**Note on Gunsite allotments – Drainage**

by Alex Hamilton and David Stacey

We visited the allotments on Monday 18th January in response to Philip’s email of 15th January (below) requesting us to comment on the site drainage.

‘Could you please advise us about the poor drainage at Gunsite, which has made the paths, especially the lateral paths, quite waterlogged and dangerous to walk on. Nelly and I were thinking of putting to the Committee on the Mar 6 meeting that we buy 100 metre perforated 100mm drainage pipes to run water down to the golf course, using short lengths under the paths, and longer ones at the bottom. Do you think this is a good idea?’

Our comments are given below.

***General***

* Between October and March, one should expect average monthly rainfall to be a little higher than in other months of the year. Some standing water with soft grass paths over parts of the site are to be expected at this time rather than in the late Spring and Summer months as evaporation is substantially lower during the late autumn and winter period.
* The natural drainage of the site is northwards towards the golf course with the site receiving both direct rainfall and run-off from the woods in the south.
* Much of the drainage from the woods is intercepted by the lateral drain which runs roughly east-west above the access road and eastern car park. The low point of this drain is near the eastern car park where a collector pipe has been installed to take water from this drain to and along the side ditches of a series of allotments. These ditches lead to the collector drain at the bottom of the site where the drainage water is piped to a ditch on the golf course.
* The standing water and grass path problems of the central part of the site are generally greater than those in the eastern areas and western areas of the site. This is partly due to the topography of the site and partly due to the greater amount of traffic that passes over the central part of the site than elsewhere.
* There are two related- all too familiar- problems for the paths, which result from them being primarily composed of clay: (i) the clay will absorb persistent moisture (e.g. from prolonged and heavy rainfall and from standing water and puddles and will only drain slowly when it becomes drier); (ii) as the clay absorbs moisture it becomes weaker, so softer. As the clay becomes softer it is easier for it to be rutted and churned up by footprints and barrow wheels, which in turn creates more puddles leading to further moisture in the clay, softening and turning into liquid mud. Grass roots help to strengthen and drain the surface, but only up to a point.
* So the solutions to the path problems must concentrate on first minimizing the entry of water into the clay, second on maximizing drainage of rainfall falling on the paths and/or ponding up against them, third, on any measures that can strengthen the surface of the paths. These are most critical for the path junctions, where there is most traffic and the drainage is worst.
* Our comments below deal with the following issues: (i) maintaining and improving condition of the grass paths; (ii) managing water entering the site from the woods; (iii) managing water reaching the lower part of the site; (iv) messages to allotment holders

***Maintaining and improving condition of the grass paths***

During wet weather, the surfaces of paths are inevitably going to be soft and vulnerable. However, damage can be mitigated by

* Keeping the level of any adjoining standing water- or saturated ground – as far as possible below the level of the path. This is commonly best done by “ditches” – on all sides of a plot. Where water levels remain high then piping drainage under a lateral path to a plot lower down the site and subsequently to the golf course may be required. It is important to encourage the maintenance of ditches on plots on the uphill side of the lateral paths, where the paths tend to act as dams and catch surface water flowing downhill, and also on the downhill side so paths can drain.
* Aiming for a slightly convex surface for the path, or a slight cross- fall in the downhill direction
* Avoiding longitudinal depressions and ruts in the paths, particularly at the junctions.

The following measures are suggested and the work could be done by individual plot-holders or through the site maintenance team.

* Raise low areas using wood chip, sand and materials which would not interfere with mowing and would aid surface drainage. This is important at the junctions which suffer both from maximum traffic and poor drainage. Where there are persistent problems at the junctions of paths, continual attention should be paid to maintaining the path level so that it does not fall below the level of the adjoining paths. It could well be worth adding a buried layer of geo-fabric, or ‘perforated plastic garden tiles’ at the junctions to strengthen the surface. This would be a somewhat bigger job than simply dumping and spreading material but, in any event, grass growth should be restored as necessary.
* Encourage plot-holders to maintain (or in some areas raise) or re-establish the level of paths
* Encourage plot-holders to clean ditches at the bottom of their plots
* Introduce pipes under the lateral (east-west) paths where there are persistent problems. If perforated pipes are installed, ensure that these are wrapped in an appropriate geo-fabric.
* Where traffic (e.g. barrows) on paths is causing ruts and low spots, encourage plot-holders to minimize the deterioration of paths. In extreme cases introduce a rotation of path use by placing small temporary barriers to reduce traffic on affected areas.

