WEDMORE VILLAGE HALL, WEDMORE. SURFACE WATER CONCEPT STORY, PART OF ADAPTING THE LEVELS PROJECT.

Ref: WVH_002 rev A (stage 3 revision)
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Scale: 1:50

This conceptual elevation builds on the work in SEED Landscape Design's Concept Design Document. It lays the Village Hall as a case study to illustrate how landscape and a considered drainage design (SuDS) could help address some of the current flooding issues. The main aim of this illustration is to showcase and inspire.

SuDS (Sustainable Urban Drainage Systems) design considers rainfall events that have a 1% occurrence with an allowance for future climate change. These events produce greater volumes and rates of runoff than a normal everyday rainfall event. A period of 6 hours is considered as being the peak event. It is for this event that storage is required to be sized prior to the ground accepting any rainfall via natural percolation.

The underlying ground conditions are not favourable for full infiltration. The diagram below details a suggested SuDS management train that deals with rainfall at source and thus reducing the chances of surface water overland flow that currently occurs at the case study site.

CURRENT SITUATION

THE RAIN GARDEN

PLANTING

- *Actaea (Actaea simplex Atropurpurea)* for vertical highlights against the honey stone.
- *Dogwood 'Midwinter Fire' (Cornus-Midwinter Fire)* for its winter stems.
- *Indian rhubarb (Darmera peltata)*
- *Autumn fern (Dryopteris erythrosora)*
- *Hemp-agrimony (Eupatorium cannabinum)*
- *Siberian Iris (Iris sibirica)*
- *Avens 'Cooky' (Geum coccineum)*
- *Soft rush (Juncus effusus)*
- *Leopard plant (Ligularia dentata 'Desdemona')*
- *Przewalski's golden ray (Ligularia przewalskii)*
- *Moor grasses (Molinia dauerstrahl)*
- *Royal fern (Osmunda regalis)*
- *Chestnut-leaved rodgersia (Rodgersia aesculifolia)*
- *Kaffir Lily (Schizostylis pink)*
- *Grey sedge (Carex divulsa) for edges of trafficked areas*
- *In and around the paving low growing plants could be used such as. Mind-your-own-business (Soleirolis soleirolii).*
- *Wild strawberry (Fragaria vesca)*
- *Chamomile (Matricaria chamomilla)*

The rain garden would be designed to take the rain runoff from the roof and use it in an attractive environmentally positive way. The planting beds would be designed to have a freeboard, a crushed stone mulch, a free draining topsoil, a gritty subsoil layer or modular storage system and a throttled land drain linked into the existing drainage system.
The planting would be chosen to thrive in times of drought and times of flood. It would be designed to inspire.

PERMEABLE CARPARK

PERMEABLE HARD SURFACES

- *Permeable tarmac for the more trafficked areas.*
- *A number of companies offer concrete reinforced grass systems. Eg. Marshalls Greenguard and GrassConcrete Grasscrete*
- *There are reinforced grass systems that look more like paving.*
- *The most popular permeable surface is sett paving which has been designed to have large gaps filled with a course grit to allow infiltration.*
- *For areas that are not trafficked by vehicles, paving spacers can be used to create wide joints between paving that can then be filled with grit or planted.*

PLANTING

- *Traditionally reinforced grass systems have been designed for low growing, drought tolerant grass. The success of which depends on how trafficked the area is.*
- *Around the edges of the carpark where cars and people can not damage the planting, other plants could be used such as 'Mind-your-own-business (Soleirolis soleirolii).*
- *Wild strawberry (Fragaria vesca)*
- *Chamomile (Matricaria chamomilla)*
- *At the bottom of walls larger plants could be introduced such as Western maidenhair fern (Adiantum aleuticum).*
- *Baltic parsley (Cenolophium denudatum) for the sunny places.*

The current carpark and surrounding surfaces are all impermeable. The carpark could become an exemplar of how surface water runoff could be significantly reduced by replacing traditional hard landscape surface with a permeable surface. A number of materials and plants could be showcased to inspire.

NATURE

THE POND HABITAT

- The pond would be home to native marginal plants such as Water crowfoot (Ranunculus aquatilis)
- The pond would be home to invertebrates like this dragon fly larvae.
- Marginal plants would need to be tough to cope with potential fluctuating water levels. E.g. Marsh marigold (Caltha palustris)
- The pond would be a place for amphibians to breed.
- Native aquatic plants would oxygenate the water and provide cover to prosperes.
- The pond would provide ideal habitat for native amphibians.

THE WETLAND HABITAT

- The insects around the water would be predated on by bats.
- Marginal perennials like Purple loosestrife (Lythrum salicaria) would populate the wetland and pond margins.
- Pennyroyal (Mentha pulegium)
- The stems of the plants would be a place where larvae would emerge and transform into adults. e.g. Common Hawker(Aeshna juncea)
- Lesser pond-sedge (Carex acutiformis)
- Yellow iris (Iris pseudacorus)

If interception and transpiration are considered together, and assuming an annual rainfall of 1000 mm, broadleaf trees could be expected to use some 400–640 mm.
Source: Information Note on Water Used by Trees from Forestry Commission

CURRENT SITUATION

Due to the slope of the grazed grassland there would be in the region of 40% surface water runoff (60% infiltration) currently either entering the existing culverted drain network or spilling across Marsh Lane towards the Village Hall site. The term for this is known as 'Greenfield Runoff'.

THE RAIN GARDEN

The alternatives for storage below these are either 25% void ratio granular material or modular units processing 90% storage capacity. For the 1% chance / 6 hour rainfall event 15m3 of storage is required prior to natural percolation into the ground. An additional 2.5m3 would be provided by water butts located adjacent to all down pipes for rainwater reuse ie: watering plants during dry periods. A storage depth in the region of 1.2m would be required for granular and 400mm for the modular alternative.

CONNECTED INTO DRAINAGE SYSTEM

An overflow with throttled release connected to the existing public drainage network can be incorporated to manage any additional volume for events in excess of the design event.

PERMEABLE PAVING

Depth of 839mm. 350mm of 25% void ratio granular material placed over the area

PERMEABLE CARPARK

The surface of the car park will allow for infiltration into the sub-structure and ground below. Based on an area of approximately 300m2, the runoff for the 1% chance / 6 hour rainfall event will generate a volume of 25m3 or a depth of 83mm. 350mm of 25% void ratio granular material placed over the area of the carpark would provide adequate storage volume prior to natural percolation into the ground.

CONNECTED INTO DRAINAGE SYSTEM

An overflow connected to the existing public drainage network can be incorporated for events in excess of the design event.

CONNECTED TO EXISTING DITCH SYSTEM

Due to the pond intercepting the runoff from the ditch and locally encouraging natural percolation, the outflow to the ditch and culvert network would be reduced and therefore reduce flooding down stream.

THE HABITAT POND

This feature will accept runoff from adjacent fields as part of the existing ditch system. The pond will have an unlined base to allow for natural percolation into the ground.

SURFACE WATER FROM THE EXISTING DITCH DIRECTED INTO POND AND WETLAND

THE WETLAND / DAMP MEADOW

Assuming the area of grazed grassland is in the region of 0.35 hectares, for the 1% chance / 6 hour rainfall event, 'Greenfield Run-off' will generate approximately 120m3 of rainfall. The wetland will have an unlined base to allow for natural percolation into the ground.

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