

# Rainwise

## Sustainable Drainage Solutions

Working with communities to  
manage rainwater

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**Megstone Avenue, Cramlington,  
Northumberland**



Megstone Avenue is located within the Whitelea Grange estate in the southern part of Cramlington. The properties are almost entirely residential, bounded by other houses on three sides and the East Coast main railway line to the west.



Figure 1: Location of Megstone Avenue, Cramlington



Figure 1: Megstone Avenue Area

There is a gentle N-S gradient across the estate as it falls towards an area of open space along its southern boundary. Drainage of the 8ha area is by a separate system of foul and surface water sewers. The area is located at the head of its catchment and there are no inflows from adjacent developments.

Two properties in Megstone Avenue had suffered sewer flooding. An initial study identified the cause of flooding to be hydraulic incapacity of the surface water sewerage system however conventional solutions proved to be non-cost beneficial. The surface water nature of the flooding and the local availability of green space provided an opportunity to retrofit SuDS and deliver a scheme which met financial criteria.



In response to these investigations the relevant risk management authorities (RMA) of Northumbrian Water (NW) and Northumberland County Council (NCC) determined that the residents would be best served by a collaborative sustainable approach to reduce the risk of further repeat flooding.

#### SuDS used

At an early stage the RMA's decided to maximise the social, environmental and financial benefits of the scheme by choosing to promote retrofit SuDS options rather than a traditional below ground tank storage system. This approach was to be delivered by 2 elements:

1. The use of open space to create a surface water attenuation feature.
2. Upsizing of public sewers and the introduction of flow control measures.

The project comprised a surface water detention basin storing 1800 cu m, the construction of a flow control chamber, 25m of new 525mm dia sewer and 87m of 450mm dia sewer, most of the pipe work being in the highway of Megstone Avenue. The basin capacity provides property protection for up to a 40-year rainfall event.



Figure 2: Schematic Layout, Megstone Avenue, Cramlington



Figure 3: Detention Basin, Megstone Avenue, Cramlington

## How it works

The basin is normally dry, only coming into operation during the larger storm events when the capacity of the old and new drainage system is exceeded. An upsized sewer in Megstone Avenue leads to an innovative flow control chamber which was designed to ensure the basin is normally dry. During periods of incapacity in the system storm water can spill over a 0.78m high weir into the 525mm dia pipe which leads to the basin.

The flow control chamber is equipped with a 225mm dia flap valve in the weir wall so that when flow in the sewer subsides water in the basin can return under gravity to the sewer. The pipe connecting the overflow and basin has a slight fall towards the overflow to enable the basin to fully drain.

The SuDS application used in this project was a single surface water storage basin, located in an area of public open space. The natural geology in the area is clay and therefore there was no need for a lining to the detention basin. The basin has gently sloping sides up to 2m deep however the maximum water depth is 1.0m in a 40 year storm event.

The area around the basin was enhanced by the planting of additional trees and shrubs. This received the support of Natural England as it created a link to the wildlife corridor along the East Coast man line. The changes to the topography and land use will encourage an improvement in bio-diversity of the area which is the largest public green space in the locality.

**NORTHUMBRIAN WATER** *living water*

**MEGSTONE AVENUE FLOOD ALLEVIATION**

WORKING HARD TO REDUCE THE RISK OF FLOODING

**STAY SAFE**

Please stay clear of this area during and after heavy rainfall as there may be water in the basin.

**WHAT AM I LOOKING AT?**

This landscaped area has been created and shaped in such a way that it can temporarily store storm water during periods of heavy rainfall. This is known as a detention basin or SUDs (a sustainable urban drainage detention basin).

The basin helps to reduce the risk of flooding to houses in this area. It is normally dry and will only contain water a few times a year when there has been heavy rainfall. Please stay clear of this area when it contains water. The rain water will drain away after the storm passes.

**WHAT WILDLIFE MIGHT I SEE HERE?**

In dry conditions, the landscaping with shrub, grasses, trees and wildflowers enhances biodiversity (the wide variety of plants, animals and microorganisms) in the area and also provides a community resource.

**WHAT CAN I DO TO HELP?**

We can all play our part to help protect this area from flooding. Stop extra water getting into the system by:

- Installing a water butt in your garden.
- Creating a rain garden to allow rainwater to soak into the ground.
- Installing a permeable driveway (one that allows water to soak through it rather than run off it).
- Making sure the pipes in your home are connected to the right sewer, for example, washing machines and dishwashers should be connected to the foul water sewer, not the surface water sewer.

