017

In November 2017, Irish Water working in partnership with Carlow County Council commenced works in Tullow as part of a lead mains replacement project. The project was part of Irish Water's national Leakage Reduction Programme. The project involved the decommissioning and replacement of approximately 100 lead connections with high density polyethylene (HDPE) plastic pipes in 10 locations across Tullow, namely:

Abbey Street	Fr. John Murphy Terrace
Bishop Street	Mill Street
Templeowen	St. Austin's Terrace
Castle Lane	Bunclody Road
Dublin Road	The Course

The works were carried out by Coffey Northumbrian Limited on behalf of Irish Water over the course of four months. Some 630 metres of aged cast iron water mains were replaced with HDPE plastic pipes during the works. The replacement programme reduced the instances of burst pipes and water outages caused by 100 year old cast iron pipes and ensured a reliable water supply to customers in Tullow; it also eliminated many leaks from the systems

supplying individual households, reduced the loss of clean treated drinking water and delivers cost savings by providing an improved water network in Tullow that requires less maintenance.

Replacing ageing water mains in Tullow, Co Carlow

Replacing over 630 metres of aged cast iron water mains

Irish Water, working in partnership with Carlow County Council, is replacing ageing water mains in Tullow, Co Carlow to improve security of supply, reduce high levels of leakage and improve water quality. The improvements involve the replacement of over 630 metres of aged cast iron water mains with high density polyethylene (plastic) pipes and are a part of Irish Water's National Leakage Reduction Programme.

3.3 Leak Detection Campaign 2020

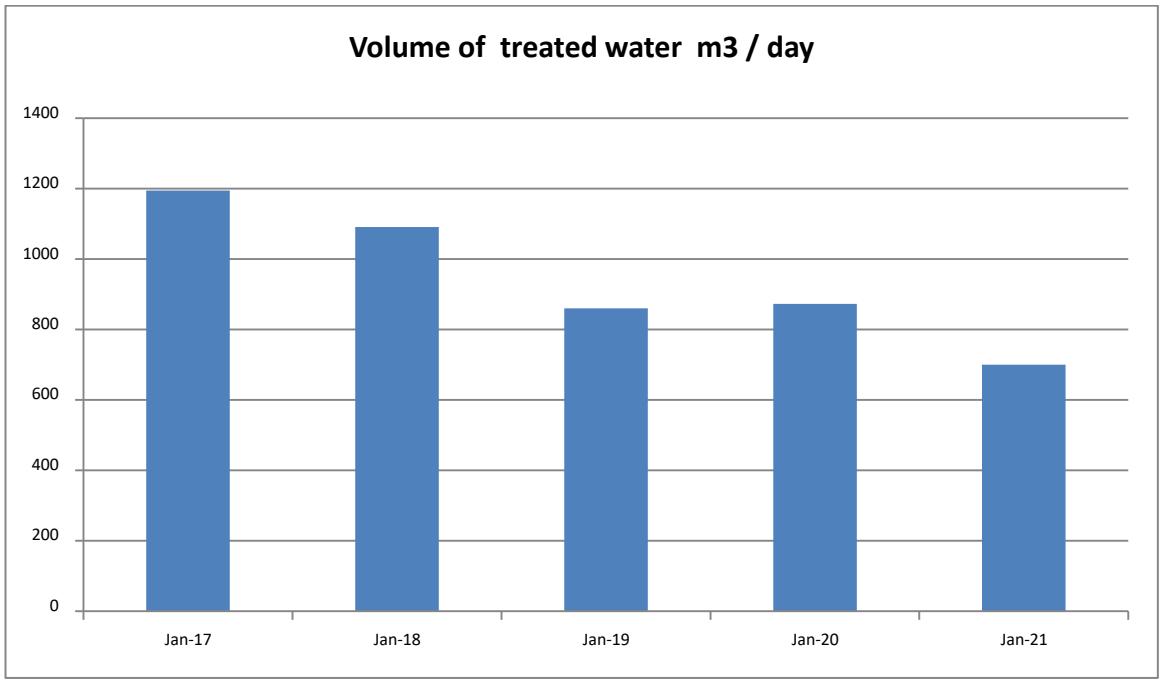
In July and August 2020 an in-depth planned leak detection campaign was undertaken by Carlow County Council staff in the Tullow East DMA using a step testing methodology. District meters were read for several months prior to the testing to record night time water flows in the town, as abnormal night time flows point to areas where water is possibly leaking.

There are approximately 175 sluice (water shut off) valves in Tullow town, normally located at the entrance to each residential estate and also installed throughout the network. Sluice valves were shut off in sequence (furthest from the district meter first) and new district meter reading were taken. From the new readings it was possible to pin point an area which had water leaking and zone into areas with big water leakage reductions when the sluice valves were shut off. Staff with acoustic listening devices then visited areas where a leak

was indicated by the step test and they proceeded to listen to individual connection points to locate any leakages. The outcome was that Carlow County Council staff were able to locate and fix leaks resulting in massive water savings of 270 $^{m3/day}$ (270,000) in Tullow.

