ONTARIO GREEN SCREEN

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Advancing Waste Management Practices in Ontario's Film and Television Industry

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Advancing Waste Management Practices in Ontario's Film and Television Industry: Production Case Studies and Opportunities for Action

Research was conducted from July to December 2022
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Glossary of Terms

- **Budget ranges in Canadian dollars**:
    - Domestic Feature (Medium Budget) • 5–10 million
    - Domestic Series (Medium Budget) • 10–20 million
    - Foreign Feature (Medium Budget) • 15–30 million
    - Foreign Series (Large Budget) • 20–80 million
- **Circularity**: Economic, technical, and environmental systems that aim to eliminate waste and maximize the reuse of resources.
- **Compost**: Common term for organic waste that has been decomposed into soil. Also used to describe the organic waste collection stream.
- **Compostable plastic**: Refers to plastics made from organic sources instead of fossil fuels (bioplastics) that have been certified by a third party to decompose in a commercial composting facility environment. Increasingly used in single-use food packaging.
- **Diversion**: The process of diverting and redirecting waste from landfills, usually via recycling, reusing, or composting.
- **Facility**: Refers to a purpose-built or retrofitted soundstage facility or studio for film and TV production.
- **Material reuse**: Practice of reusing materials rather than disposing of them as waste.
- **Mixed waste**: Common term in for general garbage or trash. Mixed waste is often disposed of in landfills in Ontario. Another similarly used term is Municipal Solid Waste (MSW). Mixed waste is used interchangeably with the word garbage in this report.
- **Recycling**: Common term for materials generally accepted in recycling processes, such as metal, paper products, certain types of plastic, and glass.
- **Waste vendors**: Businesses or individuals specifically contracted to manage, haul, or dispose of waste materials by productions.
- **Waste management**: Process by which organisations dispose of all types of waste, including recyclables and organics.

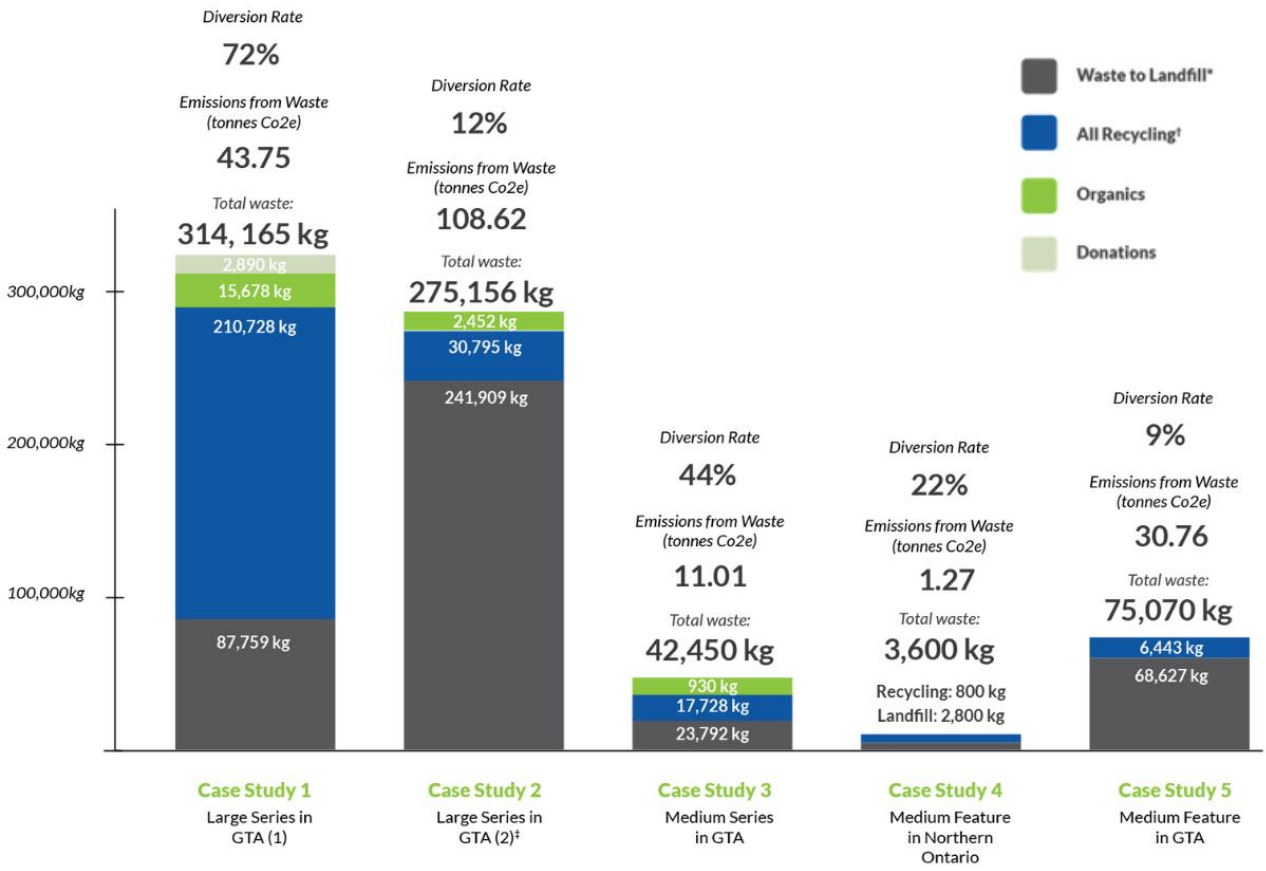
EXECUTIVE SUMMARY

The use and disposal of production-related materials—and their tangible effects on the environment—is highly visible to film and TV crews, even though viewers are likely unaware of them. The good news is that film and television productions of all budgets, sizes, and types have a number of opportunities to reduce the waste they produce.

Spurred by transformative reports from industry alliances and organisations in the USA, UK, and Europe that showcase the scale of greenhouse gas (GHG) emissions produced by film and TV productions, Ontario Green Screen and Ontario Creates, with support from Telefilm Canada, commissioned Green Spark Group to analyse production waste streams. The resulting report captures crucial information on the types of waste currently being generated, how that waste is and isn't being diverted for recycling or reuse, and how the film and television industry might make sustainable shifts to curb waste and emissions.

This report contextualises film and TV industry waste creation and diversion practices by interviewing and surveying industry stakeholders, examining Ontario-based productions as case studies, and reviewing Ontario's municipal waste systems and policies, along with the practises of various third-party vendors in the Greater Toronto Area (GTA) and Northern Ontario where the sample projects were based. For the full methodology, see page 9. The data and observations presented here have the potential to inform further research and the adoption of sustainable waste management practices by productions in other jurisdictions.

Summary of Production Waste Quantities and Diversion Rates



Common Barriers and Opportunities for Change

The research across five different Ontario-based productions demonstrated varying waste diversion rates (9%–72%, see figure on the previous page). Industry representatives identified the four most common production waste materials as single-use food and drink containers, food and organic waste, construction materials, and set dressing, props, and costumes. Green Spark Group assessed the materials' life cycles and suggested ways to improve or mitigate their use. See the Barriers and Opportunities charts on pages 43-44 for more information.

Four key opportunities for improving waste diversion emerged from interviews, crew and vendor surveys, on-site observations, and Green Spark Group's broader industry experience. For a tabular summary of opportunities, see pages 52-53. These opportunities for action are shared below in order of ease of implementation to align with the principles of a circular economy.

Close the Critical Composting Gap (page 46)

Organic waste can contribute up to 33% of a production's total waste (page 22). Where composting is not available or is poorly managed, organic waste is sent to landfills and becomes a core contributor to methane emissions (page 11).

- Productions could budget for and engage with vendors for composting and waste diversion services.
- At a minimum, organic waste collection bins could be placed in all areas where food is prepared and/or consumed. Crews could be educated about sorting organic waste.

Improve Production Accountability (page 47)

Interviewees frequently suggested that mandates and incentives from studios and governments might improve production waste diversion. The need for top-down support from studios and producers was frequently mentioned in interviews as a production-level necessity (page 33).

- Vendors offering diversion services could be used wherever possible.
- Sustainability departments could be properly funded and staffed.

Resolve the Storage Space Issue (page 48)

A need for expansive and well-managed storage space was frequently cited in interviews, and the lack of such space emerged as a top examples of a barrier to material reuse and waste diversion (page 31). A key obstacle to reusing production materials is the time and effort it takes to communicate availability, track/locate stored items (dead storage), and coordinate logistics to move materials between productions, or from productions to other potential users.

- All industry stakeholders could improve communication and collaboration to effectively improve material circularity.
- Industry members could collaborate on establishing and running a network of well-managed storage spaces.

Closing the Critical Composting Gap

Improving Production Accountability

Resolving the Storage Space Issue

Shifting Culture

Shift the Culture through Education and Engagement (page 50)

It is well known among film and TV crews that productions produce large amounts of waste. A lack of top-down guidance and low morale around how to address waste was prevalent in interviews and surveys (page 31).

- Industry members require broad support and solid frameworks to consistently reduce waste.
- Until sustainable production practices are embedded as part of crew responsibilities, sustainability experts or sustainability departments could be hired to encourage and educate crew on proper disposal and production diversion efforts.

The study findings suggest that prioritizing sustainable practices on set should become an industry norm for all film and TV productions. There is a strong desire from crew members to work on sustainable productions, which may affect the future ability of non-sustainably focused productions to attract top talent. At the same time, a willingness by waste vendors to offer waste diversion services in response to demand. There is clear opportunity as well for Ontario to become an industry leader in greener, circular practices to attract more productions to the province, and to establish a blueprint for a sustainable, successful industry in the face of our current transformative times.

Image of two crew members carrying reusable drink containers. Photo provided by Ontario Green Screen.

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Introduction

Film and television productions are often likened to cities due to the extraordinary number of people, materials, and energy sources they move, utilise, and waste. Wasted materials and their subsequent environmental effects are highly visible to film and TV production crews.

Productions of all sizes and types have opportunities to reduce waste and improve the circularity of resources. In response, industry stakeholders are beginning to act to reduce the waste that contributes to environmental degradation and global climate change.

In recent years, industry alliances and organisations in the USA, UK, and Europe have released research reports showcasing the scale of greenhouse gas emissions and material waste produced by film and television productions, while a recent Telefilm Canada report notes that industry members are eager to learn, participate, and see significant improvements in making the industry sustainable.[1] These transformative findings highlight the film and TV industry's effects on the environment and inform priorities for large-scale changes that would generate more sustainable productions.

Building on these previous findings via extensive industry engagement, Ontario Green Screen (OGS) determined that understanding metrics related to industry waste and diversion in Ontario would help the wider film and TV industry understand how they might shift practices to curb waste and emissions. As a result, OGS and Ontario Creates, in partnership with Telefilm Canada, commissioned this report to analyse production waste streams and provide crucial information on the types of waste currently being generated, and how it is and isn't being diverted for recycling or reuse. Increased knowledge about industry waste diversion practices and opportunities for improvement are a key piece of the puzzle in improving overall industry sustainability and facing the inherent challenges of end-of-life product planning.

A central framework for discussing materials and waste is the "circular economy," which the Ellen MacArthur Foundation describes as being based on three principles: "eliminate waste and pollution; circulate products and materials (at their highest value); and regenerate nature."[2] Embedding circular economy principles early in the pre-production of film and TV content is essential to meaningfully reduce the volume of waste created and the diversion challenges described in this report. Opportunities for action arising from this report prioritize the principles of eliminating waste and pollution and circulating products and materials.

[1] Telefilm Canada. Eco-Awareness Survey Report. Accessed Nov 22, 2022.
[2] Ellen MacArthur Foundation. What is a circular economy? Accessed Nov 22, 2022.

Methodology

This report summarises findings from direct engagement and observation of four Ontario-based film and television productions of differing sizes working in two regions. The research objectives were to:

- understand the scale of film and TV production waste disposal;
- identify challenges to waste diversion;
- understand the landscape of third-party vendors and municipal services and associated costs available to the industry;
- provide a lifecycle analysis of four common production materials; and
- investigate opportunities for process improvement and highlight these for action

The methods used to gather data for this report include:

- Background research and review of publicly available information.
- Interviews and information-gathering sessions with key informants, including:
    - industry waste service vendor representatives (when possible)
    - Circular Innovation Council representatives
    - Ontario Green Screen Advisory Committee members
- Primary research with four Ontario-based productions, including:
    - interviews with specific department heads or members responsible for material use/reuse and waste management on each production
    - an online survey distributed to crew members of participating productions
    - one-day site visits at each production for follow-up interviews/observations
- Data collection from waste vendors and productions about the volumes or weights and types of waste produced in each production area.

Information was subsequently collated, aggregated, and analysed for trends and insights. The emerging results and opportunities for action were supplemented by Green Spark Group's (GSG's) broad industry experience.

Where public information is available, specific information about waste vendors has been included to deepen the findings of this research. Specific details about service charges were not readily available nor permitted to be shared due to the project's confidentiality provisions, as the various services available and their related rates related are an increasingly competitive space.

Interviews were an essential part of this project to ground all feedback in industry experiences. All production, survey, and interview information were collected under an Ontario Creates privacy policy and has been aggregated and anonymized. The intention of this report is to show the effects of current practices and areas for improvement at a broad industry level. The contributions from participating productions, crew members, and vendors are greatly appreciated.

Context: Film Industry Waste Management in Ontario

Introduction

Understanding current waste management practices more generally is essential to identifying the challenges and opportunities faced by the film and TV industry. The information included here is summarised from a review of publicly available information and interviews with key informants who have expertise in waste management in Ontario. Further context around regional waste management at the production level and with waste vendors was informed by interviews, site visits, and professional experience. The following information is included in this section:

How Waste is Managed in Ontario

Across Canada, waste is managed by a blend of public and private entities that follow national, provincial, and municipal waste management regulations. In 2018, about 28% of waste from all sectors was diverted. Most of the remaining 72% was disposed of in landfills across Canada.[3] According to the *National Waste Characterization Report* (2019), Ontario diverted less than the national average, at about 26%, although the province's commercial waste dataset comes from a non-representative waste audit.[4]

Between Ontario's 616 public landfills and more than 200 private landfills, 39% of waste disposed of in Ontario is from the residential sector, 52% is from the industrial, commercial, and institutional (ICI) sector, and 8% is from demolition, land clearing, and construction (DLC).[5] However, a lack of data from the ICI and DLC sectors in Ontario is a significant gap and has yet to be addressed. The *State of Waste in Ontario: Landfill Report* (2021) estimates that waste exported from Ontario to the US amounts to 3.3 million tonnes[6]; 27% of Ontario's waste is sent to the United States (primarily Michigan) for which there is no characterization or diversion data available.

The environmental effects of landfilled waste are significant. In Canada, landfills alone accounted for 23% of national methane emissions in 2020.[7] Methane is a greenhouse gas that is about 25% more effective than carbon dioxide at trapping heat and is therefore a significant contributor to global warming.[8] Landfill methane emissions are caused by biodegradable materials such as food, paper, and wood waste as they decompose in anoxic landfill environments.[9]

In Ontario, the three largest proportions of waste found in landfills are food (24%), plastics (15%), and paper (12%), according to sector-weighted averages.[10] These materials are either compostable or recyclable, which means that Ontario has a significant opportunity to divert more waste from landfills. Data on the proportional contributions of the film and TV industry to landfills are unavailable and would fall under any non-residential waste (ICI or DLC) by national reporting standards. Since those two sectors include significant gaps in Ontario's waste reporting practices, this is a key area for provincial and industry improvement.

Food waste reduction is partially targeted under the Ontario *Donation of Food Act*,[11] which protects donors and recipients from liability when safe, edible food is donated in good faith. The Act applies to all food service institutions, including those that serve film and TV productions.

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[3] Government of Canada. Solid waste diversion and disposal. Jan. 26, 2022.
[4] Environment and Climate Change Canada. National Waste Characterization Report. 2019. (Annex B Ontario page 3).
[5] Ibid. (Annex B Ontario page 1)
[6] Ontario Waste Management Association (OWMA). Landfill Report. January 2021.
[7] Government of Canada. Waste and greenhouse gases: Canada's actions. Feb. 20, 2023.
[8] United States Environmental Protection Agency. Overview of Greenhouse Gases. May 16, 2022.
[9] Government of Canada. Municipal solid waste organics processing. Sep. 17, 2013.
[10] Ibid. (Annex B Ontario page 3)
[11] National Zero Waste Council. Food Donation and Civil Liability in Canada. April 2018.