For more detail about any of the ideas above please visit [www.nwl.co.uk](http://www.nwl.co.uk)

**WHY DID WE CONSTRUCT THIS BASIN?**

The area was at risk of flooding because of urbanisation – an increase of development including hard standing areas such as drives and patios. This sewer system isn't big enough to cope with the extra water that runs off these hard standing areas during periods of heavy rainfall. The basin will store the extra water until after the storm when it can then drain away.

**WHAT WILDLIFE MIGHT I SEE HERE?**

**BETONY (AKA BISHOP'S WORT) - *Stachys officinalis***  
Betony is an upright perennial wildflower with hairy, wrinkled leaves and white, pink or reddish purple flowers in summer and early autumn. Bees and butterflies use it as a nectar source.

**DEVIL'S-BIT SCABIOUS - *Scuccisa pratensis***  
The rounded, purple-blue flower heads of Devil's-bit Scabious can be found in damp meadows and marshes, and along riverbanks. They are in bloom between July and October; their pansicle-like flower heads attracting a wide variety of butterflies and bees. Devil's-bit scabious is also the foodplant for the declining Marsh Fritillary Butterfly.

**OSTRICH FERN - *Matteuccia struthiopteris***  
Ostrich fern is a deciduous fern with bright green leaves forming arching fessettes up to 1.5m in height. Because Ostrich Fern has large leaves and often forms colonies, it can provide substantial protective cover to various kinds of wildlife.

**RED OAK - *Quercus rubra***  
Red Oak is an ornamental tree native to North America. Its catkins provide pollen for bees and other insects in spring. Its acorns are eaten by birds and small mammals and the rounded crown provides nesting opportunities for birds.

**BEFORE**

**AFTER**

**MAINTENANCE**

The basin is jointly maintained by Northumbrian Water and Northumberland County Council. Please report any issues to 0345 717 1100 or [www.nwl.co.uk](http://www.nwl.co.uk).

**IN PARTNERSHIP WITH**

Figure 4: Orientation Board Megstone Avenue, Cramlington

## Specific project details

The project team foresaw a high level of public interest in the scheme. A number of key stakeholders were identified and the delivery team compiled a stakeholder engagement plan. The key elements included working closely with NCC and Natural England. The communication plan also ensured that ward councillors were well briefed on the project and could support the programme of extensive stakeholder engagement.

Customer engagement was carried out through several initiatives. Two customer consultation events were held at local schools to present the proposed scheme, gather comments and dispel myths or misinformation. We developed a poster for the events which provided answers in plain English to anticipated concerns and queries.

NW's consultant prepared a computer generated animation of the detention basin area to help customer visualisation of the end result. Whilst this was an effective communications tool the feature which attracted greatest interest was a simple question and answer board developed by NW and lead consultant. It displayed the twelve most likely asked questions, with answers, in an easy to read format. It satisfied some customers whilst for others it prompted more detailed questions which the event team fielded.

All the residents of the 150 properties in the estate were affected by the scheme since some of the works were located in the only access road. Their primary concerns were about safety and anti-social behaviour in the basins and the potential loss of access to their properties during construction.

The Community events were key to clarifying to residents how the basins operated and reassuring them they were safe. The first event, held in February 2014 was a combined educational one for teachers and children of Hareside Primary School, located next to Megstone Avenue and a drop in session for their parents and residents of the estate. The second, held in April 2014, was at Cramlington Learning Village and was arranged for

residents with ward and parish councillors also invited. A requirement of the planning approval was the development of an information board describing the purpose of the basin and highlighting some of its features. This was developed in conjunction with the local school for on-site display.

## Maintenance & operation

NW's collaboration with NCC enabled future operational and maintenance issues to be considered at an early stage. NCC agreed to continue taking responsibility for grass cutting, litter pick, etc, with NW retaining responsibility for the sewerage assets.

