



Wanda Roland stands in front of one of several doors that no longer fully shut, after damage she attributes to regular explosions at a nearby metal recycling plant. Her home was among those examined during the OU project.

J. Pat Carter

DO NO HARM

BY ANNA ANDERSEN

An Oklahoma City neighborhood partners with OU student researchers to examine the impact of heavy industry in its backyard.

For years, the residents of Oklahoma City's John F. Kennedy neighborhood have been asking one simple but critical question: "Is our neighborhood killing us?"

JFK, which lies between N.E. 4th and N.E. 8th streets and Martin Luther King Boulevard to North Lincoln Avenue, is a historically redlined Black neighborhood that, at one time, housed Black-owned businesses such as Jay-Kola and the Jewel Theater, as well as the "old" Douglass High School—attended by author Ralph Ellison in the late 1920s and recently converted into apartments and The Auditorium at The Douglass.

Due to the ugly legacy of segregation, however, it's also among few residential neighborhoods in Oklahoma City adjacent to a heavy industrial zone, with an asphalt plant, metal recycling yard, concrete batch plant, petroleum company, and an industrial railroad in the immediate vicinity. Oil pump jacks dip and creak next to homes.

While important, such heavy industry is defined by city ordinance as "incompatible with residential uses," and JFK residents can tell you why.

"We were hearing a buzzing, humming sound constantly," says Denyvetta Davis, who, as president of the JFK Neighborhood Association, has listened for years to residents asking if their neighborhood could be harming them. "There was smoke billowing across the neighborhood and the odor of sulfur, and sometimes natural gas. There was a film on mailboxes and cars and on the leaves of trees."

More prominent than any of these, though, are years of frequent, unpredictable and loud noises that sometimes shake windows and crack sidewalks. While the nearby metal recycler admits to occasional onsite explosions, residents have reported many more—and more severe—incidents that they believe caused damage to their homes, including fissures in drywall and even concrete floors.

Attempting to prove to city officials that these "booms" were an ongoing problem, residents started tracking them in 2011, with Davis as "keeper of the log." Between 2013 and 2018, Davis passed along her neighbors' documentation to the Oklahoma City Action Center, the city's first contact for non-emergency code violations—until she was eventually told that the Action Center was aware of the explosions but had no official jurisdiction.

When Davis asked for a report on how many complaints

JFK residents made in those five years, she says the center responded they had kept no records; instead, they referred each call on to fire-code enforcement, which in turn, reached a point where they could do no more.

"Obviously, the fire marshal couldn't pinpoint the moment to visit, because the explosions happen unexpectedly," she says.

After years of effort, Davis says, the only concrete step taken to improve the neighborhood's environment was a 2014 ordinance limiting operations of the recycling plant to between 7 a.m. and 7 p.m. and the recent construction of a 35-foot noise barrier intended to absorb sound and vibrations from the explosions. It wasn't enough.

Enter Robert C. Knox, the Ted A. Kritikos Chair and Presidential Professor in OU's School of Civil Engineering and Environmental Science. "When I connected with the neighborhood in 2018, they were kind of flummoxed. They didn't really know what to do," he says.

Being a "water guy" and not an expert on air or noise pollution, Knox didn't have much help to offer at first, either, though he pointed Davis to publicly available air-quality data for the metro area, "and we kind of left it at that."

However, Knox and CEES colleague Robert Nairn, an OU David L. Boren

Professor and Sam K. Viersen Presidential Professor, teach a yearlong, undergraduate senior capstone course in which students take a hands-on, interdisciplinary approach to an environmental challenge. The class is now an OU service-learning course.

"We try to find a client who needs a real-world project done," says Nairn, and the two have taken students all over the state to do so. Because the students work for free, they're accessible to smaller and less-affluent communities that can't afford professional analysis. Knox offered their services to the JFK neighborhood.

Three teams of Environmental Engineering and Environmental Science students started work in fall 2021, spending a semester reviewing existing data and the neighborhood's history. The students quickly became invested in their work.

"It took me completely out of the realm of being an engineer," says James Queen, an Environmental Engineering senior from Oklahoma City. Queen and other students began their field work with a tour of the neighborhood.

"What really struck me on that first visit," he says, "was the prevalence of operating pump jacks sitting next to homes, that



A metal recycling plant operates directly across the street from the JFK neighborhood, whose roots stretch back to early Oklahoma segregation.

Chris Landsberger, The Oklahoman



Denyvetta Davis stands near one of several pump jacks close to homes throughout the JFK neighborhood. Most pumps are active and among the neighborhood's concerns about heavy industry.



J. Pat Carlier

Civil Engineering and Environmental Science students gather soil samples near a pump jack in the JFK neighborhood to test for metals and petroleum by-products.

level of industrial garbage ... I've lived in New York City, in the San Francisco area, in Miami. I've never seen that. It's just not right. It's textbook environmental racism."

To gain a deeper understanding of JFK's environmental situation, the teams gathered samples of soil and water and placed outdoor air-quality monitors and indoor sound meters at the homes of neighborhood volunteers to measure the decibel levels of industrial explosions and related activities.

The air monitors, Nairn says, detect what's called PM2.5, "particulate matter that's very small" and considered more hazardous to human health than visible pollutants like dust, pollen or mold. Soil and water were tested for dissolved oxygen, two dozen metals, petroleum by-products and more.