The Ontario government is currently implementing its *Strategy for a Waste-Free Ontario* with a goal to achieve a 50% diversion rate by 2030.[12] This process includes collecting data, revising regulations and policies, and implementing extended producer responsibility (EPR) regulations for existing waste diversion programs. Other aspects currently under discussion include disposal bans (restricting materials that can go in landfills) and promoting markets for recovered materials (such as recycled metal and wood products). However, the strategy has not been updated since 2017 and quantitative progress toward interim goals has not been made publicly available. Additionally, the federal government's *Single Use Plastics Prohibition Regulations*, effective December 2022, is already shifting demand away from these materials.[13] If and when implemented, these policies have the potential to directly affect the film and TV industry.

How Waste is Managed by the Film and TV Industry

Depending on production size, genre, and creative needs, film and TV productions can produce high volumes of waste. Yet compared to other industries, there is limited industry-specific baseline data about the types and quantities of waste productions create.

A 2020 UK-based industry report estimates that an average tentpole film (with a budget of over 70 million USD) produces about 313,500 tonnes of waste.[14] In 2021, Ontario hosted 394 film and TV productions, 360 of which were live-action productions.[15] As there is currently no industry benchmark of waste quantities generated by productions across the budget and format spectrum, the total amount of production waste produced is unknown.

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[12] Government of Ontario. Strategy for a Waste-Free Ontario: Building the Circular Economy. Published Feb. 2017. Updated Jul. 28, 2021. See the Dec. 22, 2022, Progress Report. Accessed Feb. 2023.
[13] Government of Canada. Single-use Plastics Prohibition Regulations: Overview. Feb. 2, 2023.
[14] Albert. a screen new deal. March 2021. Accessed 06/23/2022. Data refers to 19 tentpole film productions in the US and UK. The total waste was provided as equivalent to 313.5 blue whales, which weigh 100 tonnes on average.
[15] Ontario Creates. 2021 Film and Television Production Statistics by Format. Mar. 24, 2023.

Production Waste Generation

Productions typically require waste collection services for three key areas:

1. The production office
2. The soundstage facility
3. Any filming on location (Table 1)

Each area produces specific types of waste and requires unique services to manage it.

Table 1: General production areas and types of waste typically generated.

	Production office	Soundstage facility*	Location
Description	Usually stationary and based in or near the stage facility. Waste is often managed by the facility, or recommended vendors are hired specifically for office waste.	Includes soundstages and support spaces such as workshops and lockups (storage areas). Basic, general waste (e.g., offices, washrooms) is usually managed by the facility. Productions contract private vendors for specific waste types like construction materials or office paper. Location waste haulers supplement waste collection at the facility when there is not enough space for waste generated by the shooting crew filming in the studio.	Includes anywhere filming takes place that is not part of a soundstage facility (e.g., commercial, residential, park, etc.) Waste is primarily generated by the shooting crew. Depending on the location and creative needs, waste can also include construction and set materials produced prior to filming.
Waste types	• Regular waste • Mixed recyclables • Organics • PPE (depending on evolving protocols) • Paper and cardboard • Electronics • Batteries • Textiles	• Regular waste • Mixed recyclables • Organics • PPE (depending on evolving protocols) • Construction materials • Set dec materials (e.g., furniture) • Props • Costume and textiles	• Regular waste • Mixed recyclables • Organics • PPE (depending on evolving protocols) • Construction materials (when required) • Set dec materials (when required)

**Soundstage facilities can be purpose-built or converted from existing warehouse spaces. Productions may also occupy buildings such as conference rooms or schools during filming; in such cases, we consider these soundstage facilities.*

Vendors and Services by Region

Productions operating in two distinct regions agreed to participate in this study: the Greater Toronto Area (GTA) and Northern Ontario. Vendors and services for waste management and diversion available to participating productions varied in each region.

In the GTA, productions use two key vendors for office and soundstage facility waste collection, and one of about six regional haulers for location waste collection. In Northern Ontario, Green for Life Environmental (GFL) is the region's primary vendor. Productions align their practices with GFL's collection services and use public drop-off facilities that GFL manages under contract with local governments. Additional regional services for waste diversion are summarised in Table 2. Future studies may have the opportunity to explore the waste vendor ecosystem in other Ontario regions (and beyond) to assess how practices converge or diverge from results herein.

Reliable vendor relationships are critical to productions because they often film outside regular business hours and require on-call services to meet production schedules and film permit requirements, particularly for location filming.

Image of a truck collecting a roll-off construction waste bin. Photo taken by Samantha Leigh, Green Spark Group.

Table 2: Summary of waste management, composting, and material reuse services by region

Region	Northern Ontario	Greater Toronto Area (GTA)
Waste management services (garbage and recycling)	• GFL is the primary vendor that provides dumpsters for all mixed waste (garbage) and recycling disposal. Accepted materials for recycling vary by municipality. • When filming in a facility, waste and recycling from the office and facility are collected together. • Location filming is popular, and waste is brought to a public drop-off facility or the production facility's dumpsters by the locations department.	• Mixed waste and recycling disposal services are widely available. There are a few preferred vendors used widely by the film industry, such as Papersavers. • Construction waste removal services are widely available, but productions in the GTA often prefer to use a specific vendor that preferred not to be named. This vendor can bring waste to local drop-off sites or transfer stations, or to specialised construction waste recycling facilities depending on production requests. • Location filming waste is collected by about 6–8 contracted individuals, or small businesses like Green Sustainability Solutions who cater to the film industry. These contracted individuals/small businesses drop off location waste at public drop-off sites/transfer stations, or through contracts with private companies including Merlin Plastics and GFL.
Composting services	• No commercial composting services are available to productions in the region.	• Three vendors were identified that provide organic waste collection for composting from productions in the GTA (Rethink Resource, Green Sustainability Solutions, and Papersavers). • Interviewees noted that three of the existing location waste vendors are also open to collecting organics in the future. • Commercial organics are not accepted at local drop-off sites. Vendors have private contracts with companies to collect organic waste. The closest known commercial composting facility that accepts production waste including compostable food packaging* is in Belleville, Ontario, which is outside of the GTA. • Four production waste vendors interviewed noted that there is low demand from productions for composting services. • Department head and vendor interviewees noted that productions are unwilling or unable to pay for distinct composting services from waste vendors.
Food donations	• Food donations are informal and community-oriented, with craft service providers distributing any surplus food within their networks. • Second Harvest's Food Rescue program is available and used by some productions, though not by interviewees for this project.	• Food donations are made by at least one craft and catering service provider at the company level. Blazing Kitchen was used by two of the productions involved in this study; they donate and redistribute food through their partnership with Feed it Forward. • Other food service providers such as David Mintz Catering have worked with productions who donate surplus food through a production sustainability department or consultant. Sustainability

Region	Northern Ontario	Greater Toronto Area (GTA)
Food donations, cont.	• According to interviewees, formal food donation processes do not accept food from productions, citing health and safety concerns specific to productions.	departments donate food to local charities directly or through Second Harvest's Food Rescue program.
Material reuse and donation	• Material reuse practices are community-oriented and often provided informally or by small businesses, as well as second-hand stores like the Salvation Army and Value Village. • Storage and inventory management are often done in collaboration with producers who repeatedly bring productions to the region. • Materials and surplus food are donated to a variety of local organisations including second-hand stores, shelters, schools, and arts companies.	• Material reuse services include rental houses, online marketplaces, set sales or auctions, and second-hand stores. • Rental houses and storage facilities are limited because of the rental and management expenses in the GTA. One example is Wiseacre Rentals, which provides various set dec and prop materials. Other prop rental houses specialise in certain materials, such as antiques (e.g., The Barn, Abbey Road Entertainment, Cynthia Findlay) and medical items (e.g., Medicine in Film Inc.). A full analysis of these services was beyond the scope of this study. • Online marketplaces are commonly used by production departments, who connect with fellow union members through platforms such as Facebook Groups. Another online marketplace is Ready Set Recycle, which also provides set sale services through its company group. • Second-hand stores such as the Salvation Army, Value Village, and Habitat for Humanity Restore are also heavily used for sourcing and disposing of materials by production departments including construction, set dec, props, and costumes. An analysis of the full extent of possible donation options was beyond the scope of this study. • Series typically store materials for reuse on the next season in large trailers or shipping containers. However, these spaces can also become dead storage as responsibility for them is shifted to new production departments, studios, or crews

**Compostable bioplastics must be certified by a verified third party to be considered legitimate.*

Use of Public Waste Services and Infrastructure

Film industry waste management practices and vendors often overlap with public waste infrastructure and services. The primary example of this is for location waste, which is typically collected by small businesses or individuals and brought to a nearby public drop-off site. Drop-off sites used by vendors that service the film industry vary depending on filming locations. Production crews also use public drop-off facilities occasionally if they cannot dispose of certain materials (e.g., broken furniture, electronic waste) in a bin on site at a soundstage facility or with any material reuse vendors.

To use a public drop-off site for both waste and recycling, a vendor must weigh each of their loads, sort out contamination, and pay any relevant fees. At public drop-off sites across Ontario, recycling is often free for residential users, but dropping off any mixed garbage or commercial waste or recycling requires a fee.

Composting services are not provided at drop-off sites in the filming regions assessed in this study (GTA and Northern Ontario). Instead, organic waste is collected in mixed-waste bins and disposed of in landfills. Some location waste vendors who participated in this study arranged for recycling or composting through private waste management companies, though this practice is uncommon and depends on requests by production clients. Critically, public drop-off sites are typically open during business hours, which means that location waste vendors must store waste collected from overnight shoots.

Diversion Services and Reporting: Costs and Barriers

There are two primary methods for assessing waste disposal and diversion provided by third-party vendors: diversion reporting and composition analysis. Diversion reports are a summary of the amount of waste sent to landfill, recycling, composting, or other disposal services. They include the total weight or volume of each type of waste and an overall percentage reflecting how much waste was diverted from landfill. A composition (or characterization) analysis is more detailed and includes a waste audit, where waste types are sorted and weighed, followed by the analysis of waste stream contamination.

Diversion and composition reports are beneficial to productions because they can be used to summarise the environmental effects of waste disposal, assess how successfully crews are sorting waste, and contribute to production company or studio sustainability reporting requirements, which are becoming increasingly common across the industry.[16]

Diversion and waste composition reporting services vary by vendor. Interviewees noted that regular reporting is possible as an added service if productions request it and are willing to pay

[16] The Sustainable Production Alliance is committed to publishing findings about environmental impacts of filming every two years. See Close Up: Carbon Emissions of Film and Television Production, March 2021.

any additional costs. Notably, there is no fixed or standard fee for these services, and not all vendors charge for them.

In Northern Ontario, GFL can provide diversion reports, including contamination estimates to productions, if they are requested to do so ahead of collection. Currently, there is no additional cost for this service.

In the GTA, diversion reports are regularly provided by Papersavers at no additional cost to productions. Rethink Resource and Green Sustainability Solutions specialise in providing specific waste composition reports, which is why their services typically cost more than landfill disposal, according to interviewees. Other vendors, including location waste haulers, stated that they can provide diversion reporting if productions pay for the additional labour time and transportation required to bring materials to private facilities for diversion if public drop-off sites or transfer stations do not divert it (e.g., compost, construction materials). All vendors noted that waste diversion services and related reporting are currently in very low demand from productions.

The main barrier that prevents increased production waste diversion is a current lack of economic demand by productions for diversion services; many productions do not request or pay for diversion services from vendors. Additional barriers on the vendor side include the aggregation of waste from multiple clients, either on a collection truck or a facility lot, and corresponding contamination that prevents waste streams from being recycled or composted. Because production waste haulers bring waste to other facilities for disposal or diversion, they must sort out any contamination or their loads are rejected and instead disposed of in landfills. During interviews, vendors stated that they can provide contamination sorting services if productions pay for the additional labour required plus any additional transportation costs to a recycling or composting facility. To address these barriers, productions can begin to dedicate a portion of their budget to waste diversion, request waste diversion services from vendors, and invest in additional labour to educate crew and reduce contamination. These solutions are discussed further in the Conclusion: Opportunities for Action (page 45).

Specific cost breakdowns and details about service charges were not readily available or permitted to be shared due to this project's confidentiality provisions. However, waste collection and diversion service rates are increasingly competitive. Further, none of the productions involved in primary research (see Case Studies) pursued more than basic recycling and composting, thereby constraining any meaningful cost comparisons. Further targeted engagement with waste vendors would help shed more light on potential means to overcome both real and perceived cost barriers.

Image of an example recycling station. Photo provided by Ontario Green Screen.

Five Production Case Studies from Ontario

Introduction

A total of five production case studies were used for this report, including four active productions and data from one archived production from a Green Spark Group client. This section contains the following summary of case study findings:

For a detailed summary of each case study, please see Appendix A | Full Case Studies.

Research Process

Over the course of five months, four Ontario-based productions identified by OGS participated in data collection for this project. Productions were categorised by budget size (medium/large) and production region (Greater Toronto Area and Northern Ontario). Engagement included site visits, interviews with key crew members and waste vendors, and a survey sent to all crew. An additional production, Case Study 1, was included using archival data from GSG to broaden the data set and analysis.

Production data is for the complete run-of show for all cases except for Case Study 2, as its production schedule continued beyond the scope of this study. For this production, total waste generated and diverted was estimated based on the four months of data collected. Differences between those values are highlighted where applicable.

Case study data provided by the construction department from a previous GSG client production suggests that actual tonnage per 40-yard mixed construction waste bin for a production is much lower than that provided by the US Environmental Protection Agency (EPA) conversion factor. However, in the absence of robust production-specific data, the US EPA conversion factor was used in all cases to account for construction lumber.

Waste data was collected by weight when possible and converted from volumes otherwise using established volume to weight conversions for different types of waste.[17] Volumes were reported by the bin size (e.g., 40-yard, 6-yard) or the number of bags. It was assumed each bag holds 20 litres of material in volume, per standards determined by albert.[18] Where vendors did not offer diversion reporting, waste volumes were determined using invoices that detailed the sizes of waste bins and the number of times they were tipped.

Case Study Observations

Practices and Challenges Among Productions

Overall, the four active productions involved in this project faced similar challenges in waste diversion regardless of production size or region. At an organisational level, waste was managed by multiple departments, which led to overlap and confusion between responsibilities, and to the contamination of waste. The lack of a standardised waste management process or strong communication chain was a key challenge for all productions. The following practices and challenges were observed in the case studies.

- **Diversion services differed by production area**. Across all three GTA productions, office spaces were equipped with more diversion options than other support areas. These productions all used Papersavers, which provides diversion services for various materials including organics, wastepaper, batteries, textiles, and bottles/cans.

[17] U.S. Environmental Protection Agency. Volume-to-Weight Conversion Factors. Apr. 2016.
[18] Albert. Methodology paper - albert carbon calculator. Oct. 2022.

- **Organic waste collection was limited.** Composting services were used partially (in the offices) by three of the productions based in the GTA and contributed to 2% or less of the total waste amount. Case Study 1 used composting services on location, at the office, and in the facility. If considering mixed waste, recycling, and organic waste alone (i.e., removing construction and set material), organic waste contributed to 33% of Case Study 1's waste composition. Assuming similar waste composition across productions, the use of composting presents a significant opportunity to improve waste diversion. While composting services were unavailable in Northern Ontario, these services do exist in the GTA but were rarely used. See Regional Challenges for Productions and Vendors.
- **All productions provided both waste and recycling services in filming and support areas.** However, two of the four active productions had waste bin set-ups where recycling and garbage bins were not always located together, which contributed to contamination. During interviews, crew members from locations teams on three productions mentioned that it is a standard practice to always put a recycling and garbage bin together, but one interviewee said that their ability to do so depends on the time available for set-up; it was also noted that crew members move the bins. Additionally, locations teams are not responsible for sorting waste, which means that any contamination on a production without dedicated resources for sorting waste is managed by the waste vendor and disposed of in landfill.
- **High rates of recycling contamination were observed during the site visits for the four active productions—except in Case Study 2, which had hired a sustainability consultancy to sort waste and educate crew**. Only the production in Northern Ontario (Case Study 4) received a contamination report from its waste vendor for recycled waste; detailed diversion reports were not available from vendors in the GTA. Contamination of recycling bins is a challenge common to all productions, and levels of transparency about contamination rates depend on the production's chosen services and vendors. Notably, for diversion reports to become a standard service offering, productions need to ask for this information actively and consistently. See Conclusion: Opportunities for Action for further discussion.
- **Documentation of construction waste disposal and diversion was a key gap across productions in this study.** Only the three GTA productions had dedicated waste disposal services for construction and set materials, partly because the production in Northern Ontario had a very small set build and was determined to reuse as many materials as possible. All three GTA productions used the same preferred vendor to collect this waste in mixed bins, which were likely disposed of in landfill according to the vendor. In all cases, the vendor did not provide diversion services or reports, as it is not currently equipped for waste auditing. However, according to interviews with the vendor, it could haul production waste to other vendors for this purpose if productions request the service and are willing to pay for it.
- **Reusing and storing construction and set materials was a common best practice across all productions, though it was not documented by volume in all cases.** The consistent

tracking of such data would be an asset for further analysis and improved management. See Conclusion: Opportunities for Action for further discussion.

