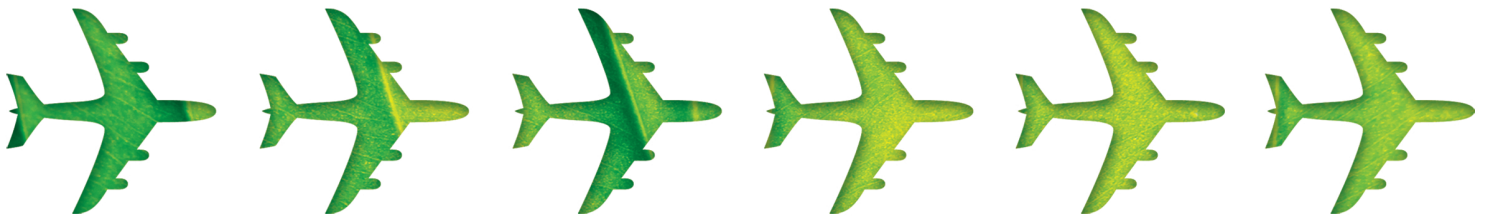


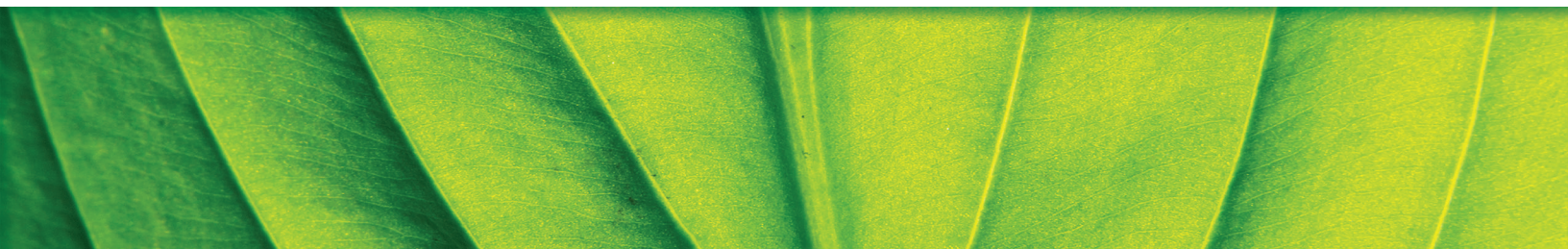


2018 Green Report



General

TAA's commitment to sustainability and the environment began in the 1980s and was formalized in its Corporate Philosophy, adopted in 2003, affirming that our organization is: "committed to the consideration of environmental health and resources in all TAA planning and activity." This commitment is further formalized in a Sustainability Policy adopted by the TAA Board of Directors in 2010.





Air Quality, Climate, & Energy

In **1984**, TAA began to replace some of its fossil fuel vehicles with electric carts, first introduced at the TUS Executive Terminal and later integrated into the TAA Custodial and Maintenance Departments. Bicycles were introduced for refuelers at the TUS Flight Line.

In **1985**, TAA installed a hydrant aircraft fueling system, eliminating the need for diesel-powered fuel trucks and their associated emissions.

In **1985**, a central 400 Hz ground power system was added, which significantly reduced emissions from ground power carts and aircraft APUs (auxiliary power units).

In **1994**, a terminal lighting retrofit through the Tucson Electric Power rebate program resulted in 10% savings.

In **1999**, the Board of Directors of Arizona Clean and Beautiful announced TAA's Fuel Recovery system a Governor's Pride in Arizona Award winner.

In **1999**, TAA began adding Variable Frequency Drives (VFD) to pumps, fans and air handler motors over five horsepower. VFDs save power by allowing the motor to only run as fast as it needs to according to the load conditions.

