



Environmentally Sensitive Site Clearance Methods for Sustainable Development.

A discussion document suggesting the use of mobile mulchers during the ground clearance phase of development to process green Waste into a usable end product.

A management scheme is proposed backed by rough budget figures.

Prepared by:

JP Associates,
Lane End,
Kentismoor Farm,
Kentisbeare,
Cullompton.
EX15 2Black Thorn.

Tel; 01884 266518. Fax; 01884 266161.
E-mail; jpp@jp-associates.co.uk

This document is intended to promote discussion on environmentally sensitive methods of site clearance and the conversion of green 'waste' into a usable end product. The document, the management scheme it suggests and the rough budget figures presented are not intended to be used as definitive guidance.

The views expressed in this document are the personal opinions of the author, who holds the copy right to all material. No part of this document may be reproduced with out the express written permission of the author.

Any comments or queries should be addressed to the author.



Environmentally Sensitive Site Clearance Methods for Sustainable Development.

The use of more sustainable systems in undertaking any development is a politically important issue and over the coming years pressure to ensure sustainability will increase. This will be especially true in the way that all 'environmental' aspects of development are managed and is reflected in current government guidance aimed at encouraging developers to deal with green waste at the point of origin. Employing more sustainable practises in ground clearance is enforced by the rapidly rising cost of using landfill sites to dispose of green waste. The high and rising cost of landfill is allowing alternative methods of treatment to become cost effective at lower volumes.

The use of mulchers, tub grinders and big stump grinders are methods that have a high initial cost that has, in the past, frequently been prohibitive. The use of such machines produces a usable by product that can usefully be employed in the landscaping either at the end of the development or at the completion of the initial ground work operations. The processed debris can be used either as a mulch or as a soil conditioner to help correct the loss of structure that is a frequent feature of new soils and leads to waterlogging, desiccation and compaction of new gardens.

Having researched the various machines it appears that the use of a mobile mulcher, perhaps backed by a large stump grinder, will provide the best results to fit in with the proposed scheme, presented after the following costings.

From recent investigations I have calculated the following rough budget figures

Landfill.

Simple cost. This is a bit difficult to calculate as Ground works, hauliers, earthmovers and tip operators are prone to wheel & deal amongst themselves!

However; a cost of £45/T not including stump extraction or haulage has been given. Assuming 2 hrs haulage @ £25/hr and assuming 8T loads would give;
 $2\text{hrs} @ £25 = £50 + 8\text{T} @ £45 = £410 (/8 = £51.25/\text{T})$

I have also been told that approximate cost can be £45/T including extraction, haulage and tipping



Mulcher.

Simple Cost.

Quoted @ £800/day + estimated £350 transport cost to Exeter. If further jobs are found onward transport charged to next job but for now assume 2 way transport charged.

$$£800 + £700 = £1,500$$

Simple Break-Even Tonnage

Dividing £1,500 by unit cost of tipping will give break-even Tonnage at which cost of tipping equals unit cost of mulcher.

$$£1,500/51.25 = 29.23T$$

$$£1,500/45 = 33.33T$$

Average of 51.25 & 45 is £48.13

$$\underline{£1,500/48.13 = 31.17T}$$

My initial thoughts are that this is perhaps a bit unrealistic.

True cost of mulcher.

£1,500 as given above.

+ Contractors %, as site clearance would probably be included in another contract. Say 10% = £1,650.

+ Transport of processed debris to on site storage for subsequent use in landscaping. Assuming 200T (approximate maximum machine output / day assuming average conditions) say 8hrs @ £25 = £1,850.

NB. The mulcher will require additional management under certain circumstances, e.g. traffic control adjacent to roads but as this is equally true of extraction and tipping the cost is ignored in these budgets.

Amended Break-Even Tonnage

$$\underline{£1,850/48.13 = 38.44T}$$



Additional points.

There are various other factors that should be born in mind.

