

# GREEN INFRASTRUCTURE

## Case Study: Sustainable Urban Drainage Systems (SuDs)

Dunstall Lane, St Mary's Bay, Romney Marsh

### Description

In 2011 approval was granted for 72 homes on an existing caravan park of approximately 3ha (7acres). The site had been in a derelict condition with both its permanent buildings and caravans removed, the scheme was intended to deliver a high quality development with a rural feel providing a mix of housing styles. Since approval in 2010, the first phase of 7 houses on Phase 1 has been completed.

### Main SuDS components used

**Swales:** a shallow channel with gently sloping sides. A swale may be either natural or human created. Artificial swales are often infiltration basins, designed to manage water runoff, filter pollutants, and increase rainwater infiltration.

**Attenuation pond:** a pond which is designed to slow the passage of water from surface run-off to the ground/ drainage system e.g. stormwater sewers. It does this by storing the run-off during times of peak flow i.e. heavy rainfall, and slowly releasing it at a controlled rate after the peak flow has passed.

### Benefits:

- Water quantity control
- Water quality control
- Amenity
- Biodiversity

### How it works

All surface water runoff will be diverted to linked swales and conveyed to a detention basin upstream prior to discharge to the Clobdsden Sewer (Environment Agency Main River). The majority of surface water is dealt with at the surface rather than relying on a piped network (see image on facing page). All units and frontages are set higher than the carriageway to ensure the flow of surface water. This was required given the minimal level difference between the proposed development and the outfall level into the Clobdsden Sewer and the Golden Sands Sewer.

Each unit in Phase 1 has a swale adjacent to the public highway to collect the surface water from each plot (see image below). These swales then connect via a pre-formed ACO SuDS swale inlet and outlet unit which run under the driveway to each plot

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before connecting to the detention basin. The carriageway surface water system for Phase 1 relied upon the cross fall to direct runoff to the longitudinal swale rather than the long fall driving the surface water to traditional piped gully system. The swales and piped network are designed to not surcharge in the 1 in 2 year return period and to surcharge but not flood in the 1 in 30 year return period. It retains the 1 in 100 year event plus a thirty percent increase to allow for climate change.

The development site was considered a "brownfield" site however the calculation of impermeable area was reduced given the areas were not contiguous and surface water would not likely reach a watercourse. The final total discharge rate within the drainage strategy has been agreed with the EA, Romney Marsh Area Internal Drainage Board (RMAIDB) and Shepway District Council. All individual house downpipes were picked up by a dished channel which had a long fall around the dwelling to convey the water to the localised swale.

### Maintenance & operation

The drainage and highways for Phase 1 have been approved for adoption under Section 38 of the Highways Act and are currently under a five-year maintenance cycle. Commuted sums based upon KCC standard sums have been calculated.

### Monitoring and evaluation

The drainage system is currently maintained by a contractor and is expected to be assessed for handover to KCC in 2022. All aspects of highways and drainage construction were inspected against approved plans for sign-off the works by KCC and Peter Brett Associates.

### Benefits and achievements

The Dunstall Lane site is representative of many development locations across Kent which have little fall and shallow invert



PETER BRETT ASSOCIATES

levels in receiving watercourses. The non-conventional drainage solution developed through consultation with the adopting authority met the constraints on ground levels, invert levels, provision of attenuation with positive drainage systems, and maintenance access arrangements. It also included source control and providing a scheme with added landscape value, visual benefit, amenity and biodiversity benefits.

### Lessons learnt

- Early consultation with consenting authorities is paramount to defining the design solution. Much of the input to the discharge rates occurred through the planning process where a certain amount of design time had already been invested.
- A design solution could not be found without the flexibility provided by KCC Highways. Early consultation with KCC Highways enabled a design solution to be developed to the satisfaction of KCC as adopting authority.
- The design criteria for the highway swales are tight and do not reflect standard side slopes and widths. This design arrangement should be assessed by the adopting authority over time to inform design criteria.
- Inspection of the drainage works highlighted the need for care as swales on the housing side were prone to washout and leaving stagnant water.

### Project details

Construction completed: November 2016

Cost: Highway and drainage costs £94,500 with a SuDS commuted sum of £66,948

Extent: 1340m<sup>2</sup> / Ha or 13.4%

### Project team

- **Funders:** Developer Agent – Martin L Backx CMB Management Services Ltd
- **Clients:** Pinnacle Universal Ltd.
- **Designers:**  
Surface Water and Highway Design – Peter Brett Associates  
Planning – Guy Holloway  
Landscape – Mark Hanton Studio
- **Contractors:** Thakeham
- **Other:** Adopting Authority: – Kent County Council

For further information:

 [www.susdrain.org](http://www.susdrain.org)



Sustainable urban drainage scheme at St Mary's Bay, Romney Marsh.