Unique Production Needs and Waste Generation

The amount of waste generated by productions varied by production size, type, and design. In this study, the production size was determined as medium or large based on budget range (see Glossary, page 3); the type was either feature film or television series; and the designs ranged from contemporary to historic to futuristic period pieces. This is notable as designs based in contemporary or historic periods may have better options for sourcing reused/reusable set decoration materials.

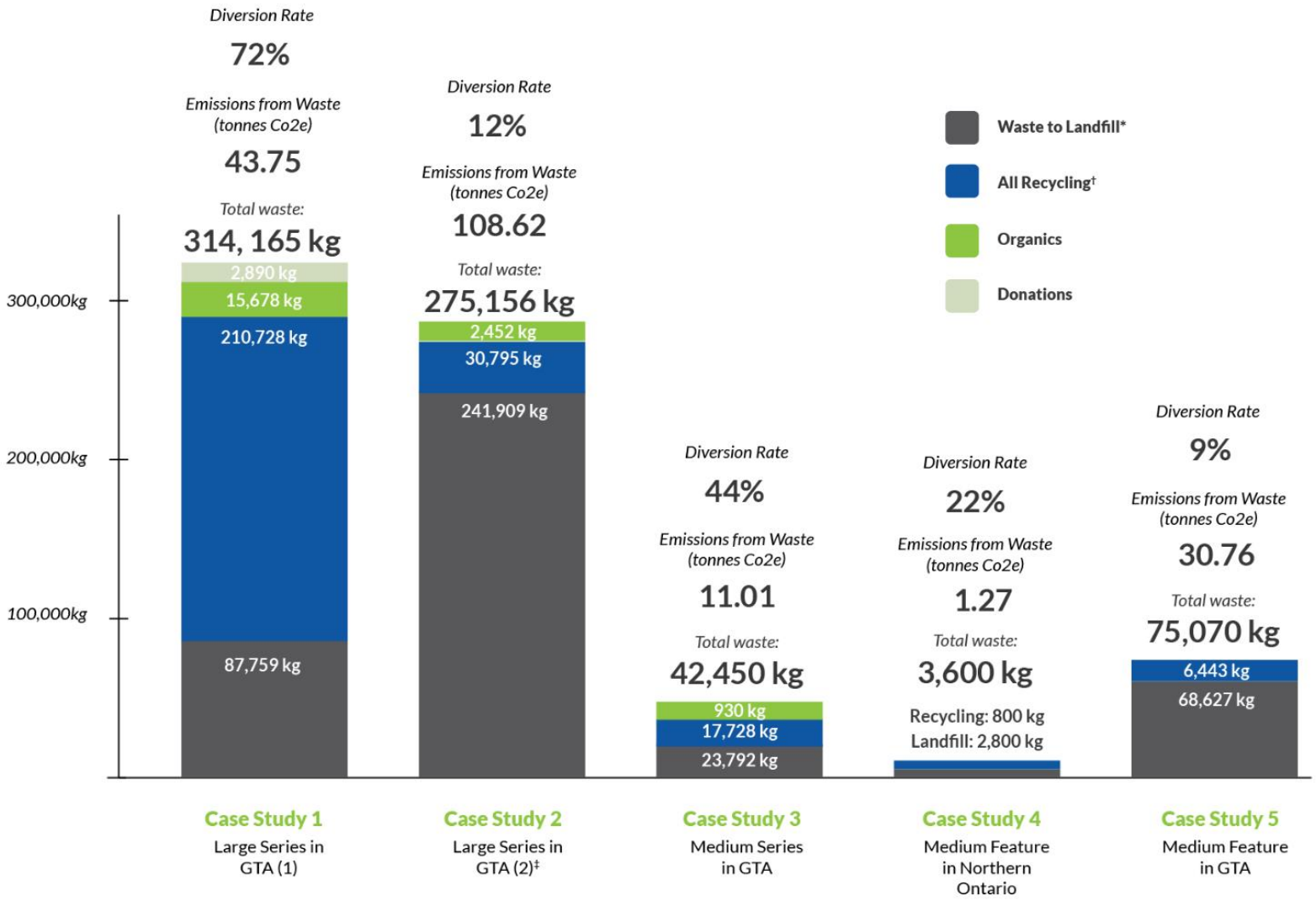
Both large series (Case Studies 1 and 2) based in the GTA produced more than eight times the waste of Case Study 3. This medium TV series was a contemporary production with minimal set builds, whereas both large TV series had extensive set builds that contributed to more waste. The medium TV series produced more waste than both the medium features (Case Studies 4 and 5) based in the GTA and Northern Ontario. This finding reinforces evidence from interviews that longer-running productions produce more waste, though further data collection is necessary to identify patterns.

The two feature productions involved in this project were within the same budget range but produced in different regions. Case Study 4 (Northern Ontario) had a very different, minimal production design compared to Case Study 5 (GTA), which was a period piece requiring extensive set decoration. These production design differences likely led to more waste being produced by the GTA feature, rather than regional characteristics. Further data collection is needed to analyse waste diversion differences between production regions in Ontario.

Greenhouse Gas Emissions from Waste

The same types of waste produce different levels of greenhouse gas emissions depending on how they are managed. As described in the introduction, organic matter in landfills contributes significantly to global warming through methane emissions. Figure 1 shows emissions from waste in tonnes of carbon dioxide equivalent (CO_2e), a standard metric for emissions that includes methane as well as other greenhouse gases. Waste volumes for each production were divided by type (mixed waste and recycling, organic waste) and disposal method (landfill/unknown, recycling, composting, donations) and entered into the albert carbon calculator, an industry standard used for calculating production emissions.[19] A key difference is shown between the two GTA-based large TV series: Case Study 1 produced over 317,000 kg of waste compared to Case Study 2, which produced an estimated 275,000 kg. However, since Case Study 1 had a 72% diversion rate, this production had less than half of the emissions of waste from Case Study 2, which only had a 12% diversion rate. This result demonstrates the importance of waste diversion for reducing industry contributions to climate change caused by global warming.

[19] Ibid.



*Includes construction material and set waste when information about recycling is unavailable. †Includes Energy from Waste where used, and construction and set waste recycling.
‡Estimated total waste based on 3 months of data collection.

Figure 1: Total estimated waste (kg) and emissions from waste (CO_2e) by case study example

Regional Challenges for Productions and Vendors

One of the key research questions for this project was to assess regional differences in vendors and services. Since four of the five productions studied were based in the GTA, the most detail was available for this region. In-depth interviews were conducted with local industry members, the primary waste vendor, and city staff in the Northern Ontario production's city to help close the information gap.

Municipalities in Northern Ontario are spread out and have smaller populations than the GTA, and therefore have fewer vendors for waste hauling and diversion. Of the three major production cities of Sudbury, North Bay, and Sault Ste. Marie, residential composting is only collected in Sudbury[20] and available for drop-off in North Bay.[21] The City of Sault Ste. Marie is exploring opportunities for expanded composting services,[22] but according to key informant interviews and a review of publications, the expansion of the "green bin program" in many Ontario municipalities is delayed in alignment with the provincial government's *Strategy for a Waste-Free Ontario*. Residential composting services are not available to businesses, leaving productions underserved due to a lack of commercial composting vendors.

Liability was also a concern among interviewees in catering and craft services despite the presence of active food rescue organisations in Northern Ontario. Reminding industry members and food rescue organisations that Ontario's *Donation of Food Act* protects donors and recipients from liability when safe, edible food is donated in good faith might help reduce hesitancy to work with such programs.[23]

Image of a production lunch in a certified compostable bowl with a plastic lid and ramekin. Photo taken by Samantha Leigh, Green Spark Group.

[20] Greater Sudbury. Green Cart Program. 2023.
[21] City of North Bay. Organic Drop-Off. 2023.
[22] Helwig, David. City prepares to build $30-million composter at Fifth Line landfill. Soo Today. Nov 2, 2021.
[23] Province of Ontario. Donation of Food Act. 1994.

Vendors also face a lack of proper recycling and composting services within the GTA. Two of the vendors interviewed for this project bring organic waste, including certified compostable plastics, collected from productions to a commercial composting facility in Belleville, Ontario, which is located about 188 km east of Toronto. According to interviews with waste vendors, this is the closest composting facility to the GTA that accepts compostable plastics and fibre-based food ware. Within the GTA, any compost collected from productions must be pure food waste or it is rejected by local privately operated composting facilities.

According to interviews with preferred industry vendors, including locations waste haulers, they can collect well-sorted waste of any type of material and bring it to nearby facilities for recycling. In addition, one preferred vendor can remove clean, recyclable materials such as cardboard and lumber from production waste bins and aggregate them on their lot for recycling. However, these diversion services come with an extra cost that vendors must pass on to productions if they are to continue operating profitably.

Awareness of the need for waste diversion services the film and TV industry is increasing. And despite a recent slight increase in demand from productions for, all vendors interviewed agreed that productions are generally unwilling or unable to pay what it costs to sort and divert waste. Instead, productions pay for waste to go to landfill, which is quicker and cheaper. The challenges of increased costs for improved diversion and less bin contamination are key barriers to waste diversion and will be discussed further in the Conclusion: Opportunities for Action.

Interview and Survey Findings

Introduction

Prior to site visits, a series of formal interviews were held with decision-makers in key departments or production areas (e.g., construction, set dec, props, catering/craft services, production office). A survey questionnaire was also distributed broadly to the crew.

During site visits, observations were made about the waste management process and contamination. Additional or follow-up informal interviews were held with anyone who expressed interest in the project. The objective was to interview crew in key roles related to waste management and obtain feedback from about 15% of other crew members. There were also opportunities for respondents to provide production-specific and industry-wide feedback about materials and waste. Four key topics explored in the interviews and survey were:

1. Ratings of Production Waste Management Systems
2. Material Reuse on Productions
3. Barriers to Material Reuse and Waste Diversion
4. Opportunities to Reuse Materials and Reduce Waste

Ratings of Production Waste Management Systems

A key intention of the survey was to identify how crew members interact with waste management systems on their productions. By production, the highest-ranked waste system was Case Study 5 (medium feature in GTA), where 7 of 10 respondents were based in office spaces (Table 3). This finding aligns with site visit observations where bins in office spaces were colour-coded and clearly labelled. The lowest-ranked waste system was Case Study 3 (medium TV series in GTA), where 10 of 14 respondents were based on set. This finding does not align with the Case Study 3 site visit, where garbage and recycling bins were generally colour-coded and set out together. However, it may point to further issues of a lack of signage and other communication efforts.

Table 3: Survey responses about waste system ratings by production

Survey Question: How would you rate your production's waste/recycling/composting program on the following scales: (1 - Strongly Disagree, 2- Somewhat Disagree, 3 - Neutral, 4 - Somewhat Agree, 5 - Strongly Agree)				
Production	**Easy to Understand**	**Bins are available when I need them**	**The waste is properly managed at the end**	**Production average**
Case Study 1	N/A - Production data was archival	N/A - Production data was archival	N/A - Production data was archival	N/A - Production data was archival
Case Study 2 (23 respondents)	3.6	3.8	3.2	**3.5**
Case Study 3 (14 respondents)	2.3	2.2	2.7	**2.4**
Case Study 4 (10 respondents)	3.7	3.6	3.6	**3.6**
Case Study 5 (10 respondents)	3.9	4.0	3.7	**3.9**
Survey Average	**3.3**	**3.6**	**3.0**	-

Notably, production crew based in offices rate production waste systems higher than crew on set or in other spaces (Figure 2). Out of 58 survey respondents, 41% were based in the office and 34% were based on set. Only 5% were based in facility warehouse spaces, and the remaining 19% worked in various production areas including driving. The sample size for the survey was small. However, this distinction between the office and other spaces aligns with observations made during the site visits, as well as final production waste disposal and diversion data. A greater survey response rate from crew based in the facility warehouse spaces would have provided further insights about differences between production areas.

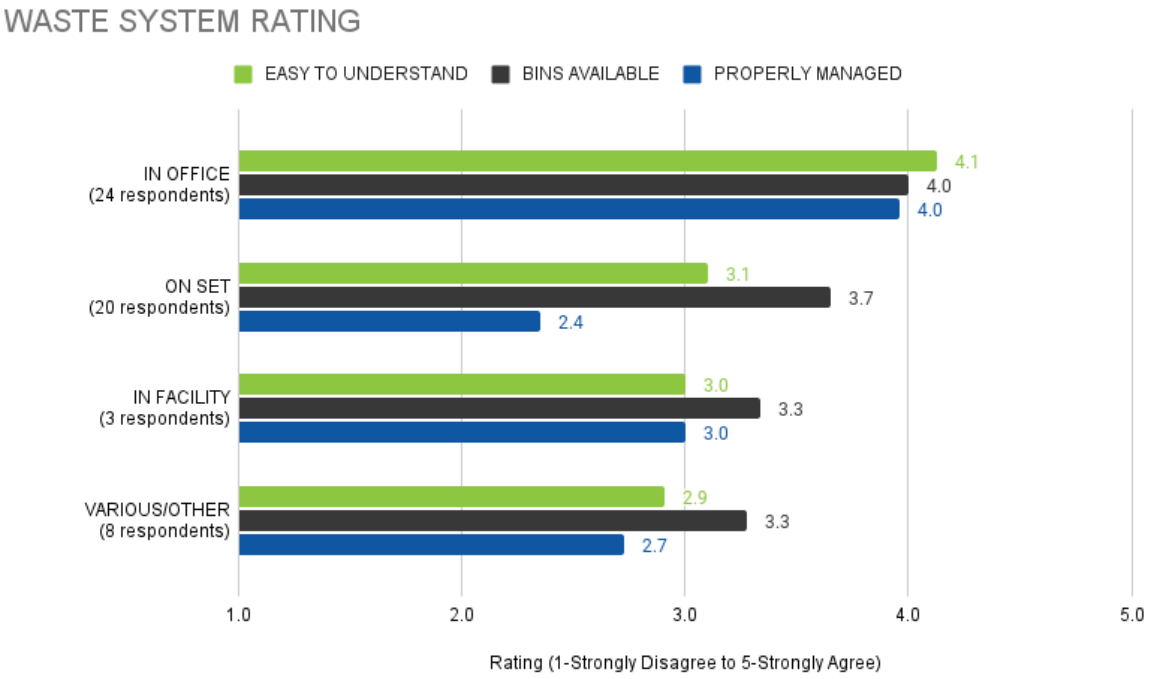


Figure 2: Survey responses about waste system ratings by production area

Results also demonstrate that the production crews surveyed lack knowledge and confidence in the proper management of production waste. For set-based crew, the lowest-ranked waste system characteristic was whether they felt that waste was properly managed **after they dispose of it** (Figure 2). This feeling was also expressed in interviews with crew members, locations department members, and waste disposal vendors. The lack of confidence in proper waste disposal practices stemmed from observations that recycling and garbage seemed to always go to the same place, which caused interviewees to feel that it didn't matter whether they sorted waste properly or not because it all ended up in the garbage anyway. This finding may also be connected to increased media attention and scepticism about the efficacy of recycling programs both in Canada and globally in recent years. Importantly, this also speaks to how communicating positive results from diversion reports to crew could help build confidence and motivate them to improve waste management practices at work.

Material Reuse on Productions

Survey respondents across all four productions consistently agreed that productions should donate more (n=49) and reuse more (n=51) materials (Figure 3). The most common materials to be donated are costume materials (28% of survey respondents), followed by office supplies (10%). For material reuse, rentals were most common (62%), followed by second-hand or reused materials (47%). Additional comments in the survey described a need for greater transparency on the part of productions and an increased focus on reuse during wrap/strike.