During previous capstone courses, Knox's and Nairn's Environmental Engineering and Environmental Science students worked on these projects alone—this year, however, they were joined by a team from OU's reconfigured Environmental Studies program in the Dodge Family College of Arts and Sciences.

"What I wanted," says Environmental Studies Director Zev Trachtenberg, "was for students to really focus on assembling different ways of thinking about environmental problems across a range of academic areas, from natural science to social science to humanities." While wondering what an interdisciplinary capstone course for the program might look like, he attended a presentation by Knox and Nairn.

"I saw what they were doing and thought, 'Eureka! That's it!'" Trachtenberg says.

From there, he connected Knox and Nairn with Environmental Studies lecturer Kasey Jones-Matrona. Her goal was to supplement scientific data with the lived experience of JFK residents by conducting in-depth interviews.

Like the Environmental Engineering and Environmental Science students, Jones-Matrona's class began their work on the project with a wider overview of environmental justice issues and careful consideration of how best to approach the community. "Our main priorities were to, first, serve the community," she says, "and second, do no harm."

According to Denyvetta Davis, the students' preparation paid off. "It wasn't an invasion," she says. "It was like the cavalry coming in."

"We asked them about their experiences living in the community, both specific to the environmental issues we were investigating, and in general," says Eleanor Mendelson, an Environmental Studies senior from Overland Park, Kan. "Things like, 'Why did they choose to move to the JFK neighborhood, or if they were born there, why they chose to stay?' We asked about the environmental issues we knew residents had expressed concerns about, like air quality and sound pollution."

The capstone course students gave a joint presentation on their findings in early May to neighborhood residents. Also in attendance were representatives of the Oklahoma City Council, Oklahoma County Commissioners and Oklahoma City Code Enforcement.

“Our main priorities were to, first, serve the community, and second, do no harm.”



J. Pat Carter

Dorothy Nelson says the deep drywall cracks in her ceiling appeared following explosions at a metal recycling plant located within a quarter mile of her 9-year-old house, which also shows damage to poured-concrete floors.

The Environmental Studies students established the stakes, playing clips from interviews during which residents discussed their love of the JFK neighborhood; their pride in its rich Black history and community; and their frustration and anger with noisy, dusty businesses that disturb their peace—as well as inaction on the part of authorities to improve things. As one presentation slide surmised, “Many interviewees believe there would be more change if JFK were a more white or ‘affluent’ community.”

Three teams of Environmental Engineering and Environmental Science students then explained their findings, some of which were encouraging. Surface water and soil samples taken within the neighborhood, for example, found nothing that warranted grave concern.

The area’s stormwater runoff, says James Queen, “isn’t something you’d want your dog swimming in,” but it isn’t dangerously polluted. Air quality, as well, tracks roughly with available data for Oklahoma City as a whole. However, since the OU team only collected data on the more dangerous PM2.5 spectrum, Queen points out that the visible smoke and dust residents complain of contain much larger particles known as PM10.

“The industries were well within their permit limits,” Knox says, “but that doesn’t mean people aren’t impacted. The students’ research showed that, under current Oklahoma City ordinances, industries are supposed to be located downwind of neighborhoods. These clearly aren’t.”

In terms of explosions, sound decibel meters students placed

in the neighborhood recorded a large “noise event” during the one-month sound-study period, measuring about 60 decibels.

“Were the source of the noise indoors at that level,” Knox explains, “it would be no big deal; that’s only as loud as normal conversation or the ambient noise of a restaurant or office. But for a noise event outdoors to measure that high inside, through walls? It must be much, much louder.”

How much louder? It’s hard to tell for certain, Knox says, since the presence of a sound doesn’t indicate how far away it is or what direction it’s coming from. Still, the way sound diminishes over distance can be mathematically calculated. Students were able to conclude that the noise wasn’t coming from the highway. Their estimates fall between 108 dB (as loud as a helicopter) and 140 dB (as loud as a jet engine).

After presenting their data, students offered a wide range of possible solutions. Some were simple: recommending that neighborhood volunteers purchase relatively inexpensive air-quality monitors, which can be tracked via an app, and to collect more sound data at different times of year. One team suggested a “green barrier” to supplement the existing sound wall by planting seedling trees and bushes that would grow to buffer sound and dust. Pursuing policy changes with the city could also help – for instance, an ordinance limiting single-noise industrial events to 90 dB or less, as is common for aviation.

Other suggestions were far more complex and controversial, such as rezoning the area or relocating industrial businesses away from JFK. “The process is slow,” Queen says, “but not impossible.”

For Davis and other JFK residents, the OU project exceeded expectations.

“We had no idea of the depth of what they were doing until we saw the report,” she says. “They had some excellent recommendations that we wouldn’t otherwise have. I think it was a win-win for everybody.”

The students’ report will serve as a starting point for new efforts, Davis says, including the JFK neighborhood requesting changes to area noise ordinances and launching a licensed, professional environmental study. Fundraising for the study already is underway.

Most important, she shares, is that JFK residents felt their concerns were heard, scientifically documented and shared with important stakeholders.

“We’ve worked on these problems from a lot of angles over the years, but I think the OU project will have the biggest impact,” Davis says. “It’s a great neighborhood, and we love living here. We just want peace, where we can breathe the air and no longer experience the explosions.”

Anna Andersen is a freelance writer living in Wichita, Kan.