

Silverbell Landfill

Water Quality Assurance Revolving Fund ([WQARF](#)) Site
(formerly known as [Silverbell Jail Annex Landfill](#))

Boundaries:

The Silverbell Landfill Site (Site) is located in west Tucson, Arizona and is bounded approximately by Sweetwater Drive on the north, Interstate 10 on the east, Grant Road/Ironwood Hill Drive on the south, and Silverbell Road on the west.

The plume geographic boundaries depicted on the [Site map](#) represent the Arizona Department of Environmental Quality's (ADEQ) interpretation of data available at the time the map was constructed. The map is intended to provide the public with basic information as to the estimated extent of known contamination as of the date of map production. The actual extent of contamination may be different. Therefore, the plume may change in the future as new information becomes available.

Site Status Update:

The City of Tucson (the City) plans to install a groundwater [pump and treat](#) system to address the central part of the landfill with the highest [volatile organic compound](#) (VOC) concentrations. The plan includes four [extraction wells](#), an [air stripping](#) treatment plant with [granular activated carbon](#) system to capture VOCs in the vapor phase, and four [injection wells](#).



The Silverbell Landfill - A Closed Municipal Solid Waste Landfill

As of December 2008, [Kinder Morgan Energy Partners](#) has extracted approximately 120,000 pounds (approximately 19,500 gallons) of [hydrocarbons](#) from the soil beneath the Site. Approximately 64,000 gallons of hydrocarbons have also been removed through free product recovery. These hydrocarbons (gasoline) were released when a pipeline broke in 2003.

Community Involvement Activities:

The City involved the community throughout the [remedial investigation/feasibility study](#) process. However, if the [Proposed Remedial Action Plan](#) is significantly modified, additional public comment will be solicited. The most recent [fact sheet](#) can be found on the ADEQ Web site.

Site History:

1960-1978: The [University of Arizona](#) operated a solid waste and debris landfill in the area east of the Santa Cruz River and south of Fort Lowell Road. The City-managed Silverbell Landfill is made up of two landfill cells, approximately 40 acres in total size, which received wastes between 1966 and 1977. Neither cell accepted hazardous waste, although landfill access was not

strictly controlled. The South Cell has been covered with soil, and the North Cell underlies a portion of the [Silverbell Golf Course](#).

1983-1985: In Fall 1983, groundwater contamination was discovered at the Tratel Mobile Home Park Production Well located east of the Site. Also in 1983, the City began conducting subsurface investigations, and ADEQ began conducting groundwater investigations in 1985. VOCs were identified in the groundwater at concentrations exceeding [Aquifer Water Quality Standards](#).

1995: In June, the City completed an interim Final Remedial Action Plan (RAP). The approved RAP proposed a pump and treat system utilizing air stripping treatment and a carbon filter to capture exhaust from the air stripper. Treated water would be reinjected into the [aquifer](#) and/or reused at Silverbell Golf Course. Although this groundwater remedy was not implemented, the City evaluated several groundwater remedial pilot projects and installed an air injection/[soil vapor extraction](#) (SVE) system.

Also in June, ADEQ closed the University of Arizona's West [Campus Agricultural Center Site](#). Data and information collected and available as of June 1995 did not show that this site was a source of [tetrachloroethene](#) (PCE) and [trichloroethene](#) (TCE) contamination in the groundwater.

1996-1998: ADEQ approved the City's request to conduct a pilot study to evaluate the effectiveness of a recirculation well to replace or enhance the approved pump and treat remedy.

1999: The Site was placed on the [WQARF Registry](#) in April with an eligibility and evaluation score of 51 out of a possible 120.

1999-2005: From October 1999 to September 2005, the City operated an SVE system to mitigate the source. This system removed a total of 2,061 pounds of VOCs. The system has remained off since achieving cleanup goals, but has operated occasionally to control [methane](#) migration.