3.4 Water Savings in Tullow WSZ

Members of Carlow County Council staff have achieved significant water savings in Tullow East DMA through leak detection programmes carried out in 2018 and 2020. These savings, illustrated in the chart below, have seen the amount of treated water produced at Tullow Water Treatment Plant fall from a high of 1,194m$^{3/day}$ in January 2017 to a 700m$^{3/day}$ in January 2021 – a 41.37% drop in the production of treated water in the last four years.



3.5 Rainwater Harvesting Projects

DTA Tullow Tidy Towns Committee developed a rainwater harvesting project at Tullow Community Parish Centre in the summer of 2016. With assistance from a Local Agenda 21 Grant, the Tidy Towns Committee erected two IBC tanks on

a steel frame at the Parish Centre to capture rainwater from the centre's roof. In total some 2,000 litres of rainwater can be harvested at any given time and the stored water is used to water floral displays in the town.

At the same time four rainwater butts purchased from Aldi where installed at St. Columba's Church (2 No.), Tullow Boys' National School (1 No.) and at St. Columba's National School (1 No.) to teach the pupils the importance of preserving a scarce resource.

Other rain water harvesting projects have been carried out by The Cairdeas Centre, Tullow and by Forward Steps Family Resource Centre (pictured on the next page), which uses the rainwater from the roof of the nearby Dental Centre to water fruit and vegetables in the centre's community garden.

Chapter 4 – Proposed Action Plan

4.1 Tullow, Ardattin, Askamore – Proposed Action Plan

People living in Ireland see lots of rain and equate the rainwater with drinking water but there is a huge difference between rainwater and treated water which is fit to drink by humans. As a result it is easy to question the need for water conservation. Beyond reducing unnecessary water waste to avoid supply constraints, other benefits include extending the life of existing water treatment infrastructure, slowing down or avoiding the need for expensive, new water sources, savings on energy and chemicals for pumping and treating drinking water and providing the opportunity for economic and commercial development by having sufficient supplies for additional industry and population growth.

Water conservation is a way of life and a method to ensure that water is available at a reasonable cost for future generations. This Community Water Conservation Plan proposes a number of actions to conserve water:

Action 1 – Information for Households and Businesses

Action 2 – Education for School Children

Action 3 – Drought Tolerant Planting

Action 4 – River Slaney Survey

Action 5 – Rainwater Harvesting

Action 6 – Riparian Margin Planting

Action 7 – Drinking Water Fountains

Action 8 – SUDS (Wetland Project)

We invite the members of the Tullow, Ardattin and Askamore communities to get involved and join us in the implementation of this Community Water Conservation Plan.

4.2 Action 1 - Information

4.2.1 Overview

The aim of any water conservation programme will be to move a proportion of water users from a position of wasting water to one of using it efficiently. A water conservation programme can consist of five simple steps, commonly adopted in commercial sector marketing:

- ***Ignorance*** of the need to reduce water use
- ***Awareness*** of the need to reduce water use
- ***Interest*** in reducing water use
- ***Desire*** to take action to reduce water use
- ***Action*** to reduce water use.

At the start of a water conservation programme members of the public may be unaware of the value of water as a scarce resource and the need to reduce water use. Some people will move through the stages quickly while others may take weeks, months or years. Individuals at the interest or desire stage will not need much encouragement to move to action. Others will need a lot of persuading to move out of the ignorance stage. Table 4 shows an example of applying this model to household customers using a series of messages.

Table 4 – Household Messages

Why we need to stop wasting water: • Water is not a free commodity • Increasingly costly to provide • Demand cannot keep on rising • Climate change • Too much abstraction can result in environmental damage	Awareness
Why we need to pull together • Household water consumption accounts for 38% of all water used, up to 25% of this water is wasted • Irish Water has made a lot of progress in reducing leakages • We need to protect the environment	Interest
Dispelling the myths • There's loads of rain in Ireland, so no water problem • Build more reservoirs and water treatment stations • Individual actions do make a difference	Desire
Damage to our natural environment • The damage to the countryside and wildlife that water shortages and inappropriate resource development would bring	Action
What you can to do to help • Turn off the tap while brushing your teeth • Buy an efficient clothes washing machine • Don't shower for longer than 5 minutes • No need to water the lawn, even in hot weather	

Source – National Water Demand Management Centre, UK

The aim is to help each individual water user realise that their actions matter and that each small contribution to water use reduction adds up to a lot of water saved in the course of a year. This "Information" action is aimed at the householder and local businesses.

Information about saving water will be distributed using four actions:

- Radio Interviews on KCLR96fm – interviews with "*KCLR Live*" with presenter Eimear Ni Bhraonain and with "*The Way It Is*" with presenter Sue Nunn asking listeners to carry out three easy actions to save water.
- Carlow Nationalist and Carlow People – articles in local newspaper with three easy actions to save water.

