



Impact of Proposed Landfill in South Kansas City

KEY FINDINGS

- *Based on the available evidence, the biggest known health risks are short term respiratory distress associated with higher levels of gas emissions as well as short term symptoms associated with the odor these gases emit.*
- *Landfill gas emissions, or the odors emitted, may exacerbate existing respiratory conditions such as asthma.*
- *Landfills are subject to strict federal regulations. While the CDC states that properly managed landfills do not emit gases at levels that would be harmful to human health, there have been multiple incidents in the United States in recent years where landfill gas emissions have reached levels that caused nuisance odors, and in some cases adverse respiratory symptoms.*



INTRODUCTION

Background

On October 25th, 2022, Raymore, Missouri, announced their opposition to the development of a landfill right outside its town boundaries.¹ KC Recycling and Waste Solutions has confirmed their intention to build a landfill on 120 acres of property.

The property sits between 150 highway and 155th street on the north and south, respectively, and between Peterson and Horridge roads on the west and east. The property directly borders the city of Raymore, is close to the Lee's Summit border, and is within two miles of Summit Pointe Elementary School (LSR-7). While KC Recycling and Waste Solutions has not yet applied for a permit with the Missouri Department of Natural Resources, state lawmakers say that a permit application is imminent.²

State law currently requires that any landfill built within half a mile of a city obtain approval from the municipality before they can proceed with an application for development with the state. While the site borders Raymore, the location for the landfill is more than a half mile outside the city boundaries. To address the concerns from the city of Raymore, state Representatives introduced House Bill 909, which would have required that developers seek approval from municipalities if they fall within one mile of a city border. The bill passed the Missouri House, but did not make it out of the senate.

In addition to Raymore,³ other community leaders and some cities in Jackson County also have voiced their opposition to the potential landfill: Grandview,⁴ Lee's Summit,⁵ and Jackson County⁶ have passed resolutions stating their opposition. The Kansas City Council has passed a resolution opposing the development of the landfill at this time while the city manager evaluates the city's potential needs for a new landfill.⁷ Additionally, the mayor of

Kansas City has recently introduced legislation that would put a yearlong moratorium on new approvals of landfill permits or zoning changes in the city so that the KC metro region can discuss a long term waste management strategy.

This health impact assessment examines existing evidence on the potential health impacts of the landfill and its effects on Eastern Jackson County communities.



POTENTIAL IMPACT

Population Affected

Data from the U.S. Census Bureau and analyzed using ArcGIS show the demographics of the community who may be most affected if the proposed landfill is built. The area is demographically similar to Eastern Jackson County as a whole, with the exception of median household income which is significantly higher.

POPULATION POTENTIALLY AFFECTED BY LANDFILL

	Within One Mile Radius	Within Two Mile Radius
2020 Population	158	2,530
2020 Total Households	67	885
2021 Median Household Income	129,095	135,476
2021 Population under 5	16	145
2021 Population 60+	27	931
2021 Hispanic/Latino	5	53
2021 Non-Hispanic White	114	2,258
2021 Non-Hispanic Black	19	215
2021 2 or More Races	13	422

Table 1. Data from the U.S. Census Bureau 2020 Census and 2017-2021 American Community Survey 5 Year Estimates. The population data within a one and two mile radius are estimates based the available data and ArcGIS analysis.

POTENTIAL IMPACT

Respiratory Health Concerns

GAS EMISSIONS

One of the main concerns with municipal solid waste landfills is exposure to the chemical gases that may pollute the nearby atmosphere. There are many factors that can influence landfill gas exposure such as weather events, wind direction, the geology of the area, and differences in landfill management and pollution control efforts.

- One systematic review concluded that it was “reasonable” to say that properly managed municipal waste landfills do not increase the risk of health effects in nearby residents.⁸
- One of the gases most commonly associated with landfills is hydrogen sulfide (H₂S).
- One large prospective cohort study in Italy, which used a validated statistical model to estimate residents’ exposure to hydrogen sulfide (H₂S), found a positive association between exposure to hydrogen sulfide and lung cancer mortality, as well as hospitalizations for other respiratory conditions.⁹
 - However, hydrogen sulfide in particular is processed and removed rapidly from the human body and is not known to cause cancer in humans, although the EPA notes that the data to assess H₂S for its carcinogenicity is inadequate.¹⁰

