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Waste Not Rot Not: Landscaping in Tucson, Arizona

Abstract:

Tucson, Arizona's population has grown quickly in the past few decades, causing the existing population to demand more from Tucson's aging infrastructure, particularly in the [area](#) [realm](#) of green (vegetative) waste disposal. For the Los Reales Sustainability Campus, the site that houses Tucson's largest (and Arizona's 3rd largest) landfill, one reaction to this demand has been to invest in different waste diversion programs, such as green waste, to keep reusable materials out of its landfill. However, the success of these programs relies heavily upon their use by those who have the greatest potential to divert vegetative waste: local landscaping firms. For this reason, this research [aimed to assess](#) the barriers to green waste diversion according to Tucson landscaping firms of different sizes in order to determine trends in current green waste disposal as well as commercial behaviors towards green waste diversion. A qualitative analysis of four landscaping companies in Tucson, AZ revealed that the greatest barrier to green waste diversion was the cost of waste diversion and the inability to [have ensure the a](#) 100% green load [as](#) required by most green waste diversion programs. Customer preference plays a significant

role in deciding the disposal business model and its capacity to change, primarily because most customers prioritize cutting costs [over](#) promoting sustainability.

Introduction:

Like many cities in the United States' Southwest, Tucson, Arizona has experienced substantial population growth over the last few decades, putting a significant strain on municipal systems and resources. According to U.S. Census data, the population of Tucson has increased by 12.6% from 2000-2019 (U.S. Census Bureau, 2021). As the population has increased, so has infrastructural demand and waste production. In Tucson and surrounding areas in the Southwest [most](#) of the burden of [vegetative](#) and other waste falls on commercial and private landscapers for removal of plant debris from properties, which is why their role [is crucial](#) in [the](#) system of waste diversion. Although [cuttings from](#) many desert plant species can be broken down naturally in a landscape or in a compost pile, they oftentimes end up in the Los Reales Sustainability Campus (formerly the Los Reales Landfill), a City of Tucson-owned landfill and sustainability campus for waste diversion in Tucson [that was](#) established in 1967 after the extension of I-10 through [South](#) Tucson. The campus houses the third largest landfill in Arizona and services much of the Southwest, [and necessarily](#) so, [since](#) the nearest municipal landfill is located in Phoenix, AZ, 100 miles [north](#) of the campus. Recognizing its crucial place in the Southwest, the landfill began initiating programs that focus on different types of waste diversion and environmental impact reduction, yet in the present day a few of these crucial programs seem to be inactive or underused, specifically programs intended to divert organic waste, including vegetative waste from landscapers. With currently unsustainable ways of disposing of plant waste at the site, waste that is relatively non-toxic and lends itself to compost and more organic forms of breakdown and

reuse, the City of Tucson loses potential to reduce the amount of waste being sent to the landfill, which would extend its lifespan and marginally decrease its environmental impact. Previous research has identified that commercial landscaping is a significant contributor to the green waste that enters the landfill, which is why it is important to target commercial landscaping firms to understand diversion trends. This research has led to the following questions: What factors impact a landscaping company's decision to divert green waste from the landfill? And, what opportunity is there for change in existing business models to accommodate green waste diversion practices? Past research has indicated that cost and ease will likely be important factors impacting a business's decision to divert green waste.

It is important to divert green waste from landscapers at the Los Reales Sustainability Campus landfill because there are opportunities for more circular waste systems in which green waste can be returned either to surrounding land or to vegetative [repurposing](#) within city limits while extending the lifespan of the landfill. The life expectancy of Los Reales, which is the time [remaining](#) until it reaches capacity and waste needs to be diverted elsewhere, is currently less than the average life expectancy of a resident of Pima County (79.9 years), where Los Reales is located (Center for Disease Control, 2022). This has drastic implications for coming generations that will be [faced](#) with diverting [waste](#) to existing facilities to the [north](#) in Phoenix or opening a new facility nearby. Both choices would only displace the environmental impact of the waste and incur [additional](#) environmental damage, [whether](#) [by](#) trucking materials two hours [north](#) or inviting the hazards of landfilling to a new area in or near Tucson.