- Household Leaflet – explaining why and how householders can save water in the kitchen, in the bathroom and in the garden – with some simple suggestions.
- Business Leaflet – asking businesses to make overnight meter readings to check to see if they have a business leak. Repairing a leak will save the business on business water charges.

4.2.2 Goals

Short term:

- Design and printing of Household information leaflet
- Design and printing of Business Water information leaflet
- Preparation of Press Release for Newspapers
- Organisation of radio interviews.

Medium term:

- Delivery of information leaflets to individual Households.
- Delivery of information leaflets to individual Businesses.

Long term:

- Delivery of information leaflets to new houses and residential estates as town / villages continue to grow.

4.2.3 Implementing the Action

Expertise will be sought in the preparation of the leaflets examples of which are available on many websites on the internet including: www.water.ie/conserve/ Information leaflets will be proofread by Irish Water officials to ensure consistency of information and messaging to the public.

Volunteers will be sought in each estate or group of estates to assist with the distribution of the household leaflet. Copies of the information leaflets will be uploaded to Facebook and local websites – www.tullow.ie and www.askamore.com Volunteers will be sought to deliver information leaflets to businesses.

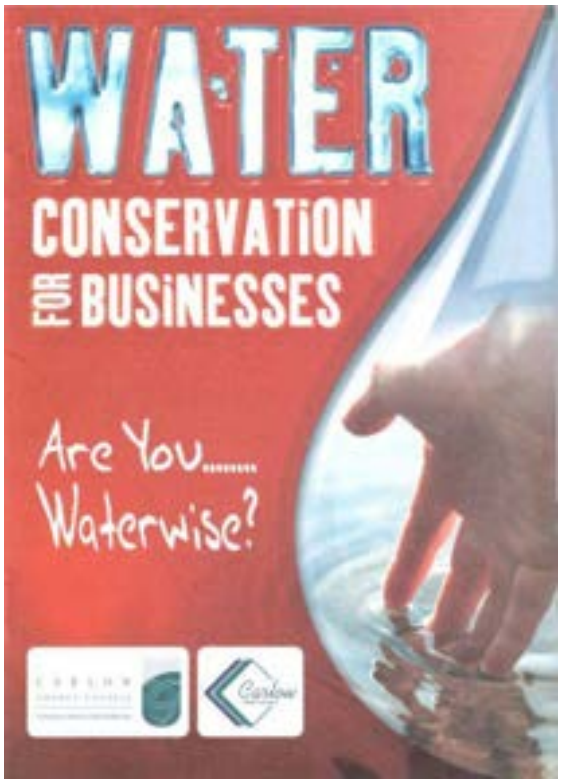
4.2.4 Costs and Benefits

Costs

- Design and Printing of Information Brochures

Benefits

- Easy to understand water conservation information, based on simple actions delivered directly to the home leading to a change in household behaviour
- Easy to understand water conservation information with space to record overnight water usage provided directly to businesses leading to a reduction in leaks.



4.3 Action 2 - Education

4.3.1 Overview

Virtually all water conservation efforts depend on public awareness and understanding of the need for conservation. Minimizing water use, waste, and loss over time is heavily dependent on continually evaluating and adopting new technologies and practices. Education is vital to inform the public about the impact of improved water efficiency and water conservation. Without adequate knowledge, water users lack the ability to put conservation measures and practices into place, however motivated they may be.

The education strand of this project will target different age-groups, and include programmes aimed at community and development groups, primary school children, secondary school children and youth groups. The responsibility for ensuring a sustainable water future lies with the community as a whole; everyone has a role to play to make sure that all water (rainwater, stormwater, public water supply, etc.) is treated responsibly and planned for properly. Education of the wider public is crucial to generating an understanding of the issues, and creating acceptance to the implementation of water conservation efforts.

4.3.2 Goals

Short term:

- Water conservation webinar
- Primary school education project
- Secondary school / Youth group education project

Medium term:

- Education webinar for Tidy Towns and Development Groups, Men's Shed, and other interested parties
- Education programme targeted at primary schools, through links with the Green Schools and Incredible Edibles projects
- Education programme targeted at secondary school age groups, with workshops for Transition Year students, and links with Youth programmes including Gaisce, Guiding and Scouting.

Long term:

- Training opportunities for educators / volunteer leaders.