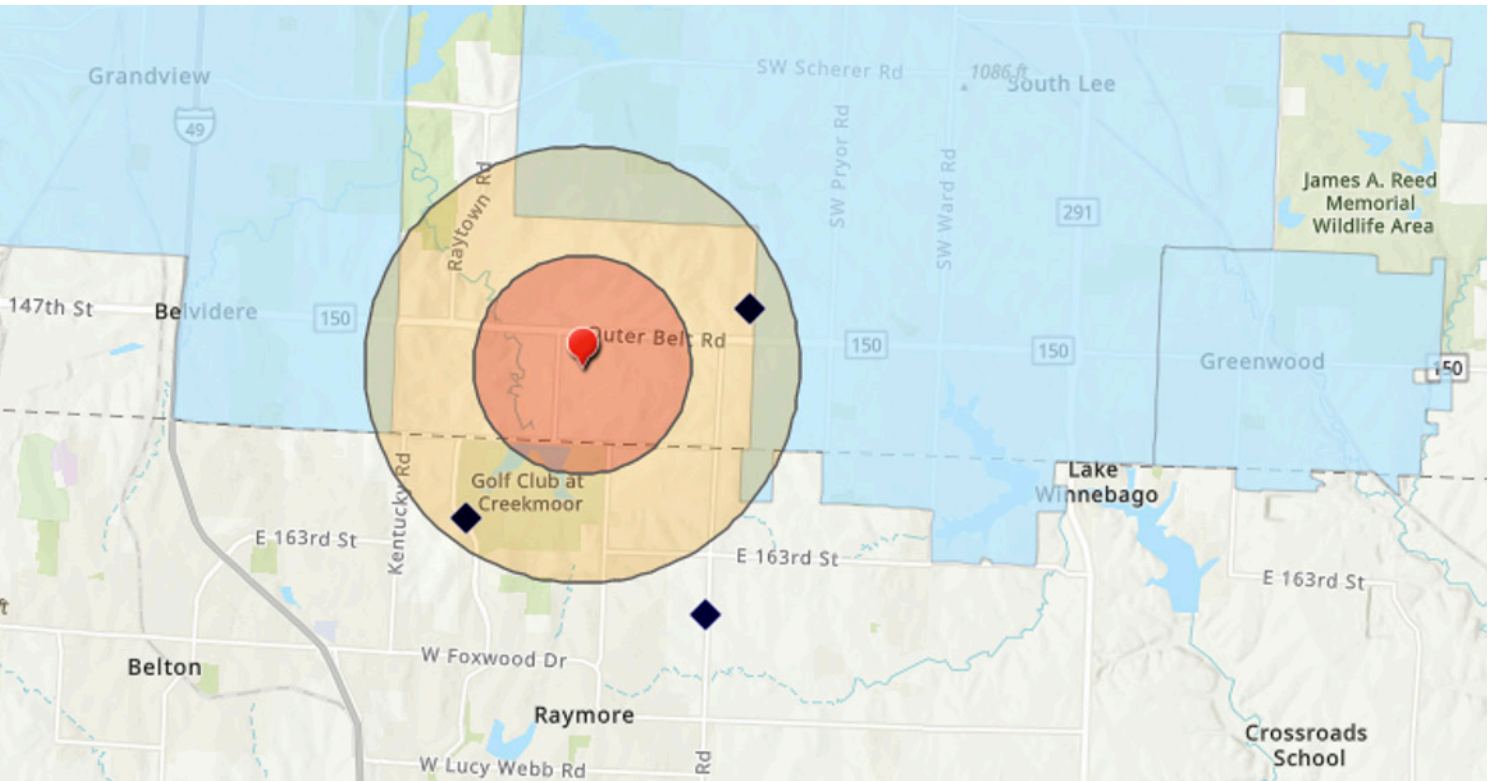


Figure 1. A map showing the approximate location of the proposed landfill and its proximity to surrounding communities. There are three elementary schools nearby, shown here as well.

◆ School Location ● Proposed Site One Mile Radius Two Mile Radius Cities of EJC, 2022

- A 2013 ATSDR case study on a landfill in New Jersey found that concentrations of H₂S released from the landfill were high enough to cause short-term health effects on nearby community members, but that lasting health effects were unlikely.¹⁰
 - Concentrations of methane, sulfur dioxide, and other volatile organic or reduced sulfur compounds were also very low and unlikely to have caused any harmful health effects or adverse safety risks.¹⁰
- One study observed landfill density and asthma prevalence in urban census tracts in the state of Texas, but found no significant relationship.¹¹
- A 2004 study in northeast Nebraska examined the relationship between levels of H₂S in the atmosphere near a large liquid waste treatment site and the number of visits to nearby hospitals
 - When H₂S levels were classified as “high” (above 30 ppb) there was a significant increase in hospital visits among children for respiratory diseases the following day.
 - A similar association was found among adults, but only for hospital visits related to asthma, suggesting high H₂S levels in the ambient atmosphere may exacerbate asthma and other respiratory diseases.¹²
- A health survey on households within two miles of a landfill in north St. Louis County found no significant difference in asthma or COPD diagnoses compared to control households.
 - They did find higher likelihood of short-term respiratory symptoms such as shortness of breath.¹³

ODOR

Many of the common gases emitted from landfills omit an odor including ammonia, hydrogen sulfide, sulfur dioxide and other sulfurs.