Literature [Review](#):

Phoenix, AZ is an important partner to Tucson, AZ because it shares [the](#) unique environmental challenges [of](#) being in a hot, arid environment. The City of Phoenix has had the [ability to analyze its situation through](#) waste characterization [and](#) determine whether the diversion of organic waste would significantly impact [overall](#) waste diversion and reuse for the Phoenix area. According to [the](#) City of Phoenix Waste Characterization Study done in 2015, around two-thirds of the residential garbage collected contained materials that could be either recycled or composted (City of Phoenix, 2015). The study collected samples from randomly selected residential garbage and recycling bins using city data, then sorted through each container to collect weights for each type of waste. Though this data does not specifically reflect the characterization of residential waste being brought to a landfill, it can be applied to make general estimations of local residential waste type and volume trends. This is important in determining which municipal diversion programs will be the most impactful in diverting waste from landfills. The study identified that nearly 30% of all disposed of materials were comprised of compostable yard waste (City of Phoenix, 2015). For the City of Phoenix, this report identified a few key recommendations for organic waste diversion, the most prominent of which were waste diversion at the source with separate “green” bins for residential organic waste of all types (City of Phoenix, 2015). [Aligned with this](#) recommendation, the City of Phoenix was already piloting the Curbside Green Organics Container program. [As of 2015, it](#) was only being [used](#) by 2.7% of eligible participants, though it is important to note that the program only began piloting in 2014 (City of Phoenix, 2015). Even so, [it is concerning](#) that the potential for diverting and composting organic waste is substantial yet the rate of use of such programs is so low.

Phoenix's waste characterization study revealed important trends in residential waste production, but [it](#) also revealed a need for further local insight into waste disposal behavior among city residents. The City of Tucson Environmental Services Department's Waste Diversion Community Study done in July of 2015 addresses such gaps in understanding residential trends and behaviors regarding waste disposal and diversion. The study obtained 773 online survey responses from residents in Tucson, AZ that indicated key demographic information as well as composting, recycling, and waste disposal behaviors at the household level (Environmental Services Department, 2015). The study revealed that the most common reason reported for not composting among Tucson residents was a lack of necessity to compost or use compost, and that of those who did report household composting, the materials were largely weeds, flowers, and animal waste (Environmental Services Department, 2015). The study also revealed that a majority of respondents believe that "more communications concerning recycling [and composting] is needed," indicating that lack of awareness of programs and their requirements and specifications might be an obstacle to effective household recycling and composting initiatives (Environmental Services Department, 2015). With regard to this finding, data produced from the study discovered that survey responses indicate more waste and more potential for recycling as family (household) size increases, a trend which could inform effective program communication initiatives (Environmental Services Department, 2015).

Methodology

The area of this research is primarily limited to commercial landscaping firms operating in Tucson, AZ and not customers of the Los Reales Sustainability Campus itself due to accessibility issues in the city-run landfill. While the first round of research in this area focused on barriers to green waste diversion once the waste has arrived [at](#) the campus, it ignored the

factors involved in getting the green waste to the landfill to begin with. [This](#) [justified](#) a qualitative approach to assess trends in where green waste is going and why it is going there. Multiple independent firms were contacted and interviews were conducted with four company representatives who responded positively to solicitation. The companies represent a gradient of size and location to capture the greatest extent of Tucson available for the purposes of this study.

To reasonably assess trends, each interviewee was asked the same sets of questions so that their answers might be fairly compared. While follow-up questions varied, the primary questions asked were:

1. What percent of your company's waste comes from waste disposal?
2. Who decides where waste goes/what does that decision making process look like?
3. What are some of the most prominent barriers to diverting green waste from mainstream courses of disposal that your company faces?
4. Would your company have an interest in sustainably disposing of vegetative waste if it made more sense for your business model?
5. Would your company have an interest in disposing of green waste sustainably if it meant making some modifications to your business model?