4.3.3 Implementing the Action

Community volunteers will coordinate the Water Conservation Webinar, aimed at Community and Development groups. We will:

- Collate educational materials
- Invite subject experts to speak at the Webinar
- Facilitate discussion after the Webinar

The primary school education programme will link in with existing Green Schools and Incredible Edibles projects. We will link in with Green Schools teams in schools, providing educational materials focussed on Water Conservation. We will assist them in implementing the programme, providing age-appropriate activities for the children.

https://www.water.ie/conservation/community/water-education-in-school/

https://greenschoolsireland.org/water/

The education programme targeted for teens will include workshops for Transition Year students and Youth groups such as the Scouts and Girl Guides. The workshops will centre around the UN Water Challenge Badge. This programme is designed to help educate young people about the crucial role water plays for life on our planet. We will mentor them in developing their own Water Conservation Action Projects, and upon completion they will earn the UN Water Challenge completion certificate and the Challenge Badge.

https://ecounesco.ie/10-18-youth-programmes/environmental-workshops/

http://www.fao.org/yunga/resources/challenge-badges/water/en/

Finally, we will invest in a training programme for our teachers and Youth Work Volunteers. ECO-UNESCO offers training for Teachers, Mentors, and Youth Work

Volunteers on how to bring education for sustainable development into youth work practice.

https://ecounesco.ie/18-25-training-programmes/teacher-training/

4.3.4 Costs and Benefits

Benefits:

- Generate public understanding of the issues related to water conservation, which is essential to the successful adoption and implementation of conservation practices.
- It also provides them with an opportunity to comprehensively understand the myriad of challenges facing the environment, and the possible mitigation measures that could be employed to address them.

- By improving public understanding of water conservation issues, we will have greater buy-in to all of the other planned Actions in this project.

Costs:

- Costs associated with advertising and hosting the educational webinar.
- Possible fees associated with expert speakers for the webinar.
- Printing of educational materials.
- Printing of completion certificates and purchase of badges for the Water Challenge Action project
- Costs associated with training workshops.

4.4 Action 3 – Drought Tolerant Planting

4.4.1 Overview

In the last decade, the ethos behind community planting has moved away from neatly mown grass verges and hanging baskets filled with water-hungry disposable annual planting. As climate change presents us with the challenge of gardening with less water, choosing plants to suit our growing conditions becomes paramount.

Where possible, perennial plants should be chosen over annuals. Planting a pollinator friendly perennial at an appropriate location is much more sustainable than a flower basket needing copious watering and annual renewal. Planting schemes should be developed using the principle of "right plant – right place". Plants should be chosen to suit the habitat, e.g. shade-lovers in the shade, wind tolerant plants on an exposed site, etc. If a plant is not suited to the conditions, it will never thrive and will likely need replacing.

Water evaporation from bare soil can lead to reduced water availability for plants. Mulching is one practice which can reduce the moisture losses from bare soil. A variety of materials can be used to mulch, including bark mulch, gravel and horticultural grit. By choosing the right plants, watering the community planting schemes using harvested rainwater, and mulching bare soil to prevent soil moisture loss we can eliminate the need to use treated water for horticultural purposes in the town and village.

4.4.2 Goals

Short term:

- Preparation of plant lists for distribution to community stakeholders (link with Action 2: Information)
- Investment in plant stock for community planting
- Investment in grit, gravel and bark mulch

Medium term:

- Implementing the sustainable planting schemes, initially for the container and hanging basket displays.
- Disseminate information to schools, through links with the Green Schools and Incredible Edibles project (link with Action 3: Education)
- Education webinar for Tidy towns and Development Groups, Men's Shed, and other interested parties (link with Action 3: Education)

Long term:

- Extension of sustainable planting principles to all permanent planting areas in the community.

4.4.3 Implementing the Action

Horticultural expertise will be sought in preparing the planting lists. Recommendations for drought- tolerant plants will be requested for a number of categories: Trees and shrubs, herbaceous perennials, hanging baskets and containers, herbs and edibles.

Community volunteers will prepare the information leaflets and engage with the Development / Tidy Towns groups and Men's Shed. Investment will be required to purchase the stock of drought tolerant plants, and mulch materials.

However, this initial investment will result in sustainable planting that will not require yearly replacement, unlike annual plants.

4.4.4 Costs and Benefits

Costs

- How much funding is available and who provides funding
- Labour needs/costs
- Costs for the implementation of the planned water conservation strategies materials needed, expertise needed e.g. architect, ecologist, engineer, construction workers etc., time frame involved etc.

Benefits

- Direct and indirect to the owner, manager and users of the site selected
- Direct and indirect to the community as a whole e.g. economic, environmental, recreational etc.

Tickseed

4.5 Action 4 – River Slaney Boom

4.5.1 Overview

Over the last few years several communities worldwide have used a boom across their local river to collect data on the type of waste being washed down stream. This is a simple solution to a larger problem - it involves placing a boom in a strategic position across a river to catch plastic waste and debris entering the ocean; also it will catch invasive plants spreading downstream. There are two types of booms which can be used an anchored boom or a floating boom. For this project we would be using a floating boom anchored to the side of the river.

4.5.2 Goals

Short term:

- Finding out what type of waste is coming down stream.
- Creating good community spirit by involving local groups.
- Education of local groups.
- Preventing unwanted plastics/waste from reaching the ocean.

Medium term:

- Hopefully local community groups take on board the information gathered.
- Disseminate information to schools, through links with the Green Schools.

- Education webinar for Tidy Towns, Development Groups, Men's Shed, and other interested parties

Long term:

- Through education and the sharing of information the long term effect on the community will be that they will be more careful on how they dispose of waste and plant cuttings.