The City's Bioremediation and Soil Vapor Extraction System

In July 2003, a pipeline operated by [Kinder Morgan Energy Partners](#) (Kinder Morgan) broke resulting in the release of gasoline to an area near the Site. Cleanup of the gasoline contamination is being conducted under ADEQ's [Voluntary Remediation Program](#). The gasoline contamination and the existing PCE and TCE plume emanating from the Silverbell Landfill are being monitored.

The City has evaluated [monitored natural attenuation](#) with enhanced [bioremediation](#) for the source areas. A pilot test using [sodium benzoate](#) to stimulate indigenous microbes began in June 2003.

In 2004, Kinder Morgan identified the presence of VOCs in the [soil vapors](#) within the Silver Creek residential subdivision. ADEQ believed these soil vapors were unrelated to the gasoline pipeline rupture. ADEQ conducted additional soil vapor testing in early October 2004 to confirm and expand upon the Kinder Morgan data. With that data, the Arizona Department of Health

Services conducted a [Health Consultation](#) to evaluate whether soil vapors from VOCs in the subsurface at the Silver Creek subdivision posed any health risks to residents. The report, released in June 2005, concluded that the observed concentrations of compounds in soil vapors pose no apparent public health hazard.

2005: In July, the City expanded the pilot test by constructing an automatic mixing and delivery system for the north cell area, and changed the added nutrient to [sodium lactate](#).

2006: In May, the City included the south cell in the pilot test. Based upon the pilot test results, sodium lactate was shown to be a suitable nutrient to stimulate [anaerobic](#) bioremediation and has reduced PCE concentrations within both the north and south cells. However, the City has determined that use of this remedial technology for the final remedy would be cost-prohibitive.

2007: In August, Kinder Morgan began operating an SVE remediation system to clean up contaminated soil beneath the Site.

2008: The City [Environmental Services](#), with [Tucson Water](#) assistance, developed a groundwater fate and transport model for the Site. The City has been evaluating a pump and treat system for plume containment using this model to prevent further off-site migration.

Contaminants:

The current contaminants of concern in groundwater include [tetrachloroethene](#) (PCE), [trichloroethene](#) (TCE), [cis-1,2-dichloroethene](#) (cis-1,2-DCE), and [vinyl chloride](#). Contaminants of concern at the Site may change as new data becomes available.

Public Health Impact:

In November 1993, the [Arizona Department of Health Services](#) completed the draft Baseline Human Health Risk Assessment. Even though no significant health risks were identified, the Risk Assessment noted concern for a possible exposure route through privately owned wells. No one is known to be drinking contaminated water from this Site; however, if you are drinking water from a private well within the boundaries of the Site, please contact the ADEQ Project Manager.

Site Hydrogeology:

The Site is located within the Tucson Basin. The basin is a broad, northwest sloping [alluvial](#) valley surrounded by mountain ranges and can be divided into four geologic units: the Pantano Formation, Tinaja Beds, Fort Lowell Formation, and recent alluvial deposits. The Santa Cruz River is an ephemeral stream that flows as a result of seasonal storm events and runs adjacent to the landfill cells.

The regional aquifer is encountered approximately 145 feet below ground surface. Flow direction in the aquifer is generally to the northwest.

Contacts:

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* In Arizona, but outside the Tucson area, call toll-free (888) 271-9302.

** In Arizona, but outside the Phoenix area, call toll-free at (800) 234-5677.

Information Repository:

The complete official Site file is located in Phoenix at the ADEQ Central Office at 1110 W. Washington Street; however, select documents are also available in Tucson at the [Southern Regional Office](#) at 400 W. Congress, Suite 433. Files are available for review Monday through Friday from 8:30 a.m. to 4:30 p.m. To arrange for a time to review the Site file at the main ADEQ office, please call the ADEQ Records Management Center with 24-hour notice at (602) 771-4380 or (800) 234-5677 (Arizona toll-free). Please call (520) 628-6715 to arrange a file review appointment at the Southern Regional Office.