

Rublees Allotment: Further Investigation of Existing Water Supply Constraints

Present:

Trevor Cree, SPC Chairman, Agricultural Engineer.
Mike Warren, Chairman, Allotment Association.
Sally Sanderson, Secretary, Allotment Association.
Mark Streeter, Agricultural Contractor.

Summary of Preliminary Proposal for Discussion

The following is a preliminary proposal for discussion developed by Trevor Cree following three site visits to the Rublees Allotment undertaken on the 26th January 2020, and the 19th and 21st June 2020. It is fully recognised that this proposal might not coincide with the views of other SPC councillors, allotment holders nor Steyning residents in general.

It is important that all Allotment Association members and non-members be brought into this conversation at an early stage and that their views be properly considered. It is fully anticipated that alternative proposals can be developed over the coming weeks with the objective of reaching an agreed solution to the current Rublees water supply constraints.

(a) - The Rublees allotment is currently in a first class condition and that is a credit to all allotment holders and the Allotment Association management. On request the SPC have supplied a number of skips to transport cleared debris away from the site and that has assisted in the achievement of the current tidy state of affairs. The latest report states that only two vacant plots remain available on the Rublees whilst no vacant plots remain available at Canada Gardens. The allotments are therefore providing a much appreciated and well used facility for the residents of Steyning.



(b) With greater global focus on the impact of climate change the aim should preferably be to reduce gross water usage on the Rublees allotment rather than increase it. It is fully appreciated that a number of allotment holders are currently experiencing difficulty in watering their plots by hose when more than two hoses are in use at the same time. However increasing the water supply capacity to allow more hoses to be used is likely to increase annual water usage from the current level. Installing extra capacity in terms of an

additional supply pipe would also be expensive because of the requirement for trenching, pipework and fittings. Trenching cost alone is estimated by the contractor to be in excess of £1,000 plus the cost of installation, water pipe and fittings. This is not to rule out this option in the longer term but in the short term other options might reduce the current plot watering problem.

(c) Increasing the level of rainwater harvesting is unlikely to be viable on the Rublees because the existing and future roof collection areas are limited in extent. Rainwater harvesting on long commercial size polytunnels can be economic but such structures would not fit well into the SDNP environment. Where it is currently used water harvesting can be beneficial.



(d) The replacement of the existing treated domestic water supply by a natural underground water source would clearly be ideal. However there is an issue with the cost of borehole drilling, lining and pump installation and the need for an electricity supply to pump water throughout the allotment. A windmill driven pump could be considered as an alternative but that would require the installation of a large holding tank at the highest point in the allotment whilst other constraints include the variability wind power when water is most needed. Water extraction rights and usage charges are other issues that require further investigation.

(e) Tapping into the existing water supply system that feeds the house(s) up the track from the Bowls Club is not considered economically feasible. Firstly it is understood that the mainline would have to commence close to the Bowls Club where the water meters are understood to be installed. That would make the length of the trenching required significant before it could be joined into the existing allotment mainline. Secondly there is a buried electricity cable that would have to be avoided that is understood to run parallel to the Rublees hedge until it reaches the transformer at the top end of the allotment.

(f) In view of the above constraints it is therefore considered that the short-term focus should be on the facilitation of hand watering by significantly reducing the distance required for hand carrying. It is reported that a good proportion of allotment holders already undertake hand watering in preference to the use of a hose. Clearly those who because of medical issues or age need to use a hose could continue to do so. Those who prefer to use a hose could do so but they would still be subject to supply constraints depending on the time of day.

(g) **Gravity Fed Water Supply System:** The proposal for consideration is to mobilise Water Outlet 5 to install a gravity fed water supply system leading down to the bottom corner of the allotment (See **RED** extension on Diagram). This would require installing a large water tank (1,000 -1,500 litres??) with ballcock in the vicinity of the Water Outlet 5. The water feed from Outlet 5 to the large tank would only be turned on when refilling was required and this would help avoid accidental excess water loss due to a pressure system. A good quality anti-kinking hose of a suitable size would be laid on the ground surface for use during the growing season but to avoid frost damage it would be reeled up and stored during the winter. Burying the hose is not considered practical because of trenching cost, excavator access and the fact that there are many sheds and other obstructions in the vicinity of the proposed hose line that is parallel to the MPF/Rublees hedge. At intervals, yet to be decided, open rectangular water tanks of sufficient size would be installed and to avoid water loss would be similarly fed via ballcocks from the surface based mainline hose. The tanks would probably be the same size as the metal ones currently in use because watering cans can easily be filled by plunging them below the water surface.