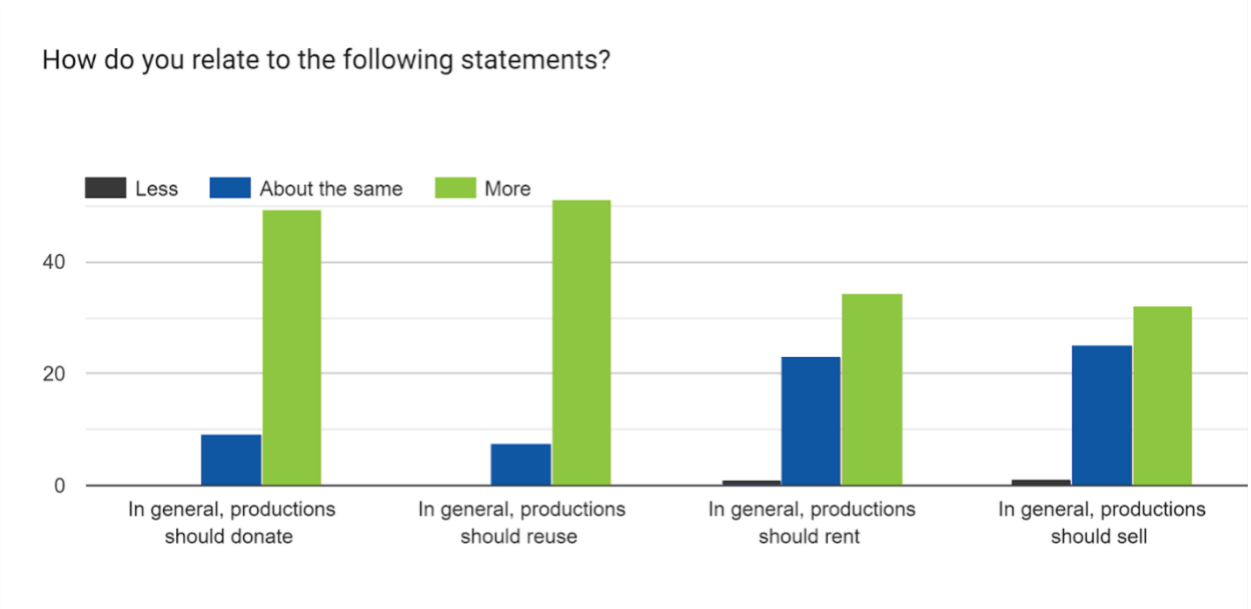


Figure 3: Survey responses regarding which material reuse options productions should use

Increasing donation practices and material reuse are key practices to ensure that materials retain value and continue to circulate in the economy. However, there are challenges with relying on donations as a primary disposal method. Interviews with set dec, props, and costume department heads and members noted that non-profit organisations have limited capacity to accept all types of materials. This arose as an important challenge. Saturating these markets with materials that they may not be able to use is not a sustainable practice. Instead, productions should only consider donating materials to local organisations after confirming that they are needed or useful. Otherwise, productions should endeavour to keep materials circulating within the film and TV industry through reuse and rentals to reduce new procurements.

Barriers to Material Reuse and Waste Diversion

Barriers to waste diversion specific to individual departments and the industry overall were grouped into sub-categories and then higher-level categories to tease out key challenges. The number of distinct mentions in interviews was counted to assess the overall order of importance. Seven high-level barrier categories were identified.

Table 4: Barriers to material reuse and waste diversion identified through interviews.

1. Limited services and/or vendors to divert waste. Key examples include: • Lack of composting services, vendors, and infrastructure (i.e., disposal bins and collection dumpsters) in studio facilities and on location. • Few storage facilities dedicated to material reuse in the film industry. • Limited services to coordinate logistics of material reuse.
2. Lack of budget/resources/support for production to reduce and manage waste. Key examples include: • Productions are not willing or do not have the budget to pay vendors for waste diversion services or to pay for labour to divert materials during wrap/strike. • Lack of signage, correct bins, on-set communication, or other resources or support to properly sort waste.
3. Crew behaviour and attitudes. Key examples include: • Lack of knowledge and education amongst crew about how to properly sort waste for diversion. • A strong perception that waste isn't properly diverted by vendors, causing apathy and inaction. • Littering and contamination of waste bins causes recyclable materials to go to landfill.
4. Nature of the current production process leads to waste. Key examples include: • Productions involve feeding and caring for high numbers of people for long workdays, which results in waste from food and drinks. • Productions purchase high volumes of materials that need to be disposed of after use. • When productions film on location, there are unique service needs and limitations. • A strong top-down hierarchy within each department with unclear accountability for waste and a fear of job loss or repercussions for rocking the boat.
5. Creative or other policy requirements/standards lead to waste. Key examples include: • Creative needs dictate what appears on screen, and scenes involving custom-designed, unique, or damage to materials, as well as last-minute changes, result in waste. • Studio-level policies for confidentiality of creative content, as well as a lack of studio-level mandates to reduce and divert waste.
6. Supply chain or material type limitations lead to waste. Key examples include: • Industry suppliers use packaging for their productions that leads to waste. For example, takeout food packaging, garment bags from dry cleaners, and shipping packaging. • Various types of materials are used, and many are low quality or cannot be easily reused or recycled, including non-assets or significantly modified set and construction materials.
7. Additional costs for sustainable sourcing and procurement, including labour. Key examples include: • Rentals are not cost-effective for longer productions. • Sourcing second-hand materials requires labour and preparation ahead of time. • Certified sustainably sourced products are more expensive (e.g., Forest Stewardship Council (FSC) certified lumber products, certified compostable food packaging).

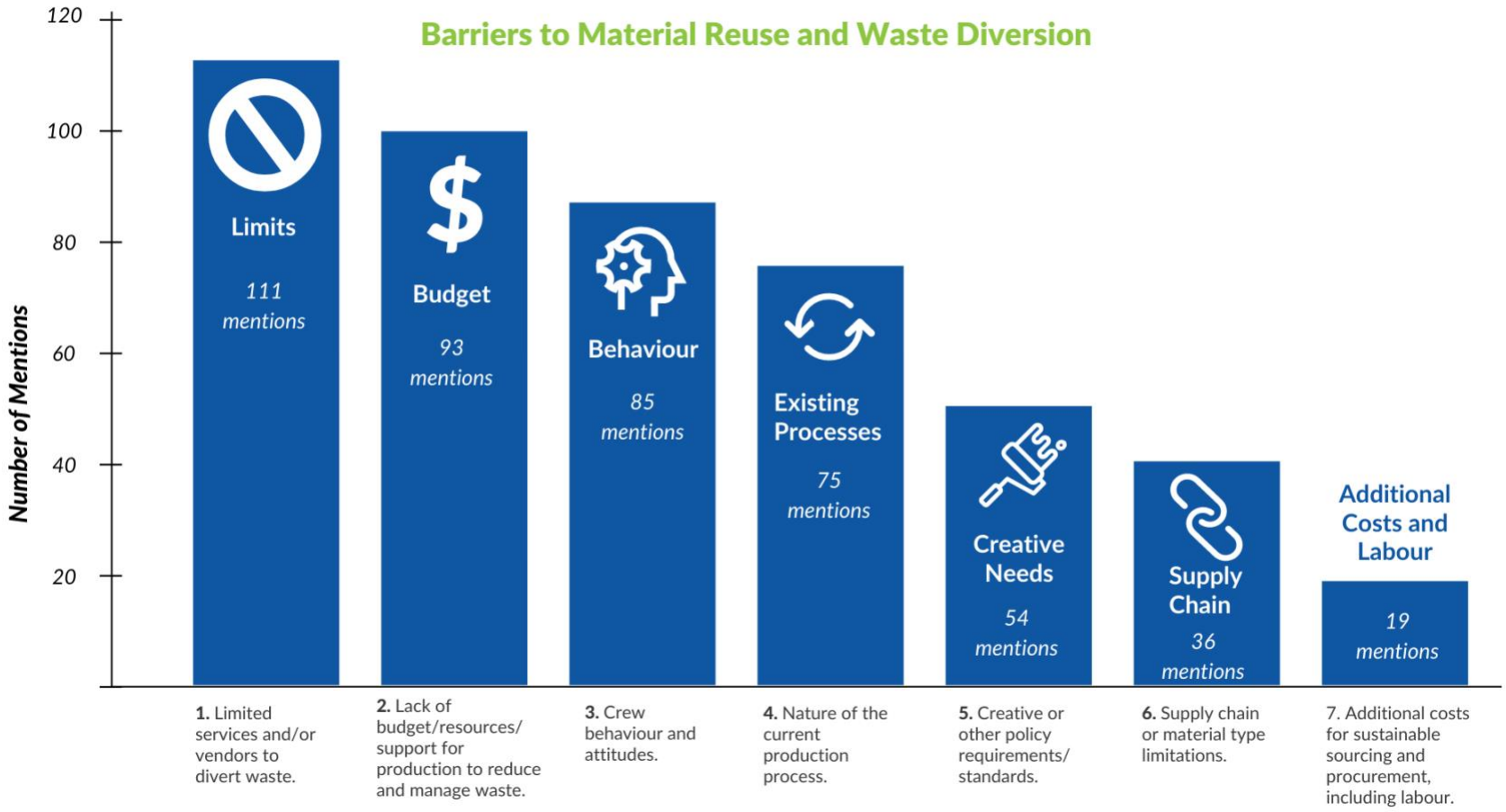


Figure 4: Key Barriers to Waste Diversion (survey responses)

These barriers strongly align with GSG's professional experience and assessments. They are also largely interconnected. For example, without productions asking for and willingness to pay for diversion services, vendors are unable to offer them. Additional costs associated with labour and materials for sustainable procurement are a distinct yet related barrier.

Crew behaviour and attitudes were also a top-ranked barrier to waste diversion in the interviews. Essentially, these barriers indicate that current production practices are wasteful, and they speak to the need for a widescale industry transformation. The Conclusion: Opportunities for Action offers a path forward.

Opportunities to Reuse Materials and Reduce Waste

Respondents were asked about opportunities to improve waste diversion specific to their department and for the industry overall. The opportunities/needs were grouped into sub-categories and then higher-level categories to identify key priorities, and the number of distinct mentions in interviews was counted to assess the order of importance. Overall, six categories of opportunities were identified (Table 5).

Table 5: Opportunities and needs for material reuse and waste reduction (interviews)

1. Increased or improved vendors/services and infrastructure. Key needs include: • Asking for diversion services and reports from hired vendors to divert waste from landfill across all production areas, with an emphasis on increasing composting services for productions and departments. • Increasing material reuse through well-managed warehouses or storage spaces for all productions. • Soundstage facilities should increase or improve waste diversion services by providing composting and diversion for construction and set materials. • Productions should budget for sustainable sourcing, including compostable food wares and labour to find materials from second-hand or sustainable sources.
2. Culture shift, education, and communication. Key needs include: • Education and training for crews through unions and production resources; possibilities include seminars, a dedicated sustainability representative, and clear waste bin labels. • Increased collaboration across departments and with vendors to reduce contamination and improve waste diversion.
3. Using/encouraging existing reduce/reuse options/practices. Key needs include: • Many existing informal material reuse and resource-sharing practices between productions through union or other professional and personal channels can be enabled or encouraged. • Higher-quality materials or upgraded products are already in use in some cases, which improves the likelihood of material reuse.
4. Production accountability and resource/budgeting. Key needs include: • Top-down support from decision-makers throughout a production (i.e., producers, department heads) provides impetus, resources, and budgets to source sustainable materials and improve waste diversion.

• Consistently providing dedicated production labour for crew support and education, including an on-set person or department, or an extra position or labour time within departments, to divert waste.
5. Mandates from studios to require material reuse and waste diversion. Key needs include: • Revising existing asset and material policies to improve waste diversion opportunities. For example, asset valuation and creative protection policies. • Requiring all productions to reuse materials and divert waste to a certain standard.
6. Government mandate or economic/financial incentive. Key needs include: • Requirements of some form (e.g., policy, bylaw) for productions to divert waste. • Government tax credit to support or reward waste diversion from productions.

Image of a water fountain with a touchless bottle refill tap. Photo provided by Ontario Green Screen.

Figure 5: Key Opportunities for Improved Waste Diversion (survey responses)

The opportunities identified by interviewees strongly align with GSG's industry experiences. The top priority noted by interviewees was a need for increased or improved vendors and services, and stronger infrastructure for material reuse and waste diversion. On the materials side, this includes well-managed storage spaces or reuse markets so set materials can be kept and reused in the film industry, as is more common in other production hubs such as Los Angeles or New York City. In their absence, materials are disposed of, sent to "dead storage" spaces (i.e., tightly packed and unmanaged trailers or lockups), or donated to material reuse centres in such high volumes that they cannot accept everything. This demonstrates the need for a culture shift, greater production accountability and resource/budget provision, and the incentivization by studios or governments to require material reuse.

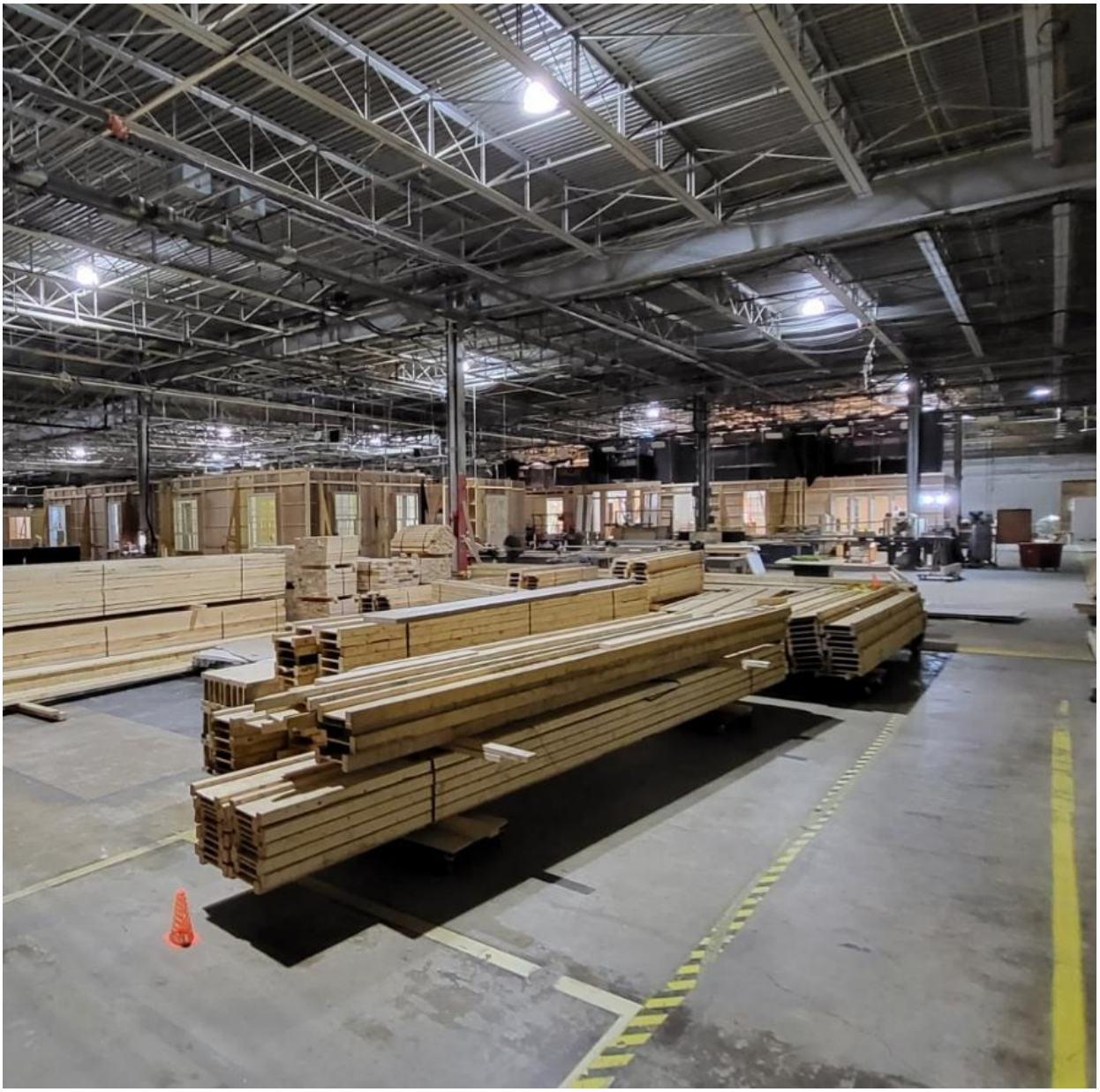


Image of a lumber storage area in a studio. Photo taken by Samantha Leigh, Green Spark Group.

Four Common Production Waste Materials

Introduction

Productions use a wide variety of materials for creative, administrative, and food service needs. Several common production waste materials stood out during the interview, site visit, and survey processes. Some of these materials are used by all crew, such as food packaging, single-use drink containers, and paper, while many materials are department-specific, such as food waste (craft, catering, locations), construction (lumber, paint), general set materials (set dec, props), and clothing (costumes). This section contains the following findings:

- Common Production Materials that are Problematic for Waste Diversion
- Production Material Life Cycle Assessment
- Barriers and Opportunities

For further details about survey and interview responses, please see Appendix B.