In **2002**, Saving Tucson Airport's Resources -- Today! (START), an internal outreach program composed of employees and tenants, was launched to raise awareness about the importance of managing resources carefully and focusing on reducing consumption of electricity, gas and water. Many environmental upgrades include retrofitting airport buildings with energy efficient lights, electronic ballasts and compact fluorescent lamps; installation of a programmable lighting control system in utilizing a photocell to turn lights on and off with the sunrise and sunset; and shutting down escalators during early morning hours.

In **2002**, TAA installed a Building Automation System to control the operation of the HVAC and lighting systems in the Terminal and new Rental Car Building. The Building Automation System was extended to the Concourses in **2007** and to the new TAA Maintenance Facility, which opened in **2008**.



In **2003**, the TAA Police Department added a Bike Patrol.

In **2003**, TAA was awarded the Annual Transportation Award by the Metropolitan Energy Commission for efforts to facilitate the opening and operation of Tucson's first publicly accessible Compressed Natural Gas fueling facility on Corona Rd. West of Country Club.

In **2003**, TAA was presented with the Excellence in Outdoor Lighting Award by the International Dark-Sky Association for replacing aging fixtures on TUS's general aviation ramp with updated lights that include full cut-off housings and modern optical assemblies. This significantly reduced uplight into the nighttime sky and visible off-site glare.

As part of the **2003** Terminal expansion project, natural light was brought into the lower level baggage area by building a bridge structure to replace the earth allowing installation of a storefront glass system supplemented by several light wells.

In **2004**, a new energy efficient chiller and boiler were installed in the airport central plant and the circulation pumps and air handlers were equipped with variable frequency drives, significantly increasing the efficiency of the airport's HVAC (heating, ventilating and air conditioning) systems.

In **2004**, TAA began conversion to LED taxiway lighting at Ryan Airfield and TUS, completing this project in **2009**.

A long-time participant in the Pima Association of Governments (PAG) Shared Ride Program, TAA began offering passes to employees who ride the City bus in **2004**, and in **2008** celebrated 18 years of compliance in PAG's Travel Reduction Plan reaching our goal of 40% alternate mode usage.

In **2005**, the EPA designated TAA a "Best Workplace for Commuters." TAA received this National designation again in **2006** and **2007**.

A second energy efficient chiller was installed in **2007** and the chilled water system was converted to a single loop configuration to further increase the energy efficiency.

In **2007**, TAA collaborated with Tucson Electric Power on the installation of a photovoltaic solar panel array north of the main parking lot revenue control building. The 9 kilowatt per month system feeds directly back into the electrical meter, and helps offset the electrical costs of powering that building. Cost savings are approximately \$1,100 per year.

In **2007**, the Concourse Renovation project included installation of a lighter colored carpet to increase the light reflectance and thereby allow the holdrooms to appear brighter without providing additional lighting. The carpet product used has a highly recyclable product content and is 100% recyclable.



In **2009**, an Easy Pay system was installed in all parking lots to minimize idle time waiting. An on-demand system is used for taxicab staging.

In **2009**, TAA installed a demand ramp lighting system for the Cargo Ramp that allows tenants to increase lighting levels from 25% to higher levels when needed for a requested time frame before returning to the 25% level.

In **2009**, TAA upgraded the Main Runway lighting from 204-watt fixtures to 115-watt high efficient fixtures.

In April **2010**, TAA installed a third high efficiency chiller, replacing the 1980s less energy efficient chiller.

In **2010**, the central 400 Hz ground power system was upgraded with solid state frequency converters to improve the reliability and energy efficiency of the system. Ground power units to service regional jets (28VDC) were also added, further reducing emissions from ground power carts and aircraft APUs.

In **2012**, TAA worked with Pima County to develop the first ever Renewable Energy Incentive Zoning Overlay District (REID) for all property at TUS and Ryan Airfield. The REID provides numerous utility-scale solar development incentives in the form of fee waivers, expedited permitting and relief from development standards.

In **2012**, TAA added the solar sculpture “Spirit of Southern Arizona” to its permanent art collection to demonstrate the importance of solar development to our community.