The benefit of the gravity fed system is that because it is not connected to the mains supply the maximum accidental loss of water is restricted to the capacity of the main feeder tank (1,000 - 1,500 litres). The justification for this system is that it would significantly reduce the current necessity for allotment holders who use watering cans to walk to and from the four existing tanks. It is hoped that the installation of these tanks would encourage a greater degree of hand watering on approximately one-third of the Rublees allotment closest to the MPF/Rublees hedge.

(h) It is anticipated that the SPC would pay for the procurement and installation of the large water tank, associated smaller water tanks, ballcock valves, mainline pipe, fittings and installation.

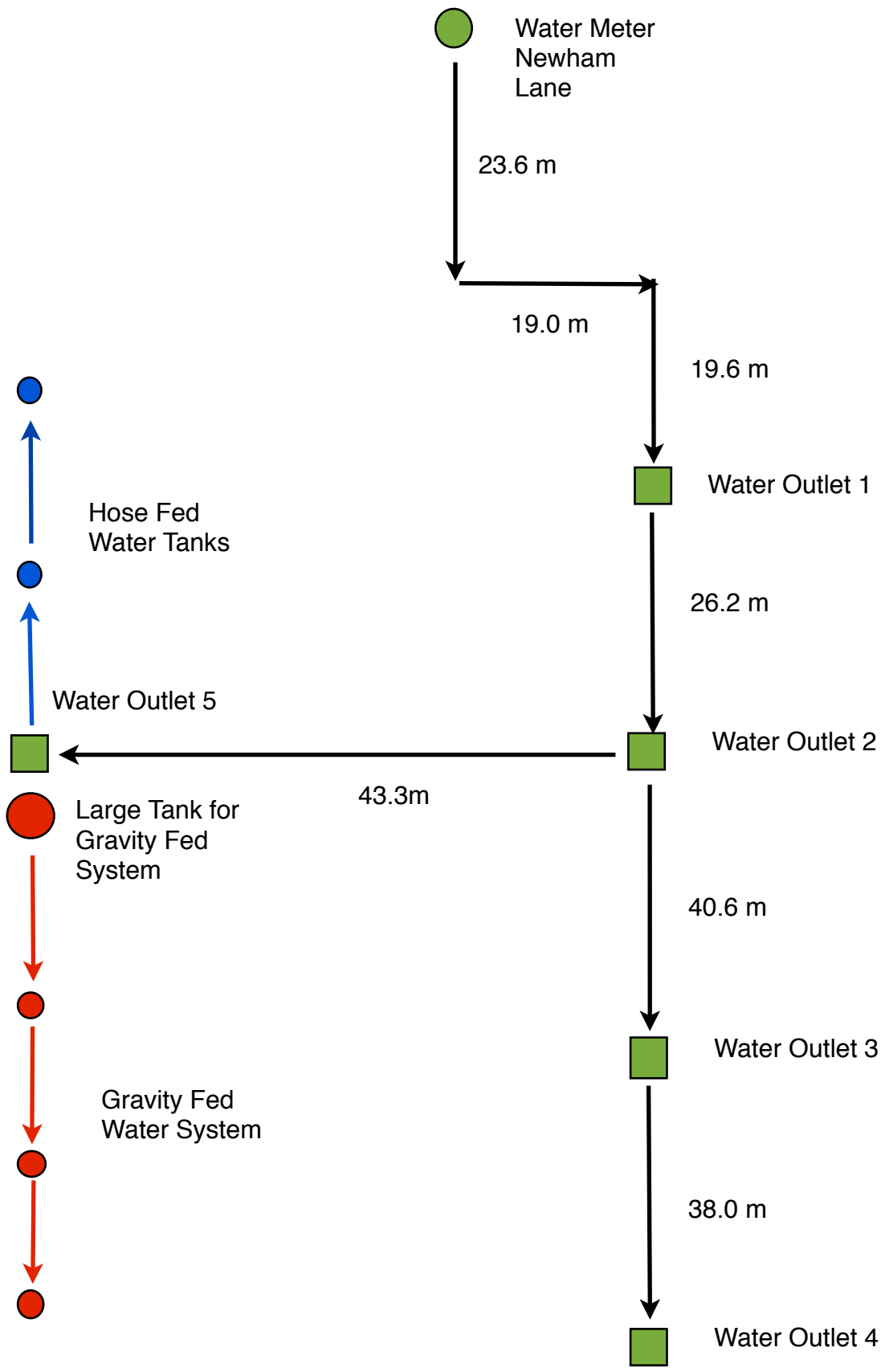
(i) Upstream of Water Outlet 5 it would not be possible to install a gravity fed system because of the contours of the land. It might however be possible to install one or two rectangular water tanks identical to the downstream gravity fed system to encourage the use of hand watering in that area. These would be filled by hose from Water Outlet 5 as required (See **BLUE** extension on diagram).