The first of these questions is intended to determine the quantities with which each company is working with green waste. A large company with multiple trucks has the capacity to impact the Tucson landscape to a greater capacity than a company with just a few or just one crew, so it is important to determine trends associated with different sizes of companies. The second question aims at understanding what considerations are taken [when](#) deciding where

waste goes, and with whom that responsibility lies. Knowing if waste disposal is a decision determined job-by-job by the crew themselves, or as a policy decided by administration, can give insight into how best to alter or understand why the decisions involved in disposal are chosen. The third question seeks to discover each company's knowledge of green waste disposal, as well as their understanding of participating in related diversion programs. Moreover, this question aims to understand the barriers to green waste diversion that each company experiences, [partly](#) to understand if factors such as the size of the company or the type of materials they are working with might affect these answers. The fourth question is intended to gauge the willingness of companies to dispose of green waste sustainably without, metaphorically speaking, swimming upstream in order to do so. This is to assess the attitudes toward green waste diversion aside from cost and current barriers. The last question, similar to the previous [one](#), assesses the willingness of a company to swim upstream slightly in order to dispose of green waste sustainably. This is to gauge the flexibility that waste diversion programs have in attracting customers.

Results and Conclusion

[This](#) study, which aimed to address what factors impact a landscaping company's decision to divert green waste from the landfill and what opportunity there is for change in existing business models to accommodate green waste diversion practices, revealed some clear trends describing factors that impact waste diversion decision-making and the capacity for realistic change to existing business models to support green waste diversion from a commercial perspective. While findings were generally consistent with one another, it is important to note the small sample size of the study limits claims about the larger Tucson area but are still a good reference due to the varying size and ownership of each company studied.

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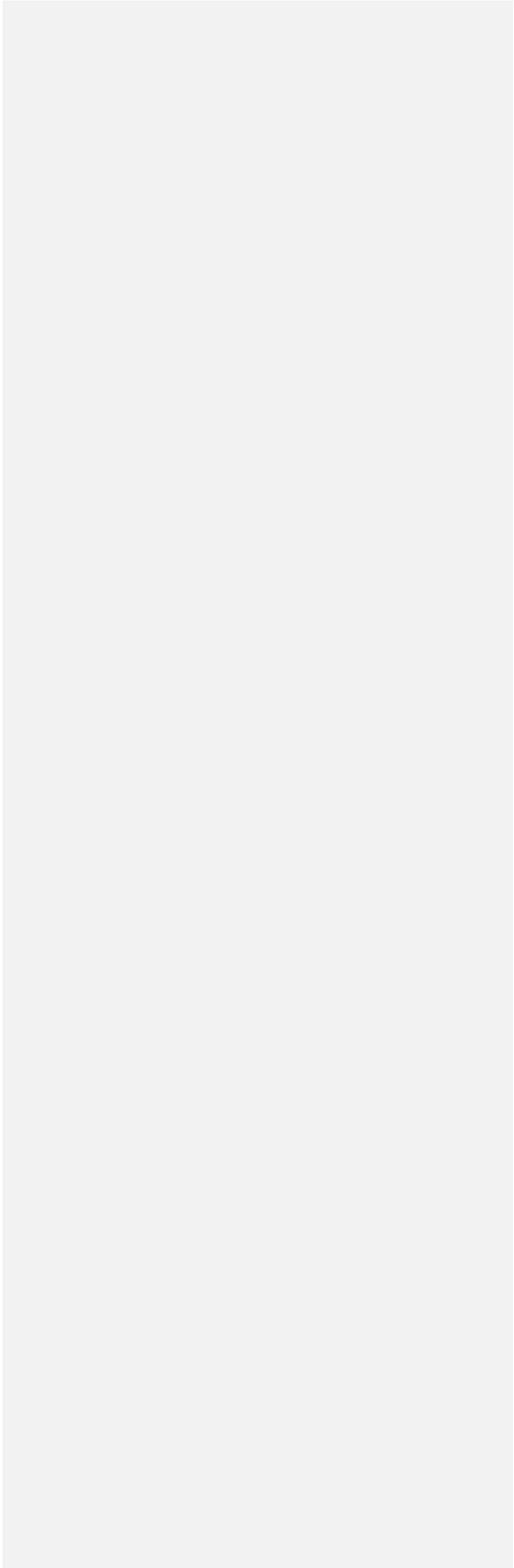
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The results of the study primarily indicate that a combination of two factors impact the decision of a company to participate in green waste diversion: the cost of green waste diversion compared to landfill disposal and the type of waste materials that a landscaping company works with. Of the landscaping companies that don't currently engage with green waste disposal regularly, all of them reported that the greatest barrier to green waste diversion was the additional costs to the business to sort green versus landfill waste on the job and to dispose of them separately. Additionally, they reported that many sites will have mostly vegetative waste and a small amount of landfill waste that homeowners or commercial contractors will expect to be removed by the landscaping firms, but which contaminates a previously 100% green waste load that green waste diversion plants require. Moreover, many companies indicated that customer preference plays a significant role in on-the-job decisions, many of which aim to cut customer costs by any means and typically to dispose of as much waste, vegetative or not, as possible for the cost of just a single truck or as few loads as possible. This is not conducive to the separating and additional attention that green waste diversion requires to be successful.