- Hydrogen sulfide (H₂S) in particular has a distinctive “rotten egg” odor. Hydrogen sulfide, can be detected by humans at very low levels (0.5 – 3.0 ppb) in ambient air.
 - The typical amount of hydrogen sulfide in ambient air near landfills has been reported as 15 ppb compared to only 0.11 to 0.33 ppb on average in areas not associated with landfills or other sources¹⁷
- Odors alone, not just the underlying chemical causing the odor, can cause adverse health effects:
 - Nuisance odors from landfills and other sources have been known to cause headaches, nausea, eye, nose, and throat irritation, as well as cough, nasal congestion, shortness of breath, stress, and mood changes.¹⁰
 - Most of these symptoms resolve when the odors go away, but for those who have pre-existing conditions (i.e. asthma) or who might be more sensitive to odors (i.e. the very young or very old), symptoms can last longer or aggravate existing medical conditions.¹⁰
- Additionally, the presence of these odors in one’s home, even if they are not causing any adverse symptoms, can be enough to cause disruptions to daily life, significant stress and worry, and negatively impact quality of life.¹⁷

CONCLUSION

Final Thoughts

LIMITATIONS

As with most environmental studies, it is difficult to determine the level of exposure to environmental agents in landfill studies. As a result, a lot of the evidence regarding health outcomes related to environmental exposures is considered inconclusive. Additionally, many of the large scale studies available on health outcomes associated with landfills were conducted outside of the United States. Studies that were conducted in the United States are mostly smaller scale, often case studies focused on the health impacts of one landfill after nearby residents have complained.

Because the formal permitting process has not begun, site specific concerns around groundwater have not been fully analyzed. If the permitting process begins, the Missouri Department of Natural Resources requires a Detailed Site Investigation Workplan that includes studying hydrologic and geologic conditions.

In addition, human waste generation in the U.S. has been increasing over recent decades, and there will likely be an increased need for municipal waste solutions in the coming years.¹⁸ While the specific needs for a landfill in the Kansas City region are outside the scope of this assessment, it is very possible that unless the region can find ways to decrease overall waste generation, landfills in close proximity to municipalities, housing developments, and schools will be unavoidable.

EQUITY CONSIDERATIONS

It is worth noting that municipal waste landfills and other waste facilities are disproportionately sited in poor communities and communities of color. Landfills and the adverse conditions they may cause can add to the cumulative burden these communities face without an equal share of resources. While this may not be the case for this specific facility, it's something that should be considered with any new proposed site. Additionally, although the median household income in the area of the proposed site is relatively high compared to the rest of Jackson County, there are an estimated 50 households within a two mile radius of the proposed site whose income falls below the federal poverty level, an estimated 256 households with at least one person living with a disability, and an estimated 70 people who are uninsured.¹⁹ These households may have greater difficulty accessing healthcare for any potential adverse symptoms they might experience as a result of a nearby landfill.

Finally, the location of multiple elementary schools within two miles from the proposed site should be considered given that elementary age children often spend parts of their school day outside. Young children may be especially sensitive to nuisance odors, and are more sensitive to asthma triggers than adults.^{20, 21}



CONCLUSION

This health impact assessment aims to give a basic overview of the known health risks associated with municipal solid waste landfills. **Based on the available evidence, the biggest known health risks are short term respiratory distress associated with higher levels of gas emissions such as hydrogen sulfide, as well as short term symptoms associated with the odor these gases emit.** In particular, the gases themselves or the odors may exacerbate existing respiratory conditions such as asthma. Those who are very young or very old have been found to be more sensitive to these nuisance odors, and may also be more likely to have an existing respiratory condition (such as asthma or COPD).

The long term health effects of residing near a municipal solid waste landfill have not been studied extensively in the United States. This is often due to the fact that it is difficult to measure exposure to environmental agents over extended periods of time while also controlling for confounding variables. The ATSDR states that the gases most commonly emitted from landfills are not harmful to human health at the levels often found in the ambient air. However, proper management and monitoring of landfills is essential to prevent community exposure to unacceptable levels of both the gases themselves and the odors they cause. There are enough examples in recent history, including recently in Leavenworth County, KS, to suggest that landfill management often fails to prevent these exposures.²² **These health risks should be taken into full consideration when decision makers weigh the proposed landfill in south Kansas City.**



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