(j) In the future consideration might be given to a differential fee for those allotment holders who hand water in contrast to those who use a hose in order to encourage a reduction in the use of water on the allotment as a whole. However that is for others to decide.

(k) The SPC may wish to consider offering some annual awards to allotment holders in both Rublees and Canada Gardens in support of self-sufficiency, health and climate change funded out of the allotment fee payments.

(l) Any other alternative ideas are welcome.

Layout of Proposed Gravity Fed Water System



Rublees Site Visits (19th & 21st June 2020)

A follow-up visit to the Rublees Allotment was undertaken on Friday, 19th June 2020, to further investigate the constraints that have caused a lack of water availability in specific areas of the Rublees when more than two hoses are in use at the same time. The first visit on the 26th January 2020 identified some anomalies in the flow and was undertaken without an Allotment Association (AA) member or with a contractor with knowledge of the underground water system being present. It was therefore felt that a joint visit would now be timely and of benefit to all 'stakeholders'. An additional visit was undertaken on Sunday, 21st June 2020, by Trevor Cree in order to take some water flow measurements.

On the Friday visit Mike Warren (AA), Sally Sanderson (AA), Mark Streeter (Contractor) and Trevor Cree (SPC) were present and that was very helpful from a coordination and practical point of view. A small rubber tracked excavator was made available and in the event was found to be essential to facilitate digging down to and locating the primary 25 mm diameter water supply mainline. There was believed to be a leak adjacent to Water Outlet 3 and it was therefore thought convenient to excavate down at that location to determine the mainline pipe size and pipe fittings. Water Outlet 3 also provided the opportunity to determine if the 25 mm pipe size continued beyond that point because it was previously thought that Water Outlet 4 might be served by a 20 mm pipe.

Initially the digging was undertaken by hand but it was found that the soil was very compacted and the depth of the mainline pipe was deeper than first thought. The excavator was used to carefully remove the soil layers one by one without damaging the water pipe. During excavation the source of the apparent water leak was actually discovered to be a small hole in the tank adjacent to the standpipe rather than from the buried water pipe.

The 'T' junction was finally revealed and it could be seen that 25 mm pipe was used throughout the mainline down to the bottom end of the allotment. The pipe had been professionally installed about 20 years ago to a good depth by excavator to avoid frost damage and the pipe itself appeared to be in very good condition. If it were to be decided to install additional capacity in the future then the existing pipe would have to be left in place and a new pipe would be run parallel on the other side of the main grass path.



Mark confirmed that sourcing an alternative water supply from the track leading up to the Downs would require linking into a point close to the Bowls Club. This would be a prohibitively expensive option because of the distance. In addition he stated that an electrical mains cable runs beneath the ground at the Newham Lane entrance and that any removal and replacement of the existing 15 mm metal water pipe from the existing meter to within the allotment itself might therefore prove difficult and prohibitively expensive. It was also discussed whether or not the water authority would accept the replacement of the meter with a larger capacity water outtake from that point because of the potential impact on household supply in the area.

When asked if allotment holders would mind paying a higher charge for their allotment to cover increased water usage and cost it was indicated that most would not mind. There was shared concern that rather than encouraging greater water use the SPC and Allotment Association should be promoting reduced water use. At present it is believed that perhaps 50% of allotment holders water by hand and 50% by hose. Clearly those with plots at a significant distance from the existing four water tanks are likely to prefer watering by hose. However a number of allotment holders have their own plastic water tanks that are no doubt refilled by hose and then they can use watering cans more easily.