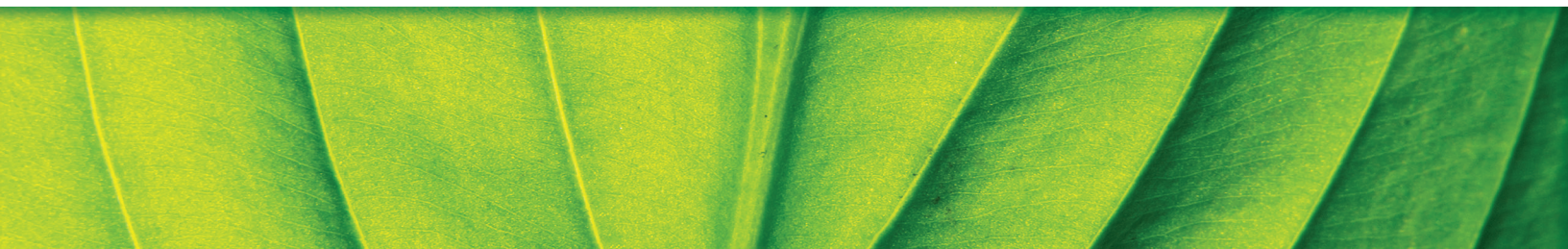
In **2012**, new high-efficiency cooling towers were installed in order to improve the efficiency of the central plant’s operations.

In **2013**, TAA began installing solar canopies over the daily parking lot. The first phase will generate approximately one megawatt of power for the main terminal complex. Additional phases are planned. Lights in the newly covered area are being replaced with energy efficient LEDs which meet Dark-Sky requirements.

New signage and flight information system displays have been converted from CRT to liquid crystal displays (LCDs) to reduce energy consumption.

High-speed taxiways have been incorporated into TUS’s airfield design helping to reduce aircraft delay (idling) and taxi time.

Solar energy powered roadway signs have been incorporated into the lower terminal roadway system.



All paints used at TUS on recent repainting projects were low VOCs, and the new reflective roof coating applied to the terminal and other TAA buildings is a more reflective and energy efficient white coating. Besides the standard elastomeric coatings that only address sunlight bounce of visible light, TAA coated all terminal and support building roofs with a white ceramic based product that contains several different ceramic additives that will reflect or block 95% of the UV, visible light, infrared, and thermal heat. This will provide additional energy savings during the hottest months.

Smoking is prohibited in all airport buildings. Outdoor smoking areas are located away from operable doors and windows.

Bicycle racks have been installed at several locations around the airport.

In **2015**, TAA was presented with the Tucson Electric Power (TEP) BrightEE Award for Large Business and the International Dark-Sky Association Lighting Design Award for replacing 664 light fixtures with new LED fixtures (419 in the rental car facility and parking garage; 65 along the circulation roadway; 98 in the Economy and QTA Parking Lots; 48 on the terminal roof for the apron; and 34 under the exit canopies in the Daily and Economy Parking Lots). This project will reduce energy consumption by 1.65 million kilowatt hours per year, reduce maintenance costs, enhance nighttime aesthetics of our facilities, as well as significantly reduce upward light into the nighttime sky and visible off-site glare.