4.5.3 Implementing the Action

Contact will be made with other community groups that have already put a boom across their local river. Leaflets will be prepared to share findings with the help of the resource centre and other groups. A small investment will have to be made for the purchase of the equipment needed.

4.5.4 Costs and Benefits

Benefits:

- Relatively inexpensive
- Simple design and setup
- Stops debris from reaching the ocean and invasive plants from spreading.
- All plastics gathered can be sent to be recycled.
- Can help identify where the plastics and other debris coming from.

Costs:

- The dearest part would be the purchase of the nets to place floatation devices in.
- The floatation devices could be made up of recycled goods.
- Labour costs could be kept to the minimum by getting local clubs involved i.e. the kayak club, the scouts and the local football teams.

Challenges:

- Only catches plastics and debris floating on the river surface
- Dose not catch micro plastics
- Sits across the river may block traffic so finding the proper location is important

Carlow Regional Youth Services – Boom at the River Burrin

4.6 Action 5 – Rainwater Harvesting

4.6.1 Overview

Rain water harvesting is the collection and storage of rain, rather than allowing it to run off or evaporate. Rainwater harvesting is one of the oldest and easiest ways of self-supply of water for households, agriculture and industry, albeit larger systems used by industry can incur large costs.

There are already many rainwater harvesting projects on the go in the Tullow area which have been successful and well maintained. We would like to add to this by contacting residents associations or community groups or schools to see if they would be interested in installing water butts or the larger IBC's to collect rainwater in their area. Also by contacting the local council with a view to inspecting municipal buildings to see if they could accommodate water butts or IBC's, as most newly built buildings have downpipes within the building.

4.6.2 Goals

Short term:

- To stir up enough interest that people start talking about rainwater harvesting for their area
- Preparation of a list of how many IBC's and water butts would be required
- Deliver information on how to go about installing above
- Investment in the purchase of IBC's and water butts

Medium term:

- To have all water butts installed by winter 2022 if possible.
- To install the water butts for those who don't have the knowledge

- By getting the local residents associations and community groups involved we would like to think that we would be educating the community.

Long term:

- To have every resident association and community group using rain water to water all their plants, vegetable's and gardens
- To keep an interest going throughout the years so the information received will be passed on to a future generation.

4.6.3 Implementing the Action

A leaflet will be printed to inform the community of the project and contact will made with the local community groups and resident associations requesting that they attend a meeting (zoom or otherwise). A plumber will be requested to install the water butts where the knowledge is required or to give advice, this could be done as a request for volunteers.

Community volunteers will prepare the information leaflets and engage with the Development / Tidy Towns groups and Men's shed. Investment will be required to purchase the stock of water Butts and IBC's. The initial investment should be a one off unless the project grows by the year.

4.6.4 Costs and Benefits

Benefits:

- Reduced demand for the use of tap water in the town for watering the community planting schemes.
- The educating of the community and schools in the use of rainwater harvesting

- Community groups that grow their own plants or vegetable's will no longer be using as much tap water.

Costs:

- Initial investment in the water Butts, IBC's and the pipework to connect same.
- A potential funding sources include the Council and Tidy Towns grants and Council Environment grants.
- Labour costs include the plumbing expertise required to install or inform how to install the water butts. Other labour will hopefully be provided by community volunteers from Tidy Towns groups, and CE scheme workers.

Challenges:

- Getting the community to sign up for the project
- Keeping the interest going and the Butts well maintained.

4.7 Action 6 – Riparian Margins

4.7.1 Overview

A riparian margin is the land that runs alongside our rivers and streams. The objective of a riparian margin is to protect the river by creating buffer zones alongside them where little or no agricultural activity takes place. Wider riparian margins are beneficial, particularly in more sloped, marginal land where there is a greater risk of surface water runoff carrying nutrient and sediment with it.

Some margins will contain hedgerows and trees while others can be wider larger areas, devoted to woodland / scrub or natural habitat. Despite the differences in what they contain, all riparian margins have the potential to protect the rivers and streams they are adjacent to while enhancing the habitat and biodiversity living along them.

Riparian zones are important in ecology, environmental resource management and civil engineering because of their role in soil conservation, their habitat biodiversity, and the influence they have on fauna and aquatic ecosystems, including grasslands, woodlands, wetlands, or even non- vegetative areas. Riparian zones dissipate stream energy. The meandering curves of a river, combined with vegetation and root systems, slow the flow of water, which reduces soil erosion and flood damage.

4.7.2 Goal

To increase biodiversity and flood prevention by encouraging farmers to preserve riparian margins on their land.