A visit to the allotment on Sunday, 21st June 2020, confirmed that a number of allotment holders have their own water tanks on their plots.



An investigation was also undertaken to determine if there was any significant variation in water flow between the five existing outlets when all other taps were turned off. The objective was to see if the water flow anomaly at Water Outlet 2 was due to a buried constriction in the pipe between the mainline and the tap outlet. It was also useful to determine if the flow from each of the five taps was broadly similar.

It was determined that the static pressure was the same at each outlet, namely 6.0 bar or approximately 90 psi. This is a very satisfactory pressure for any domestic or allotment situation and therefore the water flow problem was not due to a lack of water pressure. It was not possible to fit the water pressure gauge onto one outlet because the hose connection was fixed in place. When the taps were opened to full flow the pressure dropped down to between 0.4 bar - 0.5 bar. However this was not a constraint under these conditions because the flowrate into each tank was between 23.5 - 27.7 litres per minute.

Outlet	Flowrate (litres/min)
Outlet 1	25.2
Outlet 2	24.7
Outlet 3	27.7
Outlet 4	25.7
Outlet 5	23.5

It can be seen from the above that the flow rate at Outlet 2 was not being restricted in any way. The anomaly of zero water flow at Outlet 2 occurs when the taps at Outlet 1, Outlet 3 and Outlet 4 are fully open. One would normally expect that the flow rate would decrease due to pipe friction the further the distance the tap is from the water meter located adjacent to Newham Lane. It would therefore be expected that loss of flow would be more likely to occur at Outlets 3 and 4 but that was not the case in previous tests. One explanation is that Outlets 3 and 4 are significantly lower than Outlet 2 and that in some way the flow is 'sucked' away from Outlet 2. In the present circumstances it may be necessary to restrict hose usage to two at a time with 1 and 2 in combination and with 3 and 4 in combination. That might require staggering sector usage by time of day, perhaps 8 - 11, 11 - 1, 1 - 3, 3 - 6. There may be a better way of ensuring that allotment holders do not have a wasted journey when they go specifically to Rublees to water their plots. That must be very frustrating. Hopefully the proposed gravity fed system and greater watering can use might provide an alternative to many plot holders.

Trevor Cree
22nd June 2020

Rublees Allotments: Preliminary Investigation of Existing Water Supply Issues

1. Introduction

On the 7th January 2020 a preliminary assessment was undertaken of the existing water supply issues that have been reported at the Rublees Allotments, Steyning. This work was enabled because at this time of year water is not required by allotment holders and therefore the assessment could be undertaken without any disruption. The Steyning Parish Council had earlier purchased equipment from Access Irrigation consisting of a pressure gauge and two way water fitting with on/off controls.

2, Rublees Allotment Water Meter

The water meter is located on the driveway at the Newham Lane entrance. The dials on the water meter were stationary and that therefore indicated that there was no leakage in the existing water distribution system. The reading dated the 7th January 2020 was **05768 (12)** cubic metres and this can therefore be directly compared with readings taken over the last few years. The meter reading on the 14th December 2019 was reported to be 5767 (74) cubic metres. The SPC will have on file previous water bills detailing water usage and associated costs. On the 14th December 2019 Roger (Brown) was informed on a chance meeting with the Siemens water board technician that usage since the last reading might have been as high as 1,100 cubic metres (241,966 gallons) but that needs to be confirmed. The water supply pipe from the water meter to the first allotment water outlet is stated to be 15 mm in diameter but that requires confirmation.

Following discussion with the Allotment holders and the SPC it is recommended that during the winter months that the water supply to both of the allotments (Rublees and Canada Gardens) be turned off at the meter. This will help to ensure that water is not wasted and excessive costs incurred due to undetected leakage or water taps or hoses being left on unattended. If water is required during the winter months then the existing tanks can be topped up as required.

In addition consideration should be given to replacing water tanks that are corroded or have holes in them since that currently leads to water loss.