Common Production Materials that are Problematic for Waste Diversion

Common production materials were determined using a combination of interview and survey responses and then categorised by material type. Materials were ranked (1 being most common) according to their survey ratings and number of mentions in interviews, and an average ranking of those two categories was calculated. Single-use food and drink containers were aggregated under a single material category, as were paper products, for simplicity.

Table 6: Common production materials according to survey and interview rankings

Category ranking	Material category	Material types, examples	Survey ranking*	Interview ranking	Average ranking
1	Single-use containers: food and drink	Drink containers (e.g., water bottles, coffee cups, drink cans)	1	1	1
		Food packaging (e.g., takeout containers including compostable containers, wrappers)	1	3	2
2	Food and organic waste	Food waste	1	2	1.5
3	Construction materials	Construction materials (e.g., lumber, metal framing)	5	4	4.5
4	PPE/COVID waste	PPE and COVID testing materials (e.g., masks, gloves, shields, rapid tests)	2	7	4.5
5	Paper products	Paper	4	6	5
		Cardboard	3	8	5.5
6	Set dressing, props, costumes	Various (e.g., furniture, flowers, notebooks, clothing)	9	5	7

**Materials ranked 6, 7, and 8 in the survey were foam, paint/paint cans, and batteries respectively. They are omitted from this table because they were not mentioned in interviews.*

According to combined interview and survey results, the four most common materials found on productions are, in order, drink containers, food waste, and food packaging, with a tie between construction materials and PPE/COVID waste (Table 6). When combined by material category, as described above, the top four are single-use containers, food and organic waste, construction materials, and PPE/COVID waste.

Production Material Life Cycle Assessment

Identifying common production materials that are problematic for waste diversion is critical to finding pathways to reduce waste. The top material categories were assessed together with production waste amounts, site visit observations, and context stemming from professional experience to determine the four categories used in GSG's production material life cycle assessment.

Notably, the first three categories align with the top four categories identified through surveys and interviews, but GSG decided to include set dressing, props, and costumes as the fourth category because of the high amount of waste they generate and their potential unique opportunities for waste reduction. In contrast, paper products have readily available industry solutions like digital paperwork and recycling, while PPE/COVID waste does not generate significant amounts of waste compared to other categories and is generally unavoidable under current health and safety guidelines.

Selected material category groups and their production life cycles are summarised in Table 7.

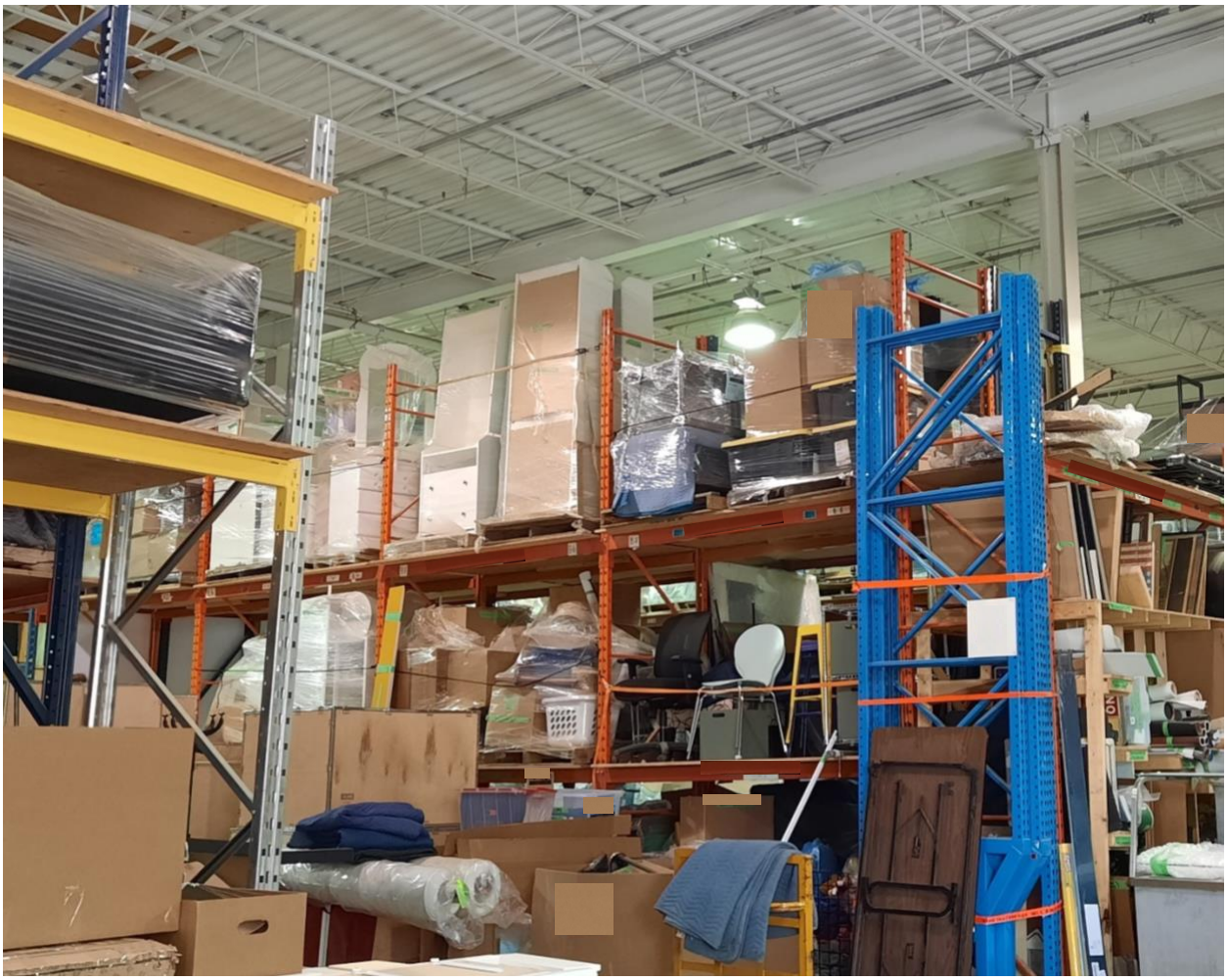


Image of a set material storage area. Photo taken by Samantha Leigh, Green Spark Group.

Table 7: Production life cycle of selected material categories

Material type	Procurement process	Use on production	Disposal process and effects
Single-use containers: food and drink	Craft and catering services purchase bulk food packaging (e.g., takeout containers, coffee cups) and pre-packaged food (e.g., granola bars, treats, plastic bottles, cans). Procurement is done to a limited degree in prep, and primarily throughout principal photography. Craft services and various production departments purchase beverages (including water) in single-use bottles or cans. Additional food services (e.g., takeout, food trucks) supply food and drinks in single-use containers. Set dec and props departments purchase single-use food packaging separately for creative needs. *	Craft and catering services provide pre-packaged food and beverages or package their provided food and beverages in single-use containers. Single use containers may be composed of plastic, compostable plastic, or fibre-based material. Productions can specifically ask caterers for fibre-based single-use options. Crews use the food packaging to store and carry food and beverages with them on production prior to consumption. Single-use food and beverage packaging was a common practice before the COVID-19 pandemic. However, some efforts were underway to reduce packaging prior to the pandemic and are currently being revisited.	Crews dispose of used food and beverage containers in recycling or garbage bins. According to interviews with locations departments on all four productions, crews frequently litter these materials around the production site. High levels of contamination in both garbage and recycling bins were observed on three of the four productions. When recycling bins are contaminated with garbage or food waste, vendors usually dispose of the entire load in landfill. When recyclable food containers end up in garbage bins and landfill, their value is wasted.
Food and organic waste	Craft and catering services purchase food from suppliers to serve to productions. Procurement is done to a limited degree in prep, and primarily throughout principal photography. Additional food services (e.g., takeout, food trucks) supply food to productions. Set dec and props departments purchase food separately for creative needs. *	Craft and catering services prepare food both in main kitchens and in trucks on site at the production to serve crews. Crews consume the food in lunchrooms, offices, vehicles, or various other places on the production site.	Craft and catering dispose of surplus food from prep and the serving lines in garbage bags or compost bags if available. Waste disposal options are provided by the locations department. One of the three craft and catering services engaged during this research coordinates donation of surplus edible food (best practice). Crews dispose of uneaten food in garbage, recycling, or compost bins if available.

Table 7: Production life cycle of selected material categories

Material type	Procurement process	Use on production	Disposal process and effects
Food and organic waste, cont.			High levels of contamination from food waste in garbage and recycling bins were observed during site visits on two of the four productions. Food and organic waste releases methane when it decomposes in landfills.
Construction materials	Construction departments purchase new lumber for set builds. Procurement for set builds is primarily done in prep, and to a lesser extent during principal photography (varies based on length of production). Construction departments procure surplus materials from other sources, including through professional networks and other productions.	Construction departments build sets of various sizes in collaboration with art, scenic, and other departments involved in production design. * Set interiors are painted, stained, have materials glued to them, or are otherwise altered for creative needs. *	Depending on production policies and whether construction materials can be reused, construction departments deconstruct sets into standard components and store them for future use. Construction departments practise informal reuse such as sharing or selling unneeded materials through professional networks and using scrap wood for other projects. It is also common for sets to be destroyed and disposed of rather than deconstructed and reused. Depending on the vendor, construction materials are sent to landfill or recycling. Lumber that is altered with paint, stain, or glue cannot be recycled. Unpainted and scrap wood can be recycled or repurposed, but this is not widely practised. Any lumber materials sent to landfill are organic matter and produce methane as they decompose.

Table 7: Production life cycle of selected material categories

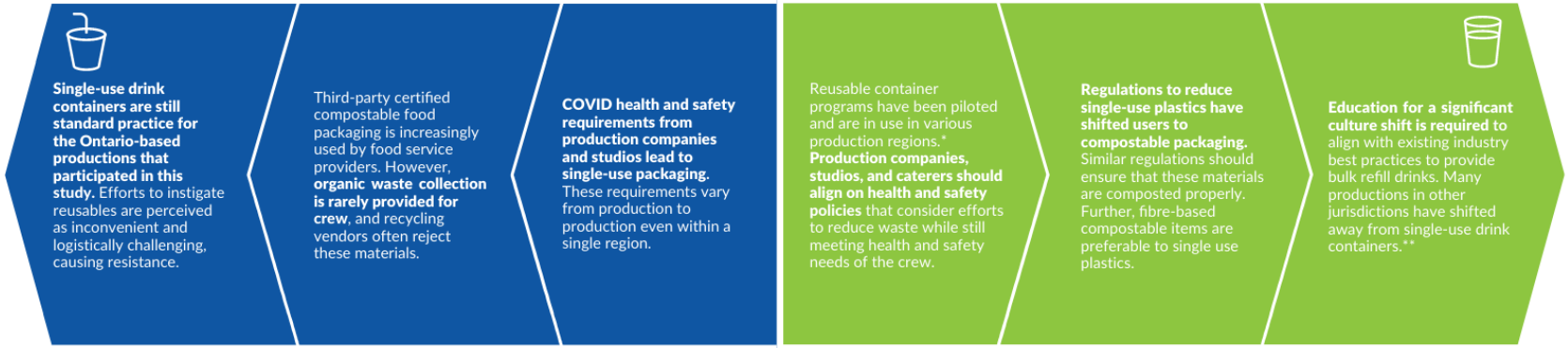
Material type	Procurement process	Use on production	Disposal process and effects
Set dressing, props, and costumes **Set dressing, props, and costumes, cont.**	Set dec, props, and costume departments procure new, rented, and/or second-hand materials. * Set dec: furniture, artwork, decorations, etc.* Props: flowers, notebooks, personal items, etc.* Costumes: fast fashion, vintage clothing, fabric, etc.* Materials are almost always delivered packaged in cardboard, paper, and/or plastic.	Set dec, props, and costume departments use procured set materials to fulfil creative needs. * Materials are modified to fulfil creative needs. * Set dec: repairs and refurbishment, damage, painting, etc. Props: alterations, damage, redecoration, etc. Costumes: breakdown, tailoring, restoration, dry-cleaning, etc. Packaging from material delivery is reused when possible, according to interviews.	Studio or production asset managers identify production assets, usually by a value threshold. Assets are retained for future use, sold to other productions, or otherwise managed to recoup value spent. Other assets are retained by the studio or production company if they will be used on subsequent productions or reshoots (e.g., "hero" materials). Set dec, props, and costume departments reuse non-asset set materials in a variety of ways depending on the material type and budget/resources available. Examples include: • Given away to crew and cast • Retained as personal assets for subsequent productions • Donated to other productions through professional networks • Donated to charities, local theatre groups, and second-hand stores When options for reuse are not available due to time, labour, budget, or storage constraints, materials are disposed of in mixed waste bins and sent to landfill. Packaging from material delivery is recycled when possible and otherwise disposed of in garbage bins.

**Varies by production depending on creative needs.*

BARRIERS AND OPPORTUNITIES

Barriers to and opportunities for waste diversion depend on the material type. The following barriers and opportunities were identified through detailed discussion with production crews during interviews and are supplemented with professional experience.

Single-use Containers: Food and Drink



Food and Organic Waste

*For example, Suppli in collaboration with Hungerhub in Ontario. See Ontario Green Screen Case Study.
**See case studies available on the Green Production Guide, such as Divorce (HBO), and Call of the Wild (20th Century Fox).

BARRIERS AND OPPORTUNITIES

Barriers to and opportunities for waste diversion depend on the material type. The following barriers and opportunities were identified through detailed discussion with production crews during interviews and are supplemented with professional experience.

Construction Materials

Set Dressing, Props, and Costumes

Conclusion: Opportunities for Action

Introduction

These opportunities are summarised from crew and vendor interview and survey information and are supported by GSG's broader industry experience. They are presented in order of ease of implementation to align with the principles of a circular economy, including eliminating waste and pollution and circulating products and materials, as defined in this report's introduction (page 8). The following opportunities are included herein:

- Close the Critical Composting Gap
- Improve Production Accountability
- Resolve the Storage Space Issue
- Shift the Culture through Education and Engagement
- Industry Leadership

See page 52 for a tabular summary of these opportunities, including involved parties.

Close the Critical Composting Gap

Adopting a robust approach to composting offers an easy win for productions and soundstage facilities. Doing so would significantly decrease methane emissions and reduce the potent greenhouse gas created when organic waste goes to landfill. The following options could help productions and facilities to close the composting gap.

- **Holistic waste collection: Productions can collect and divert organic waste in all production areas.** At a minimum, organic waste collection bins could be housed in all production areas where crews regularly eat (e.g., lunchroom, craft truck, and facility kitchens). In these areas, the number of compost bins should exceed the number of garbage bins. Crews can be educated and kept accountable on how to sort organic waste to maximise its diversion and reduce contamination of recycling and garbage bins. See Shift the Culture through Education and Engagement for more.
- **Vendor engagement: Productions could proactively work with vendors to divert organic waste.** All vendors interviewed for this report were open to expanding their services to include composting. Vendors will respond to client needs and market demand, which means that composting services will remain limited until more productions request them and are willing to pay for them. It's important to note that additional service costs are anticipated to be offset by reduced waste collection and tipping fees resulting from diversion.
- **Embed compost collection in services: Productions could request that facilities and vendors include organic waste collection as part of waste management services.** The voluntary Studio Sustainability Standard also includes composting as a minimum requirement for sustainable resource management.[24] When productions rent and use a facility, there is an opportunity for the facility to offer waste management contracts that include composting. Critically, instructions to use facility-provided waste management services must be clearly communicated to productions to ensure waste is properly collected and to reduce contamination. Facility-managed composting services are seen as an important value-add by the Sustainable Production Alliance (SPA). However, SPA's recent survey of facilities found that only 38% of facilities offer composting services.[25]
- **Landfill bans: Productions could voice support for municipal, regional, and/or provincial governments landfill bans on organic waste.** In British Columbia, waste is managed at the regional district level, and regions including Metro Vancouver have placed a disposal ban on organic materials.[26] Under the ban, any waste disposal with "excessive amounts of visible food scraps" are charged an additional fee, which brings up the costs of mixed waste disposal in landfills.[27] A similar approach in Ontario could support productions in shifting costs to waste diversion rather than disposal. Furthermore, it could encourage the development of a broad composting service infrastructure across regions.

[24] Albert. The Studio Sustainability Standard. 2022. Page 16.
[25] Sustainable Production Alliance. SPA Soundstage Facility Survey Key Takeaways. 2022. Page 12.
[26] Province of British Columbia. Residential organic waste and local governments. Accessed Dec. 1, 2022.
[27] Metro Vancouver. About Food Scraps Recycling. Accessed Dec. 1, 2022.