- Mobile mulchers are designed to cope with all organic material and can be used to convert all green waste into a useable product the material can be processed in situ on site or at a place of storage following extraction and transportation. Site tree work arisings can be processed leading to a reduction in the price paid for tree work.
- Pallets and other larger timber off-cuts from construction can also be converted – following transport to the site.
- As indicated above the processed debris can be stored and used in the landscaping either as a mulch or as a soil conditioner to help improve the structure of the new garden soils. Complete composting of the debris is likely to take a considerable time, as the inevitable inclusion of soil will add a considerable amount of inert bulk that will reduce the efficacy of the composting process. However by storing the debris on site for as long a period of time as possible the majority of the greener material will have sufficiently broken down.
- The above figures are produced to calculate the minimum costing break-even point. The site and ground conditions and the characteristics of the raw material determine the total amount of material that can be processed in a day. Figures quoted by contractors indicate that 200 Tonnes or more can be possible (through these may need to be moderated through experience).
- In some instances where high volumes are to be processed, the efficiency of the operation can be improved through using a second machine to move raw materials or processed debris. While this will inevitably increase the operation cost, the increase will be easily lost through economies of scale.
- Assuming the above £1,850 realistic cost of the first day's hire, then a 150T quantity will have a unit price of £12.33/T.
- A second day would cost another £800 + 10% (contractor's %) = £880 + another day's on site transport of £200 = £1,080 giving a total of £2,930 but this would enable 300 Tonnes to be processed @ £9.77/T. A second machine may be needed increasing the cost to £10.43/T.
- With time to plan operations and by involving various developers the transport costs could be reduced.
- There is a lot of political advantage to be gained in being saying that all green waste is recycled and not landfilled.

Conclusions.

The above figures have been calculated from guide prices given in the absence of specific site circumstances and should only be used as a guide. Individual projects, reflecting site specific risk assessments and method statements may well change the circumstances beyond those assumed in this paper exercise.

However not withstanding the inevitable vagueness and shortcomings of a paper exercise, the break-even point at which a mulcher becomes cost effective is rather lower than was anticipated (by the author). 40T of green material, while being a large pile, would easily be accumulated by even a moderately sized development.



Tree stumps etc from projects with a green material yield below the break-even point could be transported to a collecting point till a sufficient quantity has been accumulated to merit processing. The unit costs involved in this would be rather higher as there would be extraction and transport costs as well as storage costs before processing, which would have a reduced output and would require the use of an assisting machine. The processed debris would then need to be transported back to the site (or another development) for subsequent use. As long as the total unit cost of the operation is lower than the unit cost of tipping then the operation remains viable.

From conversations with the environment agency it appears that as long as the weight of the green material doesn't exceed 1000T at any one site then a specific licence is not required. As long as the operator is registered to carry green waste.

Experience appears to indicate that the large machines are quick and efficient at converting green material to a usable product, however the work does need to be managed. The use of an additional machine to roughly sort material, especially when hedges are being converted will make the operation of site preparation more efficient.

With larger specialist plant on site there is a greater risk of potential conflict between contractors undertaking different tasks. Conversion of green material should be undertaken as part of a separate contract that should have prior and exclusive control of the site ahead of the main groundwork contract. This initial contract would become the first stage of the development should include the main tree work and any other environmental operations and end with the erection of the tree protection fences.

The Scheme.

- To stop using landfill in favour of more sustainable, environmentally sensitive options.
- Using a mobile mulcher to process tree stumps and all other 'green waste' will convert a potential high cost problem into a useful by product that can be used to reduce expensive soil structure related problems experienced later in the development.
- Remove the green waste element of the site clearance from the general groundwork contract and include it into the pre groundwork operations, along with the tree, hedge and all 'environmental' work including tree protection fence erection.
- Run environmental work as an entirely separate contract using a separate main contractor so that contractor has exclusive control of the site.
- Use JP Associates to oversee all environmental operations during ground works contract and main development construction as well as during initial environmental work.

