Melton Mowbray Post 16 Centre (MV-16), Melton Mowbray

Fig 1: Mature SuDS

SuDS used

- *Swales*
- *2 x dry detention basins*
- *Main attenuation basin*
- *Rainwater harvesting tank*

Benefits

- *SuDS used for education purposes by college*
- *Wetland filter system ensures clean water enters natural drainage system*
- *Increased biodiversity in local area*
- *Controlled rate of runoff*
- *Lower maintenance costs compared to conventional piped or underground drainage*
- *Research opportunity*

1. Location

Melton Vale Sixth Form College ('MV-16'), Burton Road, Melton Mowbray LE13 1DN

2. Description

Willmott Dixon was selected by Leicestershire County Council to deliver a new Post-16 college for students in the Melton Mowbray area, the entire site, including buildings, is approximately 2.9Ha. Outside areas of the new college included grassed areas as well as a car park served by both staff and students and smaller buildings, thus demonstrating areas of hardstanding that the Sustainable Drainage System (SuDS) required to manage. The SuDS drains mostly through a 'treatment train' of grassed strips, swales and basins and the building also includes a rain water harvesting system. The SuDS filter and slow the rate of surface water run-off into a Severn Trent open channel to the north of the site.

The SuDS on this project is now very well established, being 8 years old. The site has been carefully monitored over that time and is working even better that originally anticipated. In particular the college have seized on the initial scheme to further develop learning and research opportunities and this has resulted in international attention.

3. Main SuDS components used

The SuDS involves keeping storm water on site and releasing it back into the ground gradually, so people can enjoy it and wildlife can use it. The installed SuDS also had the added advantage to clean storm water biologically in swales and ponds before being discharged into the river and pubic sewage system. This was all achieved by installing;

- Rainwater collected on the building rooftop and harvested and reused as greywater
- Storm water is collected from hard and soft surfaces
- Swales convey collected water to dry detention basins and attenuation basin
- Water is held, using flow control, in attenuation basins
- Water is encouraged to infiltrate into the natural ground where it recharges ground-water
- Plants allow evaporation of water back into the air
- Controlled and filtered outfall into the surrounding public drainage system

4. How it works

The design met the three main sustainable drainage principles that were current at the time; quantity, amenity and quality, on ground which, being clay, did not present high soil-water infiltration potential. This was achieved through involvement of both engineer and landscape architect in site planning, with an extensive 'soft' swale and basin system, which carried water from hard surfaces via basins and eventually a main attenuation basin. Water was also directed from the roof areas to a rainwater harvesting tank to be used in the building's grey water system and any overflow from this was directed to the main basin.

Quantity

Prior to construction the site appeared to have generally soggy conditions, a consequence of the ground not presenting high soil-water infiltration potential. Since a soakaway was not considered a viable option, the site was instead designed to discharge runoff directly to a public sewer in a controlled manner. To do this, the project had to comply with both the requirements of BREEAM and Leicester County Council by reducing discharge by 50% compared to the site's previous discharge rate. The site achieved this by reducing discharge from 124 l/s to 62 l/s.

Amenity

The school staff (lead by the head teacher) expressed interest early in the project's development to use the SuDS for educational purposes. It was therefore designed to be open and visible where possible and to integrate into the site's landscape. Pedestrian access including bridges over the detention basin provides viewing platforms to allow people (including visitors to the site) close contact with the water system and biodiversity.

Quality

The grassed swale's gentle 1:20 sloped sides and dry basins provide a treatment to runoff by removing sediment and debris from it through its natural filtering process. Downstream of the swales and attenuation basin, a further silt trap in the form of a sump was provided to also prevent debris from entering the public sewer. The delivery of this bio-treatment by the SuDS also meant a separate oil interceptor was not required to trap polluted runoff from entering the public sewer.

SuDS in 2018

8 years after the final completion of the SuDS, the system is now well established and operating better than originally anticipated, since swales are now fully integrated into the landscape giving the whole scheme a very natural aesthetic. The system also provides a great outdoor learning environment. The college is very unusual in that A Level lessons in subjects like Art, Geography and Biology happen by using this new SuDS landscape.