***Managing water entering the site from the woods or falling on the site***

Measures have already been introduced for this purpose and the aim should be to slow the entry of the run-off from the woods and then to pass it through the site to the golf course without causing flooding of individual plots. Run-off from the woods at the west of the site tends to run away to the west and does not affect the allotment site. Run-off from the woods in the central part of the site continues to be an issue. In developing appropriate measures to cope with times of intense rainfall, the balance between passing drainage water quickly from the top to the bottom of the site (which can cause flooding of plots at the bottom of the site) and allowing water to linger in plots higher up the site (and thereby draining more slowly to the bottom), should be considered. The following measures are suggested.

* Maintain the capacity of the ditch which runs east-west just below the woods above the eastern car park. The ditch provides storage at times of heavy rainfall, slowing down run-off.
* Provide draw-off from the east-west ditch to the allotments via the pipe and screen currently installed but ensure that this is at as high a level as practical and fixed firmly (concreted in?) at this level. Keep the pipe and screen clear of debris.
* The draw-of pipe leads to ditches at the side of the allotment. Install under the lateral east-west paths on the line of these ditches. (If perforated pipe is used ensure it is wrapped in an appropriate geo-fabric)
* If experience shows that allotments adjacent to these ditches or at the bottom of the site become flooded, consider the installation of an additional draw-off pipe from the woods further east.
* Install pipes under other east-west paths where there is a severe and persistent build-up of water.

***Managing water reaching the lower part of the site***

The ditch running along the bottom of the site is a collector drain which leads water to a pipe west of plot 63, which takes water from the collector drain to the drain on the perimeter of the golf course. The following measures are suggested.

* Clean out the collector drain and ensure drainage water can pass freely to the golf course

***Messages to allotment holders***

The Committee and volunteers cannot be expected to carry out all the ‘local’ work and it is up to individual plot-holders to carry out most of the work at or inside the area of their plot. This includes:

* Maintaining ditches at the side and bottom of their plot
* Maintaining the paths adjacent to their plot
* Advising the Committee of any severe drainage problems and obtaining advice on installing drainage pipes connecting their plot to an adjacent plot

***Conclusion***

In response to Philip’s query on whether the Committee should be asked ‘buy 100 metre perforated 100mm drainage pipes to run water down to the golf course, using short lengths under the paths, and longer ones at the bottom. Do you think this is a good idea?’, we conclude that:

* Some perforated (with appropriate geo-fabric wrapping) or some solid pipe (75- 100mm) should be bought to undertake the work discussed above. A continuous pipe running from the top to the bottom of the site, accelerating the discharge of the run-off from the woods to the bottom of the site could prove deleterious to the lower plot-holders. Delaying the discharge by routing the flow naturally through the individual plots has benefits in reducing the concentration of drainage water at times of heavy rainfall;
* Increase the capacity of the ditch below the woods and improve the intake and screen;
* Clean out the collector drain at the bottom of the site and ensure drainage water can pass freely to the golf course;
* Install pipes under the east-west paths along the line of the north-south ditches which lead from the intake and elsewhere where there is a severe and persistent build-up of water;
* Any trenches for perforated or plain pipes, cut through paths should ideally be backfilled with sand to improve drainage.
* Measures on path maintenance should be undertaken which reduce low spots and keep path levels as even as possible. Wood-chip, sand and buried artificial fabric or mats should be considered, particularly at path junctions;
* Where traffic (e.g. barrows) on paths is causing ruts and low spots, encourage plot-holders to minimize the deterioration of paths. In extreme cases introduce a rotation of path use by placing small temporary barriers to reduce traffic on affected areas;
* Advise plot-holders of the need for them to (i) make or maintain their own ditches, (ii) maintain adjacent paths and (iii) discuss local drainage problems with the Committee before installing drainage pipes themselves so the work can be coordinated and made relevant to the whole site.

David Stacey and Alex Hamilton (3 February 2016)