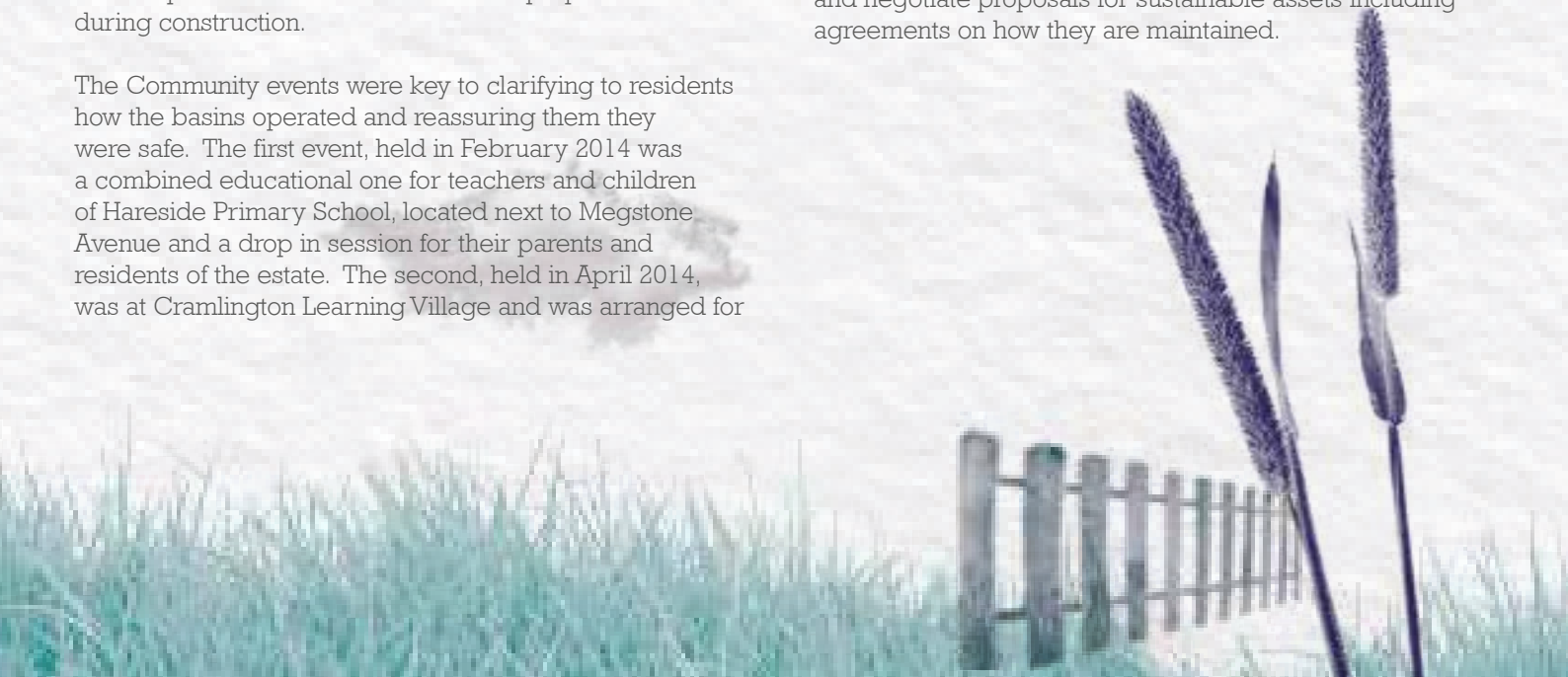
## Achievements

During the course of the project there was press interest from local newspapers and a national engineering journal. These gave further opportunities to explain the role and benefits of SuDS as well as the potential for partnership arrangements to deliver them.

In 2015 NW submitted the project to The Institution of Civil Engineers North East annual Robert Stephenson Awards and was highly commended in the under £500k category. Judges said "The project which is a fine example of collaboration between all parties, has brought huge community benefits by using an innovative and cost effective "retrofitted SuDS" design solution. The value engineering exercise ensured a cost beneficial outcome and accident free scheme, delivered within budget and programme. Extensive community consultation ensured essential "buy-in", as well as educating the cause of flooding due to urban creep."

## Challenges and lessons learnt

NW, supported by NCC invested considerable time and effort to inform and reassure residents about the nature and benefits of SuDS. There was some reluctance to have SuDS in the area however the involvement of high profile stakeholders helped explain and clarify the proposals to allay their concerns in language they could understand. This demonstrated that public acceptance of SuDS projects cannot be taken for granted and a comprehensive stakeholder engagement process is essential. This project has added to NW's understanding of how to present and negotiate proposals for sustainable assets including agreements on how they are maintained.



**Budget and funding**

The total cost of the project was £371k. NW designed and project managed the scheme and provided the funding. NCC contributed the future maintenance of the SuDS features and the support of members and officers.

**Project Team**

Risk Management Authorities

Northumbrian Water  
Northumberland County Council.

Consultant Engineer

Amec Foster Wheeler

Contractor

Seymour Civil Engineering, Hartlepool

**Status**

The scheme commenced in October 2013 and was completed in December 2014.

For further information please email [rainwise@nwl.co.uk](mailto:rainwise@nwl.co.uk).