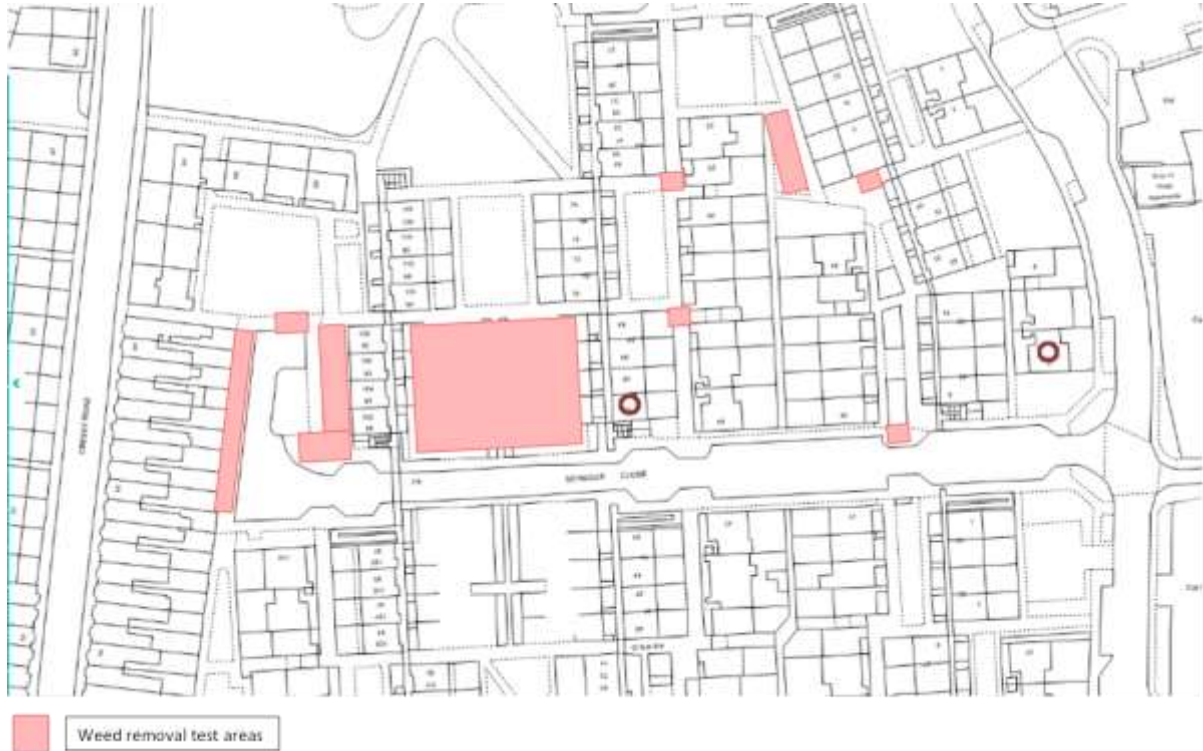


APPENDIX A - WEED REMOVAL TRIAL

In November 2021, Buckland Green & Clean team undertook a weed removal trial to understand the differences between weed spraying and using the weed ripper machine. The trial was undertaken during one day in the Seymour area of Buckland which has mostly hard surfaced areas - block paving, tarmac and paving slabs, as shown below:



For the trial to be comparable, the same area was used by the same number of operatives. Each task of the weed spray and weed ripper process were timed and the results were:

Weed Spray Test				
Activity	Start Time	End Time	Total Minutes	No. of Operatives
Collecting and checking equipment	08:00	08:05	5 mins	2 x operatives
Mixing chemicals	08:05	08:08	3 mins	
Travel time - store to first site	08:08	08:10	2 mins	
Spray time	08:11	08:40	29 mins	
Rinse and clean equipment and store	08:49	08:57	8 mins	
Total			47 mins (1hr 34mins for 2 ops)	

Weed Ripper Test				
Activity	Start Time	End Time	Total Minutes	No. of Operatives
Collecting and checking machine	08:58	09:01	3 mins	2 x operatives
Machine in use	09:07	10:57	1hr 50 mins	
Clean down and return to store	10:58	11:03	5 mins	
Total			1hr 58 mins (3hrs 56 mins for 2 ops)	

Other considerations include:

- Cost of time spent on site specific to the test
 - Weed spray test £22.74
 - Weed ripper test £57.29. 60% increase in resource costs.
- No. of resources needed
 - Weed spray test - two operatives used as they were required for the second part of the test, but only one operative is required to weed spray normally, albeit the time on site will double.
 - Weed ripper test - two operatives required, one to operate the weed ripper machine and one to operate a second machine to follow and sweep up any debris caused.
- Cost of machine - £2,500 per machine plus servicing, repair, running costs and consumable costs (brushes, filters etc).
- Hand Arm Vibration (HAVs) readings - allow for 13 hours use before a limit point is used for the day, which in practical terms means this machine could be used by one operative all day without stopping. However, this is an additional task on top of other mechanical machinery and so risks are naturally increased. Operatives could rotate between this machine and the other machine used to collect debris created, but this would only be a slight reduction in vibrations to the operatives.
- Transport requirements - the weed ripper and the collecting sweeping machines require transport via a van. A van is £26 per day to hire.
- Cost of chemical/petrol - unknown currently.
- Environmental concerns - transporting equipment has environmental impacts that should be considered, specifically the use of the vehicle, but also its carbon footprint to be produced in the first place. The same applies to the weed ripper and sweeping machines which also operate via an engine and therefore produce emissions, use fuel and oil etc.
- Finished product



From the results of the Weed Ripper test we have found:

- The weed ripping machine does not fully remove the weed from slab and block paving joints, leaving the root in-tact.
- The process results in a cleaner appearance to the slab / block paver (but that may require the whole area to be treated if to look consistent).

Scaling up

The following information is relevant to the Buckland Green and Clean team who completed the above experiment and could be used as an indication of cost.

- This year the Buckland G&C team produced 339 hours of work over 3 separate periods of time to complete the weed spraying task.
 - Approximately 9 working weeks of work.
 - If charged, this would cost in the region of £4,942.62
- No additional vehicle is required as staff simply walk the estate with the backpack sprayer and are drawn out of gardening teams for this task.
- The Buckland area used 34.36 litres of herbicide this year over 422 sites (including repeat visits to the same site). This is a spot spray method, not proactive spraying.
- A backpack sprayer costs in the region of £159.
- The Buckland team has spent £280 on herbicide product this year.

Assuming the 60% increase in resource time is accurate (based on the small-scale experiment) the following is applicable to mirror the above experiment:

- Number of treatments per year is unknown, as effectiveness is not fully understood. However, it is anticipated this will require more treatments as the weed itself is never killed to the root, instead it is ripped from the ground.
- On the basis staff will need to work in pairs and that the time on site is 60% increased and staff cannot be drawn from existing resource pools, this would have to be supplementary for this task.
- 339 working hours (60% increase to £4,492.62) = £7,908.19 or 14.6 working weeks
- Van hire = £1,950 on the basis that staff cannot walk the estate, they will need to safely store equipment and move it from site to site.

For Green and Clean alone there are 5 management areas with similar hard surfaced areas. Therefore, the figures would be in the region of:

- $£7,908.19 + £1,950.00 = £49,290.95$
 - 10 x staff and 5 x vans for 15 weeks (minimum)
 - Without vehicle and machine running costs which currently are unknown.
- In the G&C example, supplementary staff would only be required March until October and so would be employed on a temporary basis.
 - Time spent recruiting, and training such staff is an additional unknown expense and likely will come with its own challenges.
- There is no budget capacity to move towards such a scenario currently.