The one company surveyed that does dispose of vegetative waste consistently through waste diversion programs, specifically using Tanks Green Stuff, indicated that a knowledgeable team and staff are imperative to the ability to divert green waste efficiently while not incurring more costs to the customer or the business itself. Furthermore, the company elaborated that partnerships with green waste diversion facilities can be tumultuous at first, but often end up being more rewarding in the long run due to the circular relationship of compost and vegetative waste. The study revealed that many of the commercial companies would be interested in changing their business model to accommodate green waste diversion if it made financial sense,

yet when asked many of them were unaware of the circular benefits of these programs and were only aware of the greater up-front costs compared to regular waste disposal.

Poster



Waste Not Rot Not:



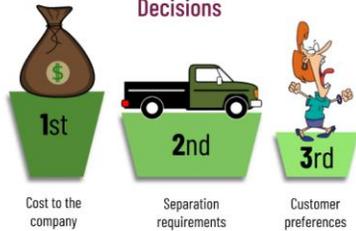
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Green Waste Diversion Potential for Tucson Landscapers

A study done in the Fall of 2021 revealed that the **Los Reales Sustainability Campus** in Tucson, AZ, home to Arizona's 3rd largest landfill, has shut down its green waste diversion program due to short and inexperienced staffing, leaving **no option for customers of Los Reales to divert their green waste**. Some of the greatest possible contributors to green waste diversion in Tucson are landscapers who, according to Los Reales, handle and dispose of thousands of tons of vegetative waste each year. This study aimed to discover trends in green waste disposal among Tucson landscapers, and to determine what influences their decisions regarding waste disposal.

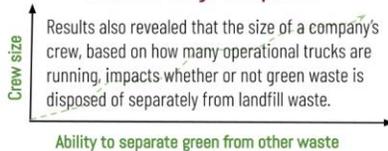
Findings

Primary Reasons Cited in Waste Diversion Decisions



Preliminary findings indicate that the greatest barriers to green waste diversion for landscaping companies are the cost of waste diversion versus traditional disposal and the 100% green load requirements that green waste diversion sites, like Tanks Green Things, require.

Small vs. Large Companies



Potential for Change

When asked what would motivate business owners and administrators to change their waste disposal practices to divert green waste, **100%** of respondents that do not already dispose of green waste sustainably said that they would change the way they dispose of waste **if it made economic sense**. The ability of businesses to decline customer requests to remove debris that is not green increases the larger the company. Smaller companies were noted to have **fewer options for denying clients' needs**, according to both large and small landscape company owners in the study.



Methods

Expert interviews of four Tucson landscaping firms of various sizes were conducted, where interviewees were asked the same questions about green waste handling practices so as to be able to compare responses and discover trends. Although more companies were contacted, only three responded to request a for an interview. Surveys regarding waste disposal habits were also sent to companies who participated in an interview.



Photo by Rebecca Sarnett, Arizona Daily Star. "Los Reales Landfill to become a zero waste 'sustainability campus'".

Conclusion

Though the sample size of the study was relatively small, results indicate that the behaviours surrounding green waste disposal by landscapers in Tucson, AZ could be altered given the right economic conditions. Further research should aim to quantify the amount of green waste going to the Los Reales landfill from landscapers so that the City of Tucson might be encouraged to invest its resources into previously abandoned green waste infrastructure at the site, reducing the economic barrier.

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