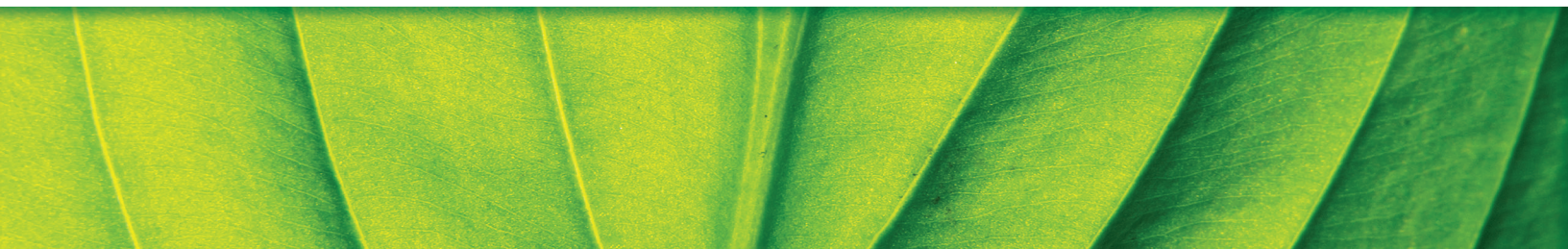
In **2015**, TAA refurbished the Heat Exchanger in the Central Plant which made the unit more energy efficient by utilizing external air to help cool the inside of the terminal. This project will reduce energy consumption and lessen the load on the chillers.

In **2015**, TAA installed additional foam roofing at the Executive Terminal which will decrease the heat load of the building. This project will reduce energy consumption and lessen the load on the cooling units.

In **2015**, TAA replaced existing incandescent medium intensity runway lights on Runway 3/21 with LED lights. The project also included all new cabling and regulators which will greatly reduce the energy consumption of the airfield lighting system.

In **2016**, TAA replaced four lighting control panels with Delta equipment for integration with TAA's facility wide Energy Management Control System (EMCS). This equipment adjusts lighting for time of day and allows for daylight harvesting reducing energy and maintenance costs.

In **2016**, TAA installed new sectional control valves on the common shared Fire Department connections lines under Concourse A. New isolation valves will save thousands of gallons of water annually during maintenance, repair and testing activities by not having to drain the entire system prior to those activities.



In **2016**, TAA replaced nine air conditioning units with Seasonal Energy Efficiency Ratio (SEER) rated units (3 at the Executive terminal, 3 at the Fire Station and 3 at the HITDA Building). New units will operate more efficiently, save energy and maintenance costs.

In **2017**, TAA replaced 12 air conditioning units with Seasonal Energy Efficiency Ratio (SEER) rated units (1 at Ryan Restaurant, 2 at the Jet Bridges, 5 at the RAC Offices and 4 at the Customs Area). New units will operate more efficiently, save energy and maintenance costs.

In **2017**, TAA installed two new escalators in the concourse entrances with sleep mode integration so the escalators would not operate until someone approached the sensors to begin operation.

In **2017**, TAA installed automatic flush valves in urinals in the baggage level of main terminal, customs, air cargo and control tower. The valves are more efficient and conserve water usage.

In **2017**, TAA continued the replacement of light fixtures to LED replacing 5,172 lamps from a combination of T-8's to LED and compact fluorescent to with new LED fixtures resulting in a reduction of 140,512 watts of power. This represents an estimated monthly saving of \$4,600. The program also replaced 2,059 fixtures from T-8's to LED fixtures resulting in a reduction of 96,214 watts of power. This represents an estimated monthly savings of \$3,100. Combined savings is approximately \$92,400 per year and a significant reduction of maintenance costs.

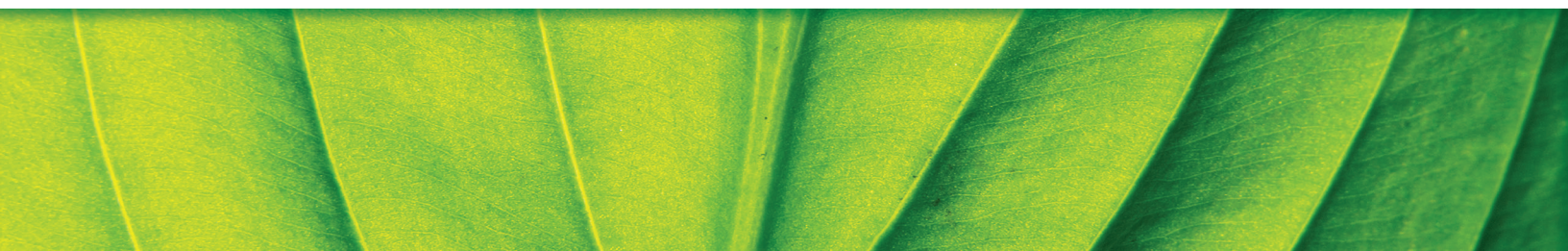
In **2017**, TAA replaced the electric ejector sewage pumps with new gravity feed lines that reduces electrical use and maintenance costs.