Improve Production Accountability

Key barriers to improving waste diversion on productions include insufficient budgets, a lack of dedicated resources and mandates, and an overall dearth of support to reduce and manage waste. As long as landfill disposal continues to be quick and cheap, and productions are either unwilling or unable to pay for additional diversion costs, waste vendors cannot ensure that recycling or organic waste is diverted. Improving accountability and making it easier for production teams to reuse materials and divert waste is essential to ensuring circularity in the film and TV industry. Additionally, film and TV productions are not specifically provided for under provincial waste diversion programs or policies. In Ontario, waste generation and diversion data from the ICI sector, which includes productions and facilities as well as their vendors, is currently limited according to the *National Waste Characterization Report* (2021).[28] Through resource allocation and policy development, opportunities to improve accountability for film and TV production waste diversion include:

- **Top-down support: Producers and studio executives can provide meaningful support for material reuse and waste diversion.** Support can be provided through policies or requirements developed for each production, including guidance on budgeting time and labour for waste diversion, and providing production-level resources such as an on-set educator and/or expert in sustainable sourcing and waste diversion. Specific types of financial or human resources required may vary based on production needs.
- **Pay for diversion: Production departments and vendors can collaborate to adequately allocate budgets and pay for waste diversion services.** Department heads could include a budget line for waste diversion expenses based on consultation with vendors as part of production and departmental budgeting process. Diversion reporting is especially critical for construction waste due to the high volumes of wood and other salvageable materials produced during set construction.
- **Mandates and incentives: Production companies, studios, and broadcasters need to develop and implement incentives to improve material reuse and waste diversion.** With limited effort, mandates at the organisational level could focus on simple objectives like:
    - reducing construction waste using circular materials, such as set design and builds using cardboard sets (as currently used in the UK)[29];
    - consistent collection by productions of waste generation and diversion reports; or
    - reusing or diverting a minimum percentage of materials from landfills depending on regional service availability.

  A dedicated incentive or other financial support to pay for additional costs could also be provided to productions.
- **Government policies: Municipal, regional, and/or provincial governments could specifically include the film and TV industry in material reuse and waste diversion strategies where possible.** Municipal and regional governments that manage waste

[28] Ibid. (Annex B Ontario page 1)
[29] Vectar Sets, Vectar Project (UK)

disposal or contract with vendors to do so should include the needs of the film and TV industry as they update strategies. As the Ontario government continues to implement its *Strategy for a Waste-Free Ontario*,[30] meaningful engagement with the film and TV industry would likely help identify opportunities for new policies and incentives.

Resolve the Storage Space Issue

The limited availability of expansive and well-managed storage space was a barrier to material reuse in both Ontario regions studied. As a result, a variety of storage areas—warehouse spaces, shipping containers, and personal garages—are used by various stakeholders to meet material storage needs. Some of these spaces risk becoming "dead storage," whereby available materials are either undocumented or inaccessible for reuse.

Construction, set dec, props, costume departments, and other heavy material users noted the specific needs of production design as impediments to circularity. Certain materials, such as low-value or poor-quality decorations, can be difficult to find other users for. And while online platforms such as Facebook Marketplace are widely used to find or try to redistribute materials, the time and effort to communicate availability and coordinate movement of materials to new users remains a barrier; vendors like Ready Set Recycle have already identified this as an opportunity.[31] The following initiatives, along with further industry engagement, are anticipated to help address the issue of inadequate storage space.

- **Industry stakeholders can better collaborate to manage existing storage space and material recirculation effectively.** Collaboration between film commissions, unions and guilds, studios, production companies, and material rental and asset management vendors in Ontario to improve logistics is necessary for material circularity. Multi-stakeholder engagement initiated by Ontario Green Screen could identify existing best practices, scale relevant opportunities for material recirculation, and innovate to ensure that production materials aren't wasted. At a minimum, all stored materials can be clearly documented, described, and collectively communicated so production buyers can efficiently procure what they need for their productions' unique creative requirements.
- **Review procurement policies and practices: Production companies and studios could develop procurement policies that prioritise reuse of existing materials.** Procurement depends heavily on creative and production design needs, which come top-down from decision-makers. Procurement policies that prioritise reused materials could require productions to use a minimum percentage of reused materials or a maximum percentage of new materials. Policy development could be department-specific and include recommendations for sourcing previously used materials, as well as guidance for budgeting labour and costs for procurement.

[30] Ibid.
[31] Ready Set Recycle. Greening the entertainment industry SHOW BY SHOW. Accessed Dec. 1, 2022.

- **Promote reuse in design practices: Production design teams could adapt creative development guidelines that prioritise use of existing materials rather than new.** Since procurement decisions are heavily influenced by creative requirements, changing production design processes to consider available materials could significantly reduce waste generation. Collaboration and communication across creative departments is key. Use of materials that cannot be recycled or reused can be minimized, per albert's list of recommendations for production designers.[32] This practice is already occurring on large-scale productions globally.

Image of costumes for a production. Provided by Ontario Green Screen.

[32] albert. In Your Role: Production Handbook. Accessed Dec. 1, 2022.

Shift the Culture through Education and Engagement

Industry members want to see less waste and are willing to participate in efforts to make that happen, but they require industry support to change their behaviour. Interviewees felt that having a sustainability consultancy on set dedicated to education and sorting waste was essential to improving their knowledge and waste disposal habits. Furthermore, locations departments on productions without a consultant felt a need for additional positions and resources to improve communication and waste diversion results. Respondents from each production noted the industry's coordinated response to COVID-19 as an example of how sustainability could be approached on an industry-wide scale.

Telefilm Canada's *Eco-Awareness Survey Report* (2022) also highlighted the need for increased industry training on sustainability.[33] Survey results found that 96% of respondents are interested in sustainable and green production practices, but only 24% have attended relevant training in the past three years. Those who have attended training did so through industry organisations, including Ontario Green Screen, which has trained over 400 individuals to date. The most important type of support that all respondents wanted was knowledge of best practices (72%), which can be provided through existing industry organisations as well as new training programs.

- **Industry-level training: Unions, guilds, and other industry organisations could develop training on waste management, material reuse, and circularity specific to member departments and needs.** Such industry training was noted as a must-have by interviewees. Education and training on alternative and circular materials, such as cardboard set design, has the potential to create high-impact change. Training and resources need to be collaborative, action-focused, and ubiquitous for all film and TV industry members regardless of affiliation to encourage the necessary shift toward increased sustainable material use and waste reduction.
- **Education on-set: Productions are encouraged to collaborate with vendors and soundstage facilities to provide on-set and in-office education for production crews.** Education opportunities include departmental meetings (pre-production, health and safety), having dedicated on-set sustainability resources, and providing signage and colour-coded bins on set. Since 2020, production practices have shifted dramatically to include health and safety practices in response to the COVID-19 global pandemic. Implementing these practices required broad industry collaboration, adopting solutions recommended by scientific research, consistent education, and sufficient resources provided at the production level. Approaching sustainability with the same level of urgency, consistency, and collaboration would lead an industry-wide transformation to more sustainable practices.

[33] Ibid. Pages 7, 8, and 17.

Industry Leadership

The opportunities shared here will require strong leadership to be implemented successfully. There is ample evidence that industry members would like to contribute to reducing waste in the film and television industry, and a willingness by waste vendors to offer waste diversion services in response to demand. What is also clear is that top-down leadership and ground-up initiative are essential for meaningful change to occur.

Thanks to the crucial information collected through this study, the Ontario film and TV industry is poised to take advantage of the opportunities presented in this report and to measure the success of its initiatives. It's likely that improving waste diversion will reduce costs—both financial and environmental—setting Ontario apart as an industry leader and attractive production location. After all, films and shows produce lasting pieces of art and entertainment, so it's imperative that the entire industry is well-positioned to last too.

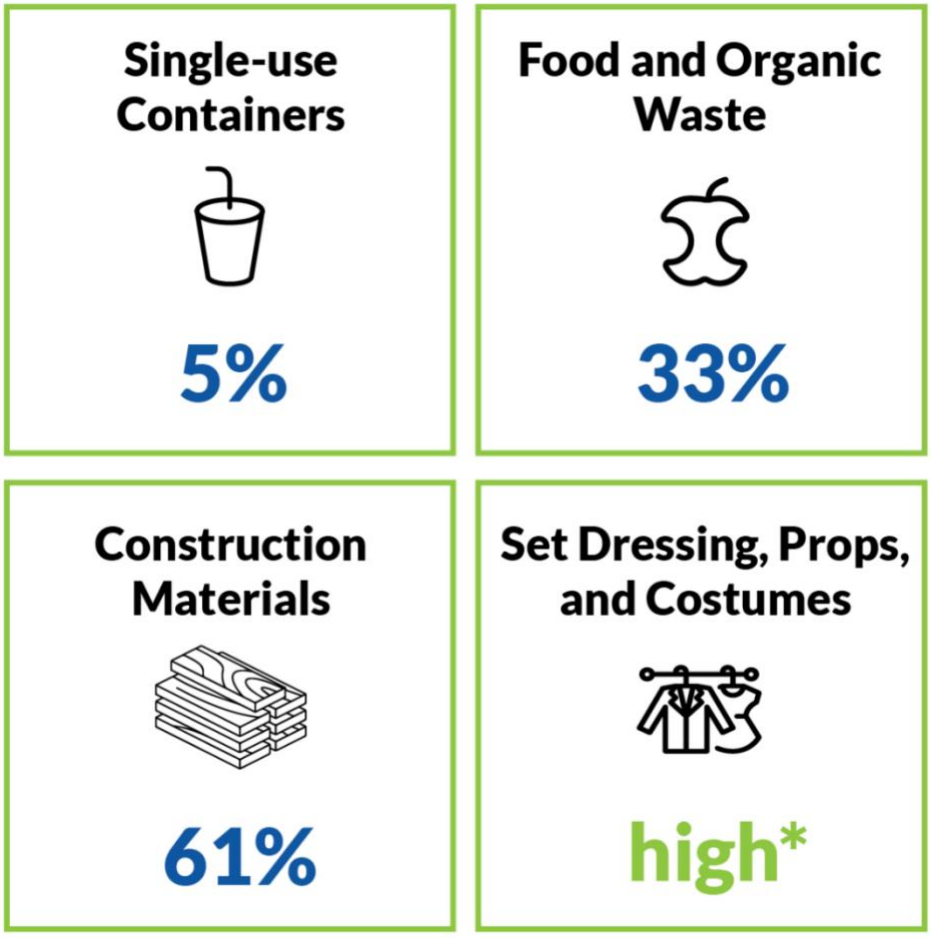


Figure 6: Potential waste diversion rates by type of material. Percentages are approximate potential production waste diversion, based on Case Study 1 data (72% diverted).

**Note that while Set Dressing, Props, and Costumes were consistently important materials, waste data specific to this category remains unquantified as no specific or consistent data exists to calculate diversion rates.*

Summary of Opportunities for Action

Opportunity	Primary actors						
	Production companies	Corporate studios, broadcasters	Facilities, vendors	Unions, guilds, industry organisations	Ontario Green Screen, film commissions	Provincial, regional, and/or municipal governments	Film and TV production funders
Close the critical composting gap							
Collect and divert organic waste in all production areas	X		X				
Proactively engage with vendors to divert organic waste	X	X	X		X		
Advocate for organic waste collection as part of waste management services provided to productions			X				
Advocate for landfill bans that include organic waste						X	
Improve production accountability							
Top-down support for material reuse and waste diversion	X	X					
Adequately allocate budgets and pay for waste diversion services (including diversion reports)	X	X					

Opportunity	Primary actors						
	Production companies	Corporate studios, broadcasters	Facilities, vendors	Unions, guilds, industry organisations	Ontario Green Screen, film commissions	Provincial, regional, and/or municipal governments	Film and TV production funders
Develop and implement mandates/incentives to improve material reuse and waste diversion	X	X	X	X		X	X
Specifically include the film and TV industry in material reuse and waste diversion policies and strategies						X	
Resolve the storage space issue							
Collaborate to manage existing storage space and material recirculation effectively		X	X	X	X		
Develop procurement policies that prioritise reuse of existing materials	X	X					
Adapt creative development guidelines that prioritise use of existing materials rather than new		X		X			
Shift the culture through education and engagement							
Develop training on waste management, material reuse, and circularity		X		X	X		X
Collaborate to provide on-set and in-office education for production crews	X	X	X	X	X		

ONTARIO GREEN SCREEN

JUNE 2023

Advancing Waste Management Practices in Ontario's Film and Television Industry

Appendices

GREENSPARKGROUP
Changing the climate of entertainment

Appendix A | Full Case Studies

Data from all case studies that contributed to this report are included in this section. They are organised as follows:

Case Study 1: Large-budget TV Series in Greater Toronto Area (1)

Size and type	Large-budget television series
Crew count	~150
Region, duration	GTA over seven months
Soundstage facility type	Converted warehouse
Location filming	Various around the GTA
Number and types of waste vendors used	Nine vendors for office, facility, PPE, location, and construction waste, as well as use of public drop-off sites. A vendor that provides hand-sorting of waste materials was also utilised, which allowed for a detailed composition analysis of contamination for waste from the shooting crew.
Sustainability department or hired consultants	A sustainability consultancy led material and waste reduction initiatives. This resulted in extensive vendor engagement and detailed diversion reporting. A sustainability department was hired for on-set engagement and waste diversion efforts.
Public waste services used	A local drop-off facility was used by the sustainability department to divert unique waste items, such as electronic waste, paint cans, and aerosol containers.
Mixed waste (garbage)	Garbage was collected from location and sent to landfill. Waste from the facility and offices was recovered and processed into energy rather than sent to landfill.
COVID testing and PPE waste	PPE waste was recovered by two vendors and processed into energy rather than sent to landfill. COVID testing waste was processed by the testing facility as biohazardous waste, and final values were unavailable.
Construction materials	Construction materials were collected and diverted by a recycling company that provided a LEED audit report.
Recycling	Recyclable waste was collected from all production areas by various vendors. More options for recyclable waste collection (e.g., paper, textiles, batteries) were available at the production office than in other areas.
Compost	One vendor collected and composted organic waste, including compostable food packaging, from all production areas.
Food donation	Food donation was implemented consistently during production by the sustainability department and catering team in partnership with a local food collection charitable organisation.
Material donation	Material donation was implemented by the department heads with support from the sustainability department, although weight or volume of donated materials was unavailable. Assets held by the production company/studio were not included.
Waste management set-up	Waste bins were always organised in groups, so compost, recycling, PPE, and garbage disposal options were always available to the crew. Bins were labelled and colour-coded, and crew were educated by the sustainability department on proper waste sorting.
Diversion rate	72%

Waste Categories

This production's data was pulled from a recent GSG archive to broaden the industry analysis and increase comparison opportunities. Data was collected from nine vendors servicing the production over the entire filming period. The number of vendors was high as the production changed vendors to improve waste diversion outcomes in line with the production's sustainability goals.

Table 8: Production areas and waste collection process for Case Study 1

	Production office	Soundstage facility*	Construction and set dec/props	Location
Vendors used and waste collected	Papersavers collected various streams (e.g., wastepaper, batteries, textiles) to be recycled. Additional waste was collected by the same vendor as the soundstage facility.	Facility waste was collected by a vendor that provides hand-sorting services for compost, recycling, and mixed waste. Any surplus waste beyond the capacity of this vendor was sent to an energy from waste facility through the facility's waste disposal contract.	One vendor collected construction waste for a few months before the production switched to Global Waste Services, which provided LEED audit reports. Hazardous and electronic waste was brought to a local drop-off facility. Additional set material waste was stored or donated.	Location recycling and compost was collected by the same vendor servicing the facility and hand-sorted for contamination. Location mixed waste was collected by a preferred industry hauler and disposed of in landfill.
Data quality	Diversion report including accurate weight or volume for each material type was provided. Volumes were converted to weight for analysis.	Diversion reports were provided by weight monthly and in aggregate at the end of the production. Energy from waste values were reported by tonnes.	LEED audit reports were provided for most construction waste by weight and type. Hazardous and electronic waste was estimated by volume when possible. Volumes were converted to weight for analysis. Data for donated set materials was unavailable.	Diversion report including accurate weights for each material type was provided for recycling and compost. The number of mixed waste bags was counted, and volumes were converted to weight for analysis.

**Includes stages, warehouses, office spaces not covered by the office-specific vendor, and other support areas for this production.*

Diversion Rate

The total waste weight for this production was estimated at **314,165 kg**, with a diversion rate of **72%**. Any contamination was sorted out by waste vendors and was included in waste stream totals. Actual waste amounts and diversion rates are broken down by area in Table 9.