3, Water Distribution System

As far as could be determined there are five water outlets within the Rublees allotments, four with water storage tanks and one without. Water is accessed by elevated water taps using watering cans or hoses or from the individual tanks. The distance from the water meter to each individual water outlet were measured to be:

Water Meter to Outlet 1 = 62.2 m
Water Meter to Outlet 2 = 88.4 m
Water Meter to Outlet 3 = 129.0 m
Water Meter to Outlet 4 = 167.0 m
Water Meter to Outlet 5 = 131.7 m

4. Preliminary Findings

Water Pressure: With all of the outlets in the off position the water pressure at Outlet 4 was measured to be 6.6 bar ($6.6 \times 14.50 = 95.7$ psi). The tap at Outlet 3 was then fully opened and the pressure measurement at Outlet 4 dropped significantly to 1.2 bar. When Outlet 3 and Outlet 2 were both fully opened the pressure measurement at Outlet 4 dropped to 0.6 bar. When Outlet 3, Outlet 2 and Outlet 1 were all fully opened the pressure measurement at Outlet 4 dropped to 0.3 bar.

Water Flow Rates: Preliminary water flow measurements were taken using indicative scenarios:

Scenario (a) Four water outlets fully open (Outlets 1, 2, 3 and 4 open, Outlet 5 closed)

This scenario was very interesting and rather baffling. Usually the flowrate will be greatest nearest the water source (Outlet 1) and then because of pipe friction loss the pressure and flowrate should have decreased the further one was from the source.

Outlet 1 Flowrate = 20.0 litres/min
Outlet 2 Flowrate = 0.00 litres/min
Outlet 3 Flowrate = 4.14 litres/min
Outlet 4 Flowrate = 10.47 litres/min

The flow at Outlet 1 provides a benchmark but then you would expect the flow at Outlet 2 to be the second highest when in fact there was zero flow. The flow at Outlet 3 was much reduced but rose at Outlet 4. Clearly allowance has to be made for the height differences between Outlet 1 and 2, 3 and 4 but the results are very odd, particularly zero flow at Outlet 2.

Scenario (b) Three water outlets fully open (Outlets 2, 3 and 4 open, Outlets 1 and 5 closed)

Although Outlets 2, 3 and 4 were fully open only the flowrate at Outlet 2 was measured. That had increased from 0.00 litres/minute up to 9.5 litres/minute.

Outlet 2 Flowrate = 9.5 litres/min

Scenario (c) Two water outlets fully open (Outlets 3 and 4 open, Outlets 1, 2 and 5 closed)

The flow at Outlet 3 was measured with Outlets 1, 2 and 5 closed but 2 and 4 open.

Outlet 3 Flowrate - 12.9 litres/min

Scenario (d) One water outlet fully open (Outlet 4 open, Outlets 1, 2, 3 and 5 closed)

In the final scenario only Outlet 4 was open whilst all other Outlets were closed.

Outlet 4 Flowrate = 32.8 litres/min

5. Follow-Up

Time was very limited for the preliminary investigation and it is clear that further work should be undertaken as soon as possible before the Spring.

(i) I understand that Mark undertakes the maintenance of the Rublees allotment water distribution system. He will probably have a very clear understanding of the underground pipe sizes and fittings that have been installed and that may help to explain some of the anomalies. A visit to the Rublees with Mark might be the next step.

(ii) It was reported that there may be another water pipeline feeding the Rublees allotment and that can be easily verified by turning the flow off at the Newham Lane water meter and then opening all of the taps until flow ceases (or does not). In addition a resident might be able to confirm the location of the second water source, if it exists.

(iii) The initial tests were undertaken without any hose attachments and many allotment holders prefer to use hoses rather than watering cans. In fact there are multiple scenarios of water usage on any one day of the year but the main requirement is that all allotment holders have equal access to the available water.

(iv) In cooperation with Hazel we need to determine if the annual water usage in 2019 was exceptional in comparison with other years and what was the final cost to the SPC. The work on the efficient use of resources may mean that we should aim to decrease the annual water usage and cost at the Rublees allotments.

(v) One potentially controversial option would be to ban the use of hoses but increase the number of water tanks to make the use of watering cans easier. Clearly no action should be taken before discussions are undertaken between the SPC and allotment holders.

(vi) It is understood that Councillor Alexander is investigating the financial viability of a borehole but it is not known how far that work has progressed.

(vii) A further investigation should be undertaken as soon as possible. At that time it will be possible to discuss different solutions to the current water problem,

Trevor Cree
26th January 2020