4.7.3 Implementing the Action

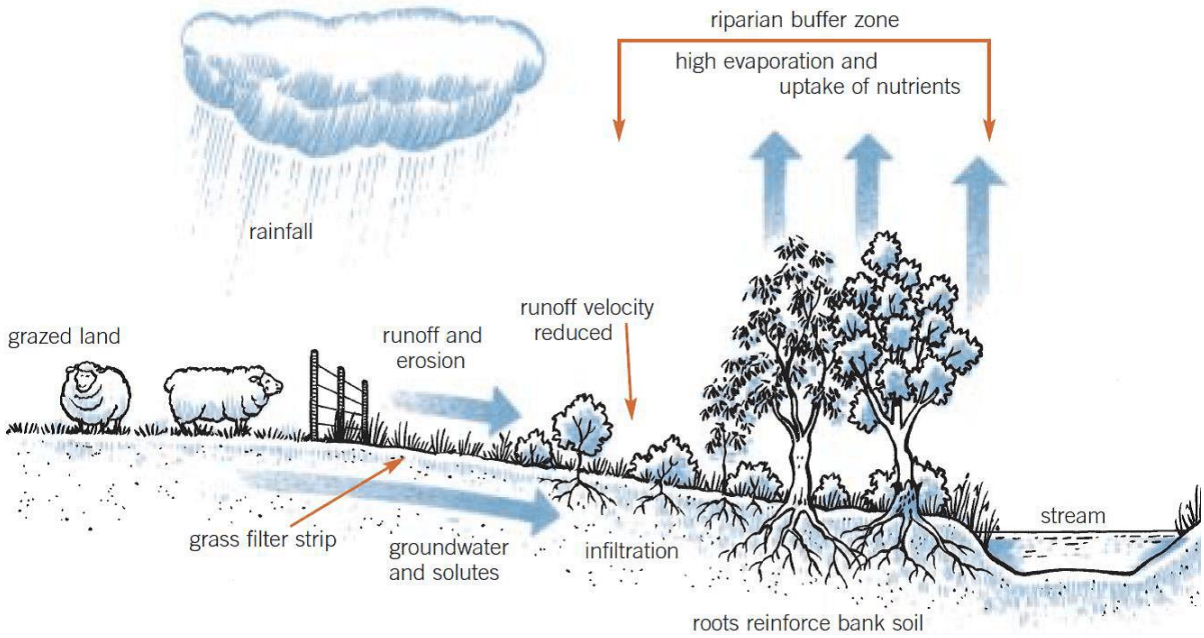
Riparian zones may be natural or engineered for soil stabilization or restoration. These zones are important natural bio filters, protecting aquatic environments from excessive sedimentation, polluted surface runoff, and erosion. They supply shelter and food for many aquatic animals and shade that limits stream temperature change.

Cattle have a propensity to aggregate around water, which can be detrimental to riparian ecosystems. While native ungulates such as deer are commonly found in riparian zones, livestock may trample or graze down native plants, creating an unnatural amount and type of disturbance that riparian species have not evolved to tolerate. This damage can be prevented by fencing riparian margins that run through farmland containing livestock. Fencing riparian margins protects the natural plant biodiversity from overgrazing and protects livestock from accidental drowning. Riparian zones can play a role in lowering nitrate contamination in surface runoff, such as manure and other fertilizers from agricultural fields, that would otherwise damage ecosystems and human health.

The re-vegetation of degraded riparian zones is a common practice in riparian restoration. Re-vegetation can be accomplished through active or passive means, or a combination of the two. The riparian zones also provide wildlife habitat, increased biodiversity, and wildlife corridors, enabling aquatic and riparian organisms to move along river systems avoiding isolated communities. Riparian vegetation can also provide forage for wildlife and livestock. The

assortment of riparian zone trees varies from those of wetlands and typically consists of plants that are either emergent aquatic plants, or herbs, trees and shrubs that thrive in close proximity to water. Native plants are accustomed to their habitat, they are able to hold water better than non-native plants. Native plants also tend to withstand the environment better than non-native plants. This allows them to withstand harsh weather and grow back the following year.

Processes that occur in the riparian zone to improve water quality and stabilise streambanks. Illustration Paul Lennon.



4.7.4 Benefits

Benefit to farmers:

- Protection of riparian margins on farmland helps prevent waterway pollution from farm runoff.
- Plant biodiversity along riparian margins increases water uptake which helps lessen flood risk.
- Increased plant biodiversity in turn increases pollinator numbers which benefit crop farmers.
- Plant roots increase riverbank stability.

4.7.5 Common Plant Species

- Common trees found along riparian margins are willows (Salix cinerea, S. purpurea, S. triandra) and non-native (Salix fragilis, S. alba, S. viminalis) and Alder (Alnus glutinosa)
- Broadleaved herbs such as Nettle (Urtica dioica)
- Creeping Buttercup (Ranunculus repens)
- Wood Dock (Rumex sanguineus)
- Meadowsweet (Filipendula ulmaria)
- Wild Angelica (Angelica sylvestris)
- Hemlock Water-dropwort (Oenanthe crocata)

Creeping Buttercup

4.8 Action 7 – Drinking Water Fountains

4.8.1 Overview

In recent years walking trails and walking loops have become more available and encouraged in local areas. Hydration, during and after walking or running is important. In the three communities, Tullow, Ardattin and Askamore, there is currently no environmentally friendly way of supplying fresh clean water to the general public. The purpose of installing water fountains close to walking trails or running paths is to encourage users to reduce the use of single-use plastics as it takes at least twice as much water to produce a plastic water bottle as the amount of water contained in the bottle. In fact, it takes 22 gallons of water to make one pound of plastic (Water Calculator, 2017).