In **2017**, TAA removed four escalators that were at the end of their useful life and ran 24 hours a day from the center core of the terminal replaced them with stairs. This eliminated the need to replace the escalators, reduced maintenance and electrical costs in keeping them operational.

In **2017**, TAA replaced the two mid 1980's boilers in the Central Plant with new more energy efficient boilers resulting in reduced maintenance and energy costs.

In **2017**, TAA replaced the terminal overhead roadway signage lighting with LED lighting to reduce energy consumption.

In **2017**, TAA began benchmarking energy usage on a monthly basis. Utilizing Energy Star Energy Star enables TAA to see the results of energy reduction projects in terms of overall site Energy Use Index (EUI) and total Green House Gas emission intensity. For the period of March 1, 2017 through March 1, 2018, TAA has reduced the site EUI by 25% and GHG by 24%.



In **2018**, TAA completed Phase 2 of the photovoltaic project installing 78 additional solar arrays over the hourly and the remaining daily parking lot. The second phase will generate approximately 1.5 megawatt of power and generate 240,000 kWh of AC power monthly for a savings of approximately \$21,000 per month. Lights in the newly covered area are being replaced with energy efficient LEDs which meet the Dark-Sky requirement.



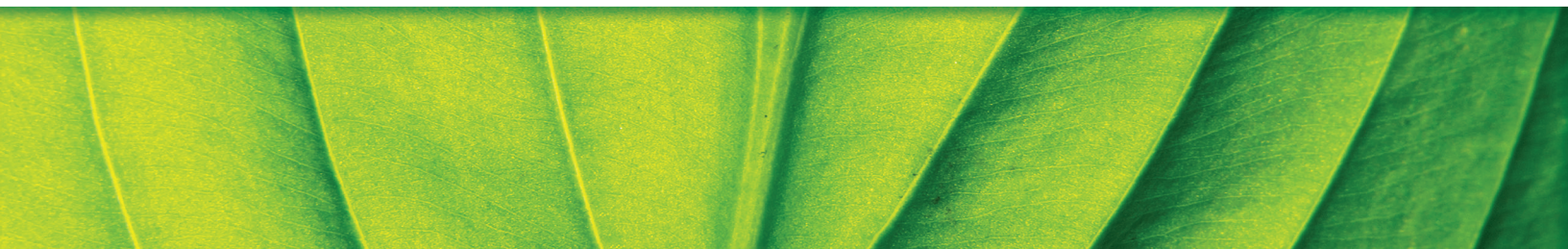
Noise

In **1982**, Tucson International was one of the first airports in the country to obtain approval of an Airport Noise Control and Land Use Compatibility Study (ANCLUC). This enabled TAA, Pima County and the City of Tucson to develop the 1982 Airport Environs Plan creating zoning ordinances to regulate development in areas exposed to high levels of aircraft noise.

In **1991**, the Part 150 Noise Compatibility Program was adopted. Significant noise abatement and mitigation measures were implemented. An Update to the Part 150 program was completed in **2014**.

Between **1992** and **2012**, a federally funded Residential Sound Insulation Program insulated homes exposed to significant levels of aircraft noise. In total, 1,121 homes and one school were acoustically treated.

To create a noise buffer around TUS, TAA has acquired land adjacent to the airfield to protect neighbors from the impact of noise, and created a separate aircraft engine run-up apron shielded by a dirt wall to absorb and dissipate engine noise.