5. Specific project details

In addition to the SuDS the project also incorporated a number of additional ecological enhancements all of which helps contain water within the site. These include wildflower grasslands, woodland and hedgerows. The customer expressed an interest to use their outside area for educational purposes and the SuDS, as well as these additional ecological enhancements, provide the tools and resource needed for the students to excel in their chosen A Level subjects.

6. Maintenance & operation

Rob Roberts, the college's premises officer, reports that the system requires very little maintenance. He engages external landscape contractors to cut grass and carry out routine work. This work is prescribed in a landscape management plan, written by DSA Environment + Design as part of the planning consent. The basins have not needed any work beyond the removal of litter and the occasional football from the neighbouring sports pitches.

Furthermore, it is during the ongoing maintenance and operation period where this project is really able to demonstrate whether the SuDS is sustainable or not, since it is hard to say whether a scheme has 'worked' until it is bedded in. Therefore, only time can prove whether people interact with a scheme positively and whether biodiversity flourishes without much human interference.

7. Monitoring and evaluation

DSA Environment + Design, part of the original design team, return to the site periodically to ensure the SuDS operate as per the original landscape plans. Students from MV16 carry out regular monitoring of the system, both informally and as part of curriculum work. This is especially the case in A Level Biology lessons, since the course requires students to complete a number of core practical exercises throughout the course that covers specific skills and techniques. In particular Tetrad Surveys were carried out to assess whether different management practices or changes in the nature of the vegetation have an influence on species diversity. This approach ensures the system is constantly monitored throughout the year, with supervision of tutors.

8. Benefits and achievements

This project provides the expected benefits of SuDS by slowing the rate surface water run-off reaches public sewers, and in the this case of this project it reduced the rate by 50% compared to the site's previous run-off rate before installation. But this SuDS project really excels itself where it supports student's learning and attracting increased biodiversity into the area. The success of this now mature SuDS, which combines water control, increased biodiversity and education, has captured the attention of researchers and practitioners around the world, with the project featuring in a study by researchers from the University of Copenhagen and as a case study for the EU CIRCLE-2 Climate Change Adaptation and Inspiration Book, published in 2014.

From a contractor and client perspective, saving a very large amount of money (circa £114,000) by adopting a SuDS approach was also very beneficial and was achieved by avoiding the use of long lengths of drainage runs, the type of which is typically required in conventional drainage.

9. Lessons learnt

It is important to remember that 'SuDS' was not originally part of the design brief for the school. From the beginning of the project the design team identified that the customer was reassured and therefore fully understood what they would expect from the SuD, especially as there was an initial misunderstanding that the system of 'reed beds' treated foul drainage. Further reassurance, especially around safety and maintenance, was given by carrying out visits to other schools with SuDS projects and speaking to staff at these schools. A tour was organised to speak to staff at Bushloe High School (another susdrain case study) to see how they use their SuDS features in curriculum development.

Lessons learnt from this project have provided the confidence to include SuDS scheme on further Willmott Dixon projects including Birkett House SEN School (completed 2017) and the under-construction Barwell School, both located in Leicestershire.

10. Interaction with local authority

Leicestershire County Council supported the application of a SuDS scheme since they had experienced success of a number of SuDS schemes in schools. The Environment Agency was also heavily involved in the project and requested a SuDS solution with a Landscape Management Plan, which was passed to the Local Authority and conditioned.

11. Project details

Construction completed: Project and SuDS completed in 2010.

Cost:

Overall Project: £11,260,000

SuDS: £114,000 cost saving compared to conventional drainage

Extent: SuDS covering the whole 2.9 Ha area of project around buildings

12. Project team

Funders	• Leicestershire County Council
Clients	• Leicestershire County Council
Designers	• DSA Environment and Design • Arup • A & G
Contractors	• Willmott Dixon

13. Site images and illustrations

Fig 2: Students using SuDS during college courses

Fig 3: Mature SuDS

Fig 4; Mature swale

Fig 5: Site visit attended by researchers