Table 9: Estimated total waste generated by a large series in the GTA (1)

	Area	Offices, facility, and location (KG)	Construction and set materials (KG)	TOTAL (KG)
Landfill	Construction waste	-	82,708	**82,708**
	Garbage	5,051	-	**5,051**
			LANDFILL TOTAL	**87,759**
Diverted	Construction recycling	-	187,510	**187,510**
	Metal recycling	-	5,290	**5,290**
	Mixed set materials recycling	-	683	**683**
	Energy from waste*	1,610	-	**1,610**
	PPE Energy from waste*	274	-	**274**
	Mixed recycling	10,394	-	**10,394**
	Paper recycling	4,830	-	**4,830**
	Cardboard recycling	103	-	**103**
	Batteries	34	-	**34**
	Organics	12,788	-	**12,788**
	Food donations	2,890	-	**2,890**
			DIVERTED TOTAL	**226,406**
	OVERALL TOTAL	**37,974**	**276,191**	**314,165**
	Diversion rate	**87%**	**70%**	**72%**

**Included under diverted waste.*

Analysis and Summary of Observations

Waste diversion on this production was high at 72% because most of the construction waste was recycled and diverted rather than sent to landfill. This key action was implemented along with other diversion practices due to strong support from producers and other top decision-makers on the production.

The main waste vendor provided detailed diversion and composition reports for location and facility waste, which provides high transparency about disposal effects for this production. This service was more expensive than landfill disposal and was paid for by production in support of its sustainability goals. Energy from waste was included under diverted waste to calculate the diversion rate because it was not disposed of in landfill and some value was recovered for it; this is a key distinction made for waste diversion values.

Contamination of waste bins was nevertheless observed during the production. On set, the main contaminants were food waste and food packaging in garbage bins. Non-recyclable food packaging, or food packaging contaminated with food waste, was also observed in recycling bins. However, much of the contamination was sorted by the waste vendor.

No interviews, survey responses, or site visit data is included as information for this case study was pulled from GSG archival data.

Image of a set wall. Photo taken by Samantha Leigh, Green Spark Group.

Case Study 2: Large-budget TV Series in Greater Toronto Area (2)

Size and type	Large-budget television series
Crew count	~150-200
Region, duration	GTA over seven months, sample data collected for four months due to limited overlap with this project's schedule
Soundstage facility type	Purpose-built studio
Location filming	Various around the GTA
Number of waste vendors used	Four vendors for office, facility, location, and construction waste
Sustainability department or hired consultants	A sustainability consultancy led material and waste reduction initiatives through on-set management and coordination. This resulted in extensive crew engagement and education.
Public waste services used	Vendors dropped off waste at local landfill facilities for production
Mixed waste (garbage)	Garbage was collected in all production areas by two vendors, as well as the facility, and sent to landfill.
COVID testing and PPE waste	PPE waste was not diverted and collected in regular garbage streams. The testing company disposed of PCR test waste in accordance with biohazardous waste disposal regulations. Data for biohazardous waste was not available.
Construction and set materials	Construction and set materials were collected in two large, 40-yard bins as mixed waste. The vendor could not provide a diversion report for this high volume of mixed waste due to the space and costs required. However, they diverted an unknown but small amount of materials (e.g., clean wood, cardboard) when possible (i.e., when the vendor could pull these materials from the top of the bin).
Recycling	Recycling was collected in all production areas by two vendors (office and location) plus the facility. More options for recyclable waste collection (e.g., paper, textiles, batteries) were available at the production office than in other areas.
Compost	Organic waste was collected for composting on location and at the soundstages by one vendor, and at the production office by another vendor.
Food donation	Food donation was coordinated at the catering services level. Any surplus edible food prepared for catered meals was returned to the catering company's kitchen and used in other dishes or donated to their food rescue partner. Since food donations were aggregated at the kitchen level, production-specific data was unavailable. Craft services did not report generating any donated food.
Material donation	N/A - This information was not available. However, interviewees indicated that they donated set materials when possible if given enough time. Much of the production materials have been stored for upcoming seasons.

Waste management set-up	Waste bins were always organised in groups so that recycling and garbage disposal options were always available to the crew. Bins were labelled and colour coded. Compost bins were only available in certain areas including the kitchen, lunchroom, and near the craft truck.
Diversion rate	12% (estimated for run-of-show)

Waste Categories

Data was collected from the four vendors servicing the production over a four-month period that included one month of prep and three months of filming. Data quality varies by vendor and is described in Table 10. Mixed construction and set dec/props waste were dropped off at local landfills and transfer stations by the vendor. According to the vendor, any easily salvageable materials (i.e., clean recyclable materials at the tops of waste bins) were saved for recycling on their lot, although diversion reports were unavailable from the vendor for these services.

Contamination levels were not reported by any of the production's vendors, so it is unknown if any quantities of recycling or compost ended up in landfill due to contamination. The monthly waste disposal and diversion data was extrapolated to the remaining production months based on the production schedule for an estimated total. Food and material donation amounts or estimates were not available from the caterers or department heads and are not included.

Table 10: Production areas and waste collection process for Case Study 2

	Production office	Soundstage facility*	Construction and set dec/props	Location
Vendors used and waste collected	Papersavers collected various recycling streams (e.g., wastepaper, batteries, textiles) and organic waste to be composted.	Facility cleaner collected mixed waste (garbage) and mixed recycling (cans, bottles, paper, cardboard).	A preferred vendor collected two 40-yard bins, one each for construction and set dec/props.	Location waste was collected by an industry-specific waste hauler in collaboration with locations department and sustainability consultancy.
Data quality	Diversion report including accurate weight or volume for each material type was provided. Volumes were converted to weight for analysis.	Daily bag counts of garbage and recycling for two months of filming were reported by each support area. Volumes were converted to weight for analysis.	Each bin was tipped when it was full, and the number of times the bins were tipped was reported by the construction department and the production office. Volumes were converted to weight for analysis.	Average monthly location waste was estimated in pounds by the sustainability consultancy through communications with the waste hauler.

**Includes stages, warehouses, office spaces not covered by the office-specific vendor, and other support areas for this production. Does not include the 40-yard construction and set dec/props bins.*

Diversion Rate

To align with report timelines, production data was collected for one month of prep and the first three months of shooting. Additional waste volumes were projected for the run-of-show, including wrap, using the first four months as reliable proxy data. The total waste volume for this production over the first four months was estimated at **154,432 kg**, with a diversion rate of **7%**. Overall, the production produced an estimated **275,156 kg** of waste with a diversion rate of **12%.** Estimated total waste amounts and diversion rates are broken down by area in Table 11.

Table 11: Estimated total waste generated by a large series in the GTA (2)

	Area	Production office	Construction and paint	Set dec and props	Stages and support areas	Location	TOTAL
Landfill	Garbage	4,741	483	-	5,890	19,222	30,336
	Mixed set materials waste*	-	119,585	91,988	-	-	211,573
						LANDFILL TOTAL	**241,909**
Diverted	Mixed recycling	6,416	-	-	1,604	4,782	12,802
	Paper recycling	16,465	-	-	-	-	16,465
	Corrugated cardboard	518	-	-	-	-	518
	Cans, bottles, and glass	579	-	-	-	-	579
	Fabrics/ textiles	431	-	-	-	-	431
	Organics	1,538	-	-	-	914	2,452
	Toner/ink cartridges**	137 items					
						DIVERTED TOTAL	**33,247**
OVERALL TOTAL		**30,688**	**120,068**	**91,988**	**7,494**	**24,918**	**275,156**
Diversion rate		**85%**	**0%**	**0%**	**21%**	**23%**	**12%**

**Construction, set dec, and props materials were collected in general mixed waste 40-yard bins, and the vendor did not report how much of those materials were salvaged or recycled.*

***Included in the vendor diversion reports as several items, not by weight or volume.*

Analysis and Summary of Observations

Waste diversion on this production was low (12%) overall despite having a high diversion rate in the production office (85%). This is primarily due to key high-volume areas not diverting waste. Waste collected in the 40-yard bins used by the construction/paint and set dec/props departments were all disposed of in landfills after being collected.

During the site visit, the construction/paint 40-yard bin was observed to be filled with lumber materials, which are recyclable when brought to a vendor that accepts it. The set dec/props bin was emptied before observations could be made, but on-site interviews described these bins as full of both broken and whole furniture, black garbage bags, and other mixed materials, making the entire bin non-recyclable.

Contamination of waste bins was observed during the site visit. On set, the main contaminants were food waste and food packaging in garbage bins. Non-recyclable food packaging, or food packaging contaminated with food waste, was also observed in recycling bins. However, much of the contamination is sorted by the sustainability consultancy.

During the site visit, conversations with crew members showed a high level of awareness about the high amounts of waste generated by Ontario-based productions in general, and the efforts that this production was undertaking to reduce its impact. However, all interviewees felt that more needs to be done from a top-down approach through incentives or mandates from governments or studios, or dedicated production budgets for waste. Two representatives from the sustainability consultancy described a shift in crew behaviours toward waste diversion while educating the crew and helping sort their waste. Contamination was observed in some bins around the set and facility, but waste was observed being properly sorted in the lunchroom and craft services areas with support from the sustainability consultancy.

Image of a dishware return station. Photo taken by Samantha Leigh, Green Spark Group.

Case Study 3: Medium-budget TV Series in Greater Toronto Area

Size and type	Medium-budget television series
Crew count	~85-100
Region, duration	GTA over four months
Soundstage facility type	Vacant building temporarily used for filming and offices
Location filming	Regularly on location in a small community on the edge of the GTA
Number of waste vendors used	Three vendors for office/facility, location, and construction waste
Sustainability department or hired consultants	N/A - Not hired for this production
Public waste services used	Vendors dropped off waste at local landfill facilities for production
Mixed waste (garbage)	Garbage was collected in all production areas by two vendors and sent to landfill.
COVID testing and PPE waste	Collected in regular garbage waste streams, although the COVID health and safety team did explore recycling options.
Construction and set materials	Construction and set materials were collected separately on two occasions in a 25-yard and 16-yard bin as mixed waste during set builds. Throughout production, any construction materials were collected in the facility mixed waste and recycling 6-yard bins. At wrap, construction materials were deconstructed and saved or given or sold to other productions. No data was available about volumes of materials saved or donated. Since materials in bins were mixed, the vendor could not provide a diversion report. However, they diverted an unknown but small number of materials (e.g., clean wood, cardboard) when possible (i.e., when the vendor could pull these materials from the top of the bin).
Recycling	Recycling was collected in all production areas by three vendors. More options for recyclable waste collection (e.g., paper, textiles, batteries) were available at the production office than in other areas.
Compost	Organic waste was collected for composting in the production office by one vendor.
Food donation	Food donation was coordinated at the craft services kitchen level. Any surplus edible food prepared for craft services was returned to the company's kitchen and used in other dishes or donated to their food rescue partner. Since food donations are aggregated at the kitchen level, production-specific data was unavailable.
Material donation	N/A - This information was not available. At wrap, set materials and costumes were saved or given or sold to other productions. No data was available about volumes of materials saved or donated.
Waste management set-up	Waste bins were usually organised in groups so that recycling and garbage disposal options were available to the crew. There were no signs, but blue bins with clear bags designated

	recycling, and yellow bins with black bags designated garbage. Compost bins were only available in office kitchen spaces, so the crew did not access them.
Diversion rate	44%

Waste Categories

Data was collected from the three vendors servicing the production over the entire production process. Data quality varies by vendor and is described in Table 12. Mixed waste was dropped off by the vendors at local landfills, and mixed recycling went to transfer stations to be recycled, although diversion reports were unavailable to the vendor from these services. Contamination levels were not reported by any of the production's vendors, so it is unknown if any quantities of recycling or compost ended up in landfill due to contamination. Food and material donation amounts or estimates were not available from the caterers or department heads and are not included.

Table 12: Production areas and waste collection process for Case Study 3

	Production office	Soundstage facility*	Construction and set dec/props	Location
Vendors used and waste collected	Papersavers collected various recycling streams (e.g., wastepaper, batteries, textiles) and organic waste to be composted.	All mixed waste (garbage) and mixed recycling (cans, bottles, paper, cardboard) were collected by the departments and a facility cleaner and put in 6-yard garbage and recycling bins.	A preferred vendor collected one 25-yard bin and one 16-yard bin from the construction department during prep. Any additional construction waste was added to garbage bins for the soundstage facility.	Location waste was collected by an industry-specific waste hauler in collaboration with the locations department.
Data quality	Diversion report including accurate weight or volume for each material type was provided. Volumes were converted to weight for analysis.	Each bin was tipped when it was full, and the number of times the bins were tipped was reported on invoices from the vendor. Volumes were converted to weight for analysis.	Each bin was tipped when it was full, and the number of times the bins were tipped was reported on invoices from the vendor. Volumes were converted to weight for analysis.	Garbage and recyclable waste volumes were reported on invoices by the number of bags.

**A vacant building housed the production office, storage areas, and soundstages for this production.*

Diversion Rate

The total waste weight for this production was estimated at **42,450 kg**, with a diversion rate of **44%**. Actual waste amounts and diversion rates are broken down by area in Table 13.

Table 13: Estimated total waste generated by a medium series in the GTA

	Area	Offices and facility	Location	Construction (when not combined with facility waste) *	TOTAL
Landfill	Garbage	18,711	1,938	-	**20,649**
	Mixed construction waste**	-	-	3,143	**3,143**
				LANDFILL TOTAL	**23,792**
Diverted	Mixed recycling	15,687		-	**15,687**
	Paper recycling	2,041	-	-	**2,041**
	Organics	930	-	-	**930**
				DIVERTED TOTAL	**18,658**
	OVERALL TOTAL	**37,369**	**1,938**	**3143**	**42,450**
	Diversion rate	**50%**	**0%**	**0%**	**44%**

**After the initial set was built, the construction dumpster was replaced with one recycling and one garbage dumpster for all facility waste, including any construction waste.*

***The hauler was unable to provide reports on whether the waste was recycled or sent to landfill.*

Analysis and Summary of Observations

Waste diversion on this production was moderate at 42% due to consistent mixed recycling collection in a 6-yard bin at the facility, which included offices. All facility and construction waste and recycling were collected by a preferred vendor and brought to a nearby transfer station for disposal and diversion. It is unknown how much recyclable construction material was contaminated and disposed of in landfill instead of being recycled. However, since contamination of the recycling bins were observed during the site visit, it is reasonable to assume that an unknown amount of the waste collected in the 6-yard recycling bin was disposed of in landfill. See Conclusion: Opportunities for Action for suggested next steps to address this challenge.

Contamination of waste bins was observed during the site visit. On set, the main contaminants were food waste and food packaging in garbage bins. Non-recyclable food packaging, or food packaging contaminated with food waste, was also observed in recycling bins.

During the site visit, conversations with crew members showed a mixture of hope that productions in Ontario will reduce and divert more waste from landfills and cynicism about whether it will be possible without some sort of mandate from the government or production companies. There was also a clear distinction in the key barriers faced by the shooting crew (those who travel to location) and the office-based crew. The office and facility provided many more opportunities for recycling (e.g., organics bins in the kitchens, paper shredding) and reuse (e.g., sinks to wash cutlery and dishes, water refill stations) than were available than to the shooting crew. One interviewee mentioned during the site visit that while water refill stations are nice in the studio, they wished they were also available on location. Single-use plastic water bottles were commonly seen on location visits.

This production contracted Papersavers for their collection streams, and the facility had a contract with GFL for mixed waste and recycling. However, a critical communication gap between the production and the facility led to organic waste (which had been properly sorted by the production crew) ending up in the GFL mixed waste bins rather than being collected by Papersavers for composting. Clearer communication between the facility and the production about the responsibility for composting services would have mitigated this challenge.

Case Study 4: Medium-budget Feature in Northern Ontario

Size and type	Medium-budget feature film
Crew count	~100
Region, duration	Northern Ontario over five weeks
Soundstage facility type	Vacant building temporarily used for filming and offices
Location filming	Regularly in the nearby region
Number of waste vendors used	Two vendors for all waste/recycling and PPE
Sustainability department or hired consultants	N/A - Not hired for this production
Public waste services used	N/A - No public drop-off facilities were identified. However, productions in this region are usually location-heavy and use public drop-off facilities. Since this production had an office facility, all location waste was brought back to those bins.
Mixed waste (garbage)	Garbage was collected in all production areas and sent to landfill.
COVID testing and PPE waste	Rapid and PCR COVID testing occurred onsite. All PPE and rapid testing waste was collected in regular garbage streams, but PCR testing waste was collected by a separate vendor as biohazardous waste. Data for biohazardous waste was estimated by the COVID testing team for this research.
Construction and set materials	Construction and set materials were minimal and largely salvaged from other productions or purchased second-hand. At wrap, construction materials were deconstructed and saved or given or sold to other productions. No data was available about volumes of materials saved or donated.
Recycling	Mixed recycling was collected in all production areas.
Compost	N/A - Commercial composting is not available in this region.
Food donation	Food donation was informally coordinated by craft services, who distributed surplus food to production crew or to charities. Food donation services suitable for productions are not well-established in this region. There were no catering services for this production; instead, all meals were ordered from a local restaurant. No data was available about the amounts of food diverted from waste.
Material donation	N/A - This information was not available. At wrap, set materials and costumes were saved or given or sold to other productions. No data was available about volumes of materials saved or donated.