The proposal for the water conservation plan is that any overflow of the bottles or any unused water will be collected in a water tank below and can be stored for the community to use to water floral displays etc.

Source – www.fingal.ie

4.8.2 Goals

Short term:

- Preparation of the area where drinking fountains will be located.
- Investment in the water fountain, water tank and some pipes.
- Investment in grit, gravel and information on health benefits.

Medium term:

- Implementing a maintenance plan and a plan to invest in other areas in the community.
- Inform the community of the action plan and use the water fountain and walking loops to encourage people to come visit our local community.
- Education webinar for Tidy towns and Development Groups, schools and walking tours and other interested parties.

Long term:

- The use and reuse of the water fountains and provide health benefits.
- Encouraging more walking tours and trips.

4.8.3 Implementing the Action

Meetings with Area Engineers from Carlow and Wexford County Councils to discuss the scheme, prioritise water drinking fountain locations, seek funding, obtain permissions and erect water drinking fountains. It may even be possible for community volunteers to erect the water drinking fountains if the skills exist within the implementing groups.

4.8.4 Costs and Benefits

Costs

- Purchase of water drinking fountains and plumbing supplies
- Labour costs involved in installing the water drinking fountains
- Maintenance into the future
- Promotion of water drinking fountains e.g. handing out free “bottle for life” to the first 20 people to use the new fountains

Benefits

- Reduced demand for single use plastics which in turn cuts out water waste in the manufacture of the plastic bottles
- Reduced use of treated water for watering floral displays
- Easy to use, user friendly, water for those using walking routes or loops

4.9 Action 8 – SUDS (Wetlands Project)

4.9.1 Overview

Urban Wetlands are intrinsic to the functioning of sustainable community environments. From supporting natural eco-systems to improving well-being the benefits of such environments are as far reaching as they are as multifaceted. They feature at the last stage of the SUDS management train and the forefront of a communities recreational, social and environmental hub.

The location of the proposed project is ideal in fulfilling such functions as it is directly beside, and one level beneath, a large multinational supermarket carpark and could act as a gravity fed final stage of water treatment and collection from this area and adjoining infrastructure (main road, commercial buildings etc.) It is also located beside an extensive recreational area; featuring a playground, skate park, exercise areas and walking track.

The proposal features from one to several ponds both lined and unlined. Their construction is standard and synonymous with similar wetland projects carried out both across Ireland and globally. The basic concept is to capture and filter water as an extension of a SUDS system and to also store water (rainwater run-off, water-table spill over etc.) as part of a water conservation plan. A timber boardwalk could be constructed through the wetland area as an extension to a

walking loop stretching through the centre of the town and past the kayak club.

4.9.2 Goals

Short term:

- Procurement of the proposed site.
- Site testing; water basin levels, soil profiling etc.
- Developing plan to link into SUDS system.
- Identifying potential contributory and distributary sources.
- Identifying beneficiaries' social, environmental, tourism etc.

Medium term:

- Excavating wetland area; laying drainage pipes, lining ponds where necessary.
- Connect to SUDS system and water conservation plan.
- Link in with local horticulture/landscaping students (link with Action 3: Education).

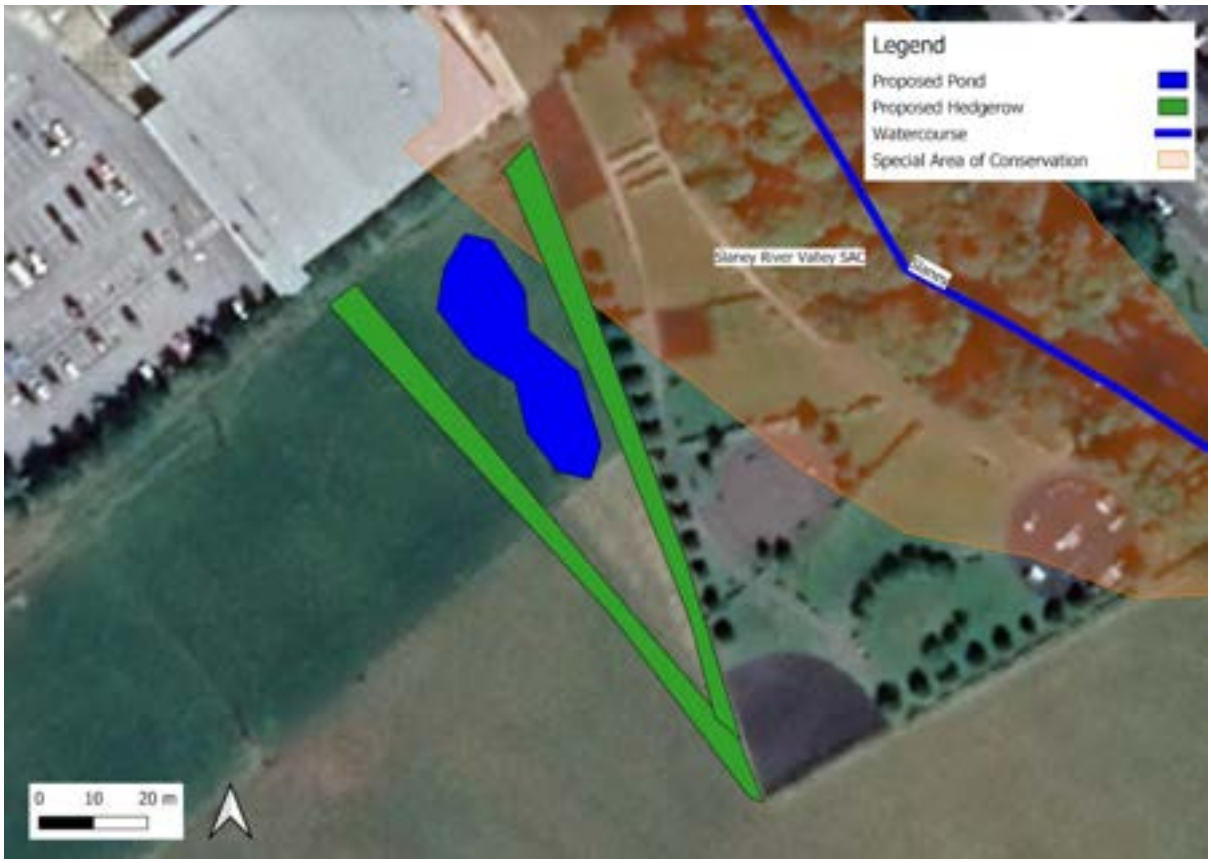
Long term:

- Creation of a boardwalk and linking to other recreational amenities.
- Development of educational programmes (link with Action 3: Education).
- Maintenance.

4.9.3 Implementing the Action

Expertise will be sought in assessing the site and preparing plans. Community volunteers will excavate the site, lay pond liners and drainage pipes where necessary. Investment will be required to purchase the stock of plants and materials (see costs) will be needed.

Professionals will also be sought when linking the wetland area to the SUDS system and for the construction of a boardwalk. A lined pond will form part of the water conservation plan for the dry summer months and a transportable pump will be used to supply the surrounding locations. An example of wetlands area in Tullow is that next to Tullow Town Park, which with the co-operation of the land owner could be transformed as follows:



Drawing by Dr. Julie Larkin

This concept also utilises riparian planting outlined in Action 6 whereby native species such as alder, hawthorn, blackthorn, hazel could be used in the hedgerow closer to the open field while more wetland tolerant species e.g. willows could be incorporated within the hedge row closer to the Town Park.

4.9.4 Costs and Benefits

Benefits:

- Reduced demand for water in the town and village for watering the community planting schemes.
- Part of a SUDS system; reduce flooding, filter waste.
- Providing green urban space, eco-tourism, recreation (part of future green/blue way).
- Educational; located a few minutes' walk from the local schools, programme development.
- Improvement of surrounding land for farming purposes due to drainage into wetland area.

Costs:

- A wetland can be created by simply digging a hole in the ground deeper than the level of the water table. Over time the eco-system will develop naturally. Materials to speed up and tailor to specific purposes; pond liner, drainage pipes, pumps and plants.
- Labour costs include employing a professional to assess the sites viability and draw plans to link in with a SUDS system. Other labour will be provided by community volunteers from Tidy Towns groups, and CE scheme workers.
- Additional materials and labour costs would be required for a boardwalk but not at an initial stage.
- Potential funding sources include the Council and Pobal Tidy Towns grants and Council Environment grants.

Chapter 5 – Conclusion

5.1 Introduction

Over the course of the past few four months (February to May 2021) seven volunteers (five from Tullow, one each from Ardattin and Askamore) have worked together to create a Community Water Conservation Plan for our communities. Although our three communities are different in size the majority of the eight actions outlined in this plan are capable of being implemented in each of the three communities.

Matt Demetriou, Sean Sheehan, Will Paton, Mary Doyle, Laura Kirwan, William Roche and Grace O'Donnell

Formulating the Community Water Conservation Plan was the easy bit. Now comes the real challenge of implementing the eight actions. Our next step is to set realistic delivery goals to ensure that each of the eight actions are implemented on the ground.

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Further Reading

13 best ways to save Water

https://friendsoftheearth.uk/sustainable-living/13-best-ways-save-water

How we can all conserve Water

https://www.water.ie/conserve/

The Hidden Water in everyday Products

https://www.watercalculator.org/footprint/the-hidden-water-in-everyday-products/