Waste management set-up	Waste bins were usually organised in groups so that recycling and garbage disposal options were available to the crew. There were no signs, but blue bins with clear bags designated recycling and yellow bins with black bags designated garbage.
Diversion rate	22%

Waste Categories

Data was collected from both the vendor servicing the production and the facility over the entire production process. Data quality is described in Table 14 by each production area. All waste from the soundstage and location areas were collected in mixed waste (garbage) and mixed recycling bins serviced by Green for Life Environmental (GFL). Waste from additional office and support areas was collected separately by the facility. Contamination levels in the recycling bins were reported by GFL, so the overall diversion rate estimate has been updated with this information.

Table 14: Production areas and waste collection process for Case Study 4

	Production office*	Soundstage facility**	Construction and set dec/props	Location
Vendors used and waste collected	The facility cleaner collected waste from the office and other support spaces. Some unknown amount of overlap likely occurred with spaces that were publicly accessible. All facility waste was processed by GFL through a separate contract from the production waste.	All mixed waste (garbage and organics) and mixed recycling (cans, bottles, paper, cardboard) was collected by locations and other departments and put in 6-yard GFL garbage and recycling bins.	Not applicable; included in soundstage facility waste data.	Not applicable; all location waste was brought back to the soundstage facility.
Data quality	Daily bag counts of mixed waste (garbage) were reported by the facility cleaner. Volumes were converted to weight for analysis.	Each bin was tipped when it was full, and the total tonnage was reported by the vendor. The vendor also included a contamination estimate for recycled waste.	Not applicable	Not applicable

**Includes some office spaces, some hallways, and bathrooms.*
***A vacant building housed the production office, storage areas, and soundstages for this production.*

Diversion Rate

The total waste weight for this production was estimated at **3,600 kg**, with a diversion rate of **22%**. In addition, the waste vendor provided an estimate of 25% contamination in the recycling bins, or 198 kg, which was sorted out and disposed of as waste. Recycling bin contamination brought the estimated diversion rate down to 16% (Table 15).

Table 15: Estimated total waste generated by a medium feature in Northern Ontario

	Area	Facility (bathrooms and offices) (kg)	Locations (all filming and support areas) (kg)	COVID (biohazardous PCR testing waste)* (kg)	TOTAL
Landfill	Garbage	300	2,500**	NA	2,800
	COVID testing (PCR)	NA	NA	10	10
				LANDFILL TOTAL	**2810**
Diverted	Mixed recycling	NA	790	NA	790
				DIVERTED TOTAL	**790**
OVERALL TOTAL		300	3,290	10	**3,600**
Diversion rate		**0%**	**24%**	**0%**	**22%**
Recycling contamination**		NA	25% of mixed recycling	NA	198
Estimated diversion rate		**0%**	**18%**	**0%**	**16%**

**Final disposal of COVID PCR testing biohazardous waste is unknown, assumed to be incineration or landfill following Ontario's Environmental Protection Act C-4 guidelines.*
***Estimated by waste vendor, GFL.*

Analysis and Summary of Observations

Waste diversion on this production was low at 22% due to the high volumes of mixed waste (garbage) generated. Additionally, contamination in the recycling bin was estimated at 25% by GFL, which further brought the estimated diversion rate down to 16%. GFL provided detailed tip reports for this project, as well as feedback to the production's locations team about key contaminants to improve sorting by the crew.

During the site visit, conversations showed general frustration about how budget limitations reduce the ability to set up proper waste diversion services and educate the crew. In addition, department heads and senior production members who normally film in the GTA expressed disappointment that this filming region did not have an option to compost organic waste.

Contamination of waste bins was observed during the site visit. On set, the main contaminants were food waste and food packaging in garbage bins. Non-recyclable food packaging, or food packaging contaminated with food waste, was also observed in recycling bins.

On the other hand, there were many successful efforts by different production members and local small businesses to source materials second-hand and to donate or store them for use on future productions. This production worked with a local business to use and return office materials, set materials, and props. Another local production company also stores and reuses materials for productions in the region.

Image of a container being disposed of in a green organics bin. Photo provided by Ontario Green Screen.

Case Study 5: Medium-budget Feature in Greater Toronto Area

Size and type	Medium-budget feature film
Crew count	~200
Region, duration	GTA over two months
Soundstage facility type	Converted warehouse
Location filming	Various around the GTA and nearby regions
Number of waste vendors used	Three vendors for office/facility, location, and construction waste
Sustainability department or hired consultants	N/A - Not hired for this production
Public waste services used	N/A - No public drop-off facilities were known to be used.
Mixed waste (garbage)	Garbage was collected in all production areas and sent to landfill.
COVID testing and PPE waste	COVID testing occurred onsite, and all PPE and testing waste was collected in the regular garbage stream.
Construction and set materials	Construction and set materials came from a variety of sources including second-hand from an on-site warehouse, from rental houses in the GTA and the United States, and new from retailers. At wrap, useful construction materials were deconstructed and saved in the on-site warehouse for other productions. No data was reported about volumes of materials saved or donated, although provided photos showed more than 30 stacks of plywood sheets and other lumber.
Recycling	Recycling was collected in all production areas by three vendors. More options for recyclable waste collection (e.g., paper, textiles, batteries) were available at the production office than in other areas.
Compost	Organic waste was to be collected for composting in the production office by one vendor. However, due to a miscommunication between the production and the facility, all organic waste that had been properly sorted by the production was disposed of in the mixed waste/garbage bin by facility cleaners. The vendor is hired by the production rather than the facility, so before the production set up the service, any organic waste collected by the facility was sent to landfill.
Food donation	Food donation was coordinated at both the craft and catering services kitchen levels. Any surplus edible food prepared for craft services was returned to the company's kitchen and used in other dishes or donated to their food rescue partner. Any surplus edible food prepared for catering services was returned to the

	company's kitchen and used in other dishes. Since food donations are aggregated at the kitchen level, production-specific data was unavailable.
Material donation	Information was not available. At wrap, set materials and costumes were saved or given or sold to other productions. No data was available about volumes of materials saved or donated.
Waste management set-up	On set and in support areas, waste bins were usually organised in groups so that recycling and garbage disposal options were available to the crew. There were no signs, but blue bins with clear bags designated recycling and yellow bins with black bags designated garbage. In the production office and lunchroom, clearly labelled and colour-coded bins for garbage and recycling were available, with clearly labelled bins for composting in all kitchen areas. Contamination was observed to be lower in these spaces than in other production areas.
Diversion rate	9%

Image of a recycling station in an office. Photo provided by Ontario Green Screen.

Waste Categories

Data was collected from the three vendors servicing the production over the entire production period. Data quality varies by vendor and is described in Table 16. Mixed waste was dropped off by vendors at local landfills, and mixed recycling went to transfer stations to be recycled, although diversion reports were unavailable to the vendor from these services. Contamination levels were not reported by any of the production's vendors, so it is unknown if any quantities of recycling or compost ended up in landfill due to contamination.

Table 16: Production areas and waste collection process for Case Study 5

	Production office	Soundstage facility**	Construction and set dec/props	Location**
Vendors used and waste collected	Papersavers collected various recycling streams (e.g., wastepaper, batteries, textiles) and organic waste to be composted. However, organic waste was disposed of in landfill due to miscommunication between the production and the facility.	All mixed waste (garbage) and mixed recycling (cans, bottles, paper, cardboard) was collected by the facility cleaners and the departments and put in 6-yard GFL garbage and recycling bins. Organic waste was disposed of in landfill due to miscommunication.	A preferred vendor collected 40-yard bins from the construction department.	Location waste was collected by an industry-specific waste hauler in collaboration with the locations department. Receipts with weights of garbage and recycling were not collected by the vendor from the drop-off facility. However, the vendor ensured that all recyclable waste was dropped off in the recycling area.
Data quality	Diversion report including accurate weight or volume for each material type was provided. Volumes were converted to weight for analysis.	Each bin was tipped daily, and the total waste was reported in kilograms on invoices from the vendor. Weight was not divided by garbage and recycling, so estimates were made using EPA conversion factors (see Methodology).	The bin was tipped when it was full, and the number of tips was reported on invoices from the vendor. Volumes were converted to weight for analysis.	The number of collections was included in vendor invoices. The vendor estimated ~750 lb per load, with 60% garbage and 40% recycling by weight. These estimates were used for analysis.

**Includes office spaces, support areas, and soundstages.*
***When filming in the soundstage facility, waste generated by the shooting crew would not fit in the facility bins, so any extra waste was piled beside the bins and collected by the location waste hauler.*

Diversion Rate

The total waste weight for this production was estimated at **75,070 kg**, with a **9%** diversion rate. This value does not consider contamination, as it was not reported by vendors. Actual waste amounts and diversion rates are broken down by area in Table 17.

Table 17: Estimated total waste generated by a medium feature in the GTA.

	Area	Production office and facility (KG)*	Construction (KG)	Location and facility (KG)**	TOTAL
Landfill	Mixed construction waste	-	61,326	-	61,326
	Mixed waste / garbage	3,831	-	3,470	7,301
				LANDFILL TOTAL	**68,627**
Diverted	Mixed recycling	2,832	-	2,313	5,145
	Paper recycling	1,089	-	-	1,089
	Cans, bottles, and glass	209	-	-	209
	Organics***	-	-	-	0
				DIVERTED TOTAL	**6,443**
	OVERALL TOTAL	**7,961**	**61,326**	**5,783**	**75,070**
	Diversion rate	**52%**	**0%**	**40%**	**9%**

*Facility waste was estimated based on the site total KG provided by GFL and using US EPA estimates for weight of mixed waste and mixed recycling.
**Location waste was estimated based on the vendor's estimate of 750 lb per load, with 60% garbage and 40% recycling by weight.
***Organic waste was collected on this production; however, due to communication error between the production office and the facility, organic waste was not diverted and instead disposed of in mixed waste/garbage.

Analysis and Summary of Observations

Waste diversion on this production was low at 9% due to the high volume of construction waste generated. An estimated 61,326 kg of mixed construction waste was generated despite the construction department reclaiming and storing lumber for use in future set construction. This estimate was determined using the conversion factor for lumber provided by the US EPA, which is equivalent to 3.07 tonnes per 40 cubic yard bin.

Contamination of waste bins was observed during the site visit. On set, the main contaminants were food waste and food packaging in garbage bins. Non-recyclable food packaging, or food packaging contaminated with food waste, was also observed in recycling bins.

During the site visit, conversations with the crew showed a clear understanding of the efforts taken by the production and the facility to provide recycling bins and store construction and set materials for reuse. There was a clear division between the production office and the shooting areas. In the production office, recycling stations were clearly labelled and colour-coded, and compost bins were provided in kitchen areas and the lunchroom, which was used by the shooting crew. On the soundstages, recycling bins were available, although they were not always set up next to garbage bins and contamination was observed. Other support areas had some mixed waste bins that were handled by departments, and it is unclear whether this waste was disposed of in the bin for construction or the GFL bins for the facility.

Appendix B | Interview and Survey Engagement

Overall, 73 formal and informal interviews were conducted both remotely and during site visits across all productions involved in this project. The number of interviews exceeded the anticipated six interviews per production. Most interviews were held with key department leads, as well as waste management, material reuse, and food services vendors (Table 18). Only interviews that addressed questions about common waste materials, barriers to diversion, and any needs or opportunities the Ontario film industry might pursue to reduce waste and improve diversion were included in this analysis.

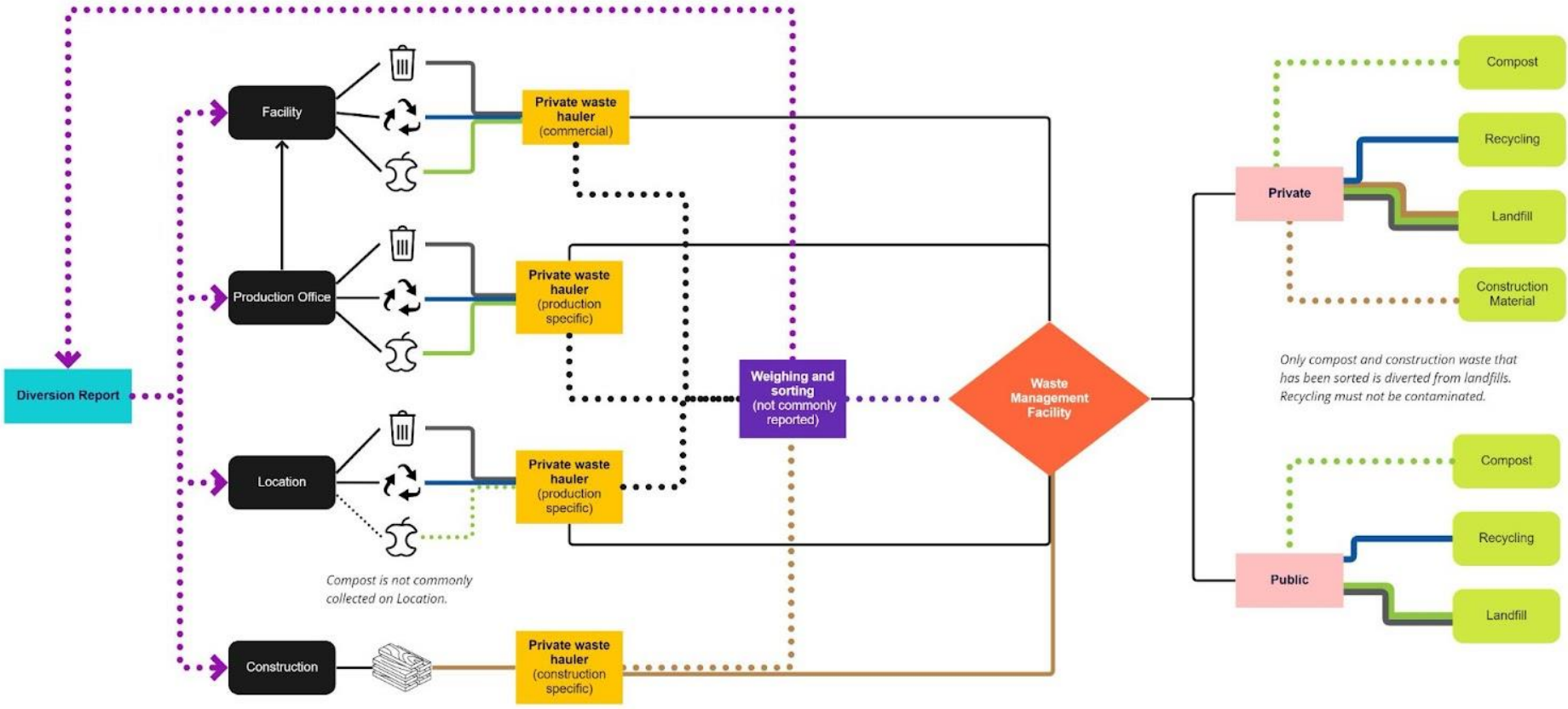
The survey received a total of 58 responses and did not achieve the target of 15% of production crew despite ongoing engagement and reminders. Production crews attributed low responses to their busy schedules. Despite this limited response, the survey fulfilled its intention to inform research ahead of site visits, and to provide opportunities for wider feedback from crew members interested in contributing to the project.

Table 18: Engagement results for interviews and surveys

Interview Type	Total number of interviews*	Total number of survey responses
Case Study 1: Large TV Series in GTA (1)	N/A - Production data was archival	N/A - Production data was archival
Case Study 2: Large TV Series in GTA (2)	18 (~10% of crew)	23 (~13% of crew)
Case Study 3: Medium TV Series in GTA	14 (~15% of crew)	14 (~13% of crew)
Case Study 4: Medium Feature in Northern Ontario	13 (~13% of crew)	10 (~10% of crew)
Case Study 5: Medium Feature in GTA	16 (~13% of crew)	10 (~5% of crew)
Vendor	9	N/A - Not distributed to vendors
Other Key Informant	3	1 - By request
TOTAL	**73**	**58**

**Includes both formal and informal interviews that addressed the target questions noted above.*

Appendix C | Waste Materials Process Flow Map



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