Waste Management

In **1990**, TAA initiated an airport-wide recycling program for white paper and newspaper throughout the airport complex, and in **1992**, Tucson airlines instituted a cardboard and aluminum collection program.

Also in the early **1990s**, TAA began shredding, chipping and composting woody landscape waste materials and reusing them as mulch on airport property.

Since **1995**, TAA has routinely recycled lamps and ballasts, used fuel filters, waste oil, waste antifreeze, contaminated fuel, used tires, batteries, and scrap metal generated from airport operations.

In **2000**, TAA specified recycling of concrete and asphalt from horizontal construction projects to the extent practicable. Milled asphaltic concrete has been used to construct economical haul road surfacing to provide a durable surface and eliminate dust pollution.

Areas disturbed during construction operations are subsequently hydroseeded with a native seed mix.

In **2007**, TAA began collecting liquids banned by the Transportation Security Administration at the security checkpoints and donating unopened items to local charities.

In **2008**, TAA installed collection containers for recycling paper, bottles and cans throughout the public areas of the terminal, further expanding the recycling program.

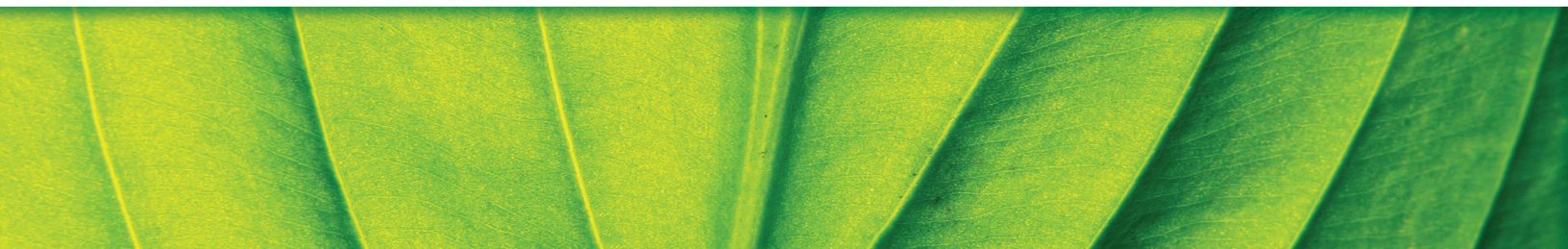
In **2009**, TAA installed beverage disposal containers pre-security so passengers could empty liquids from containers and keep them for refilling once through the checkpoints.

TAA recycles used computers to a local charity for distribution to Tucson families who cannot afford to buy their own.

In **2010**, TAA disposed of approximately 88.55 tons of recycling in the front load cans and roll-offs.

In **2010**, TAA instituted an active buffelgrass control program. In 2013, 2014, and 2015, TAA performed buffelgrass mitigation activities on approximately 8,000 acres of TAA property.

In **2015**, TAA began incinerating Regulated Garbage at TUS. Regulated Garbage includes food scraps, table refuse, galley refuse, food wrappers or packaging materials, and other waste material from international aircraft arriving at TUS. Prior to installation of the incinerator, TUS's Regulated Garbage was collected by a contractor and transported to Phoenix for treatment and disposal.



In **2017**, TAA recycled 30,419 pounds of copper by disassembling obsolete electrical switch gear panels to recover the copper and prevent it from being discarded as waste during the Terminal Optimization Project.

In **2017**, TAA recycled 2,836 pounds of scape metal by collecting metal recovered during repairs and recycling versus placing it in waste containers.



Water Quality

In **1982**, TAA converted much of the airport's vegetation to Xeriscape (lower water use) landscaping and installed drip irrigation systems to minimize water use.

Rock mulch is used in landscaped areas to provide erosion control and soil moisture retention. Extensive use of native landscape plants reduces water use and pesticide use.

In **1988**, TAA received an Award of Excellence from the Southern Arizona Water Resources Association for the desert garden in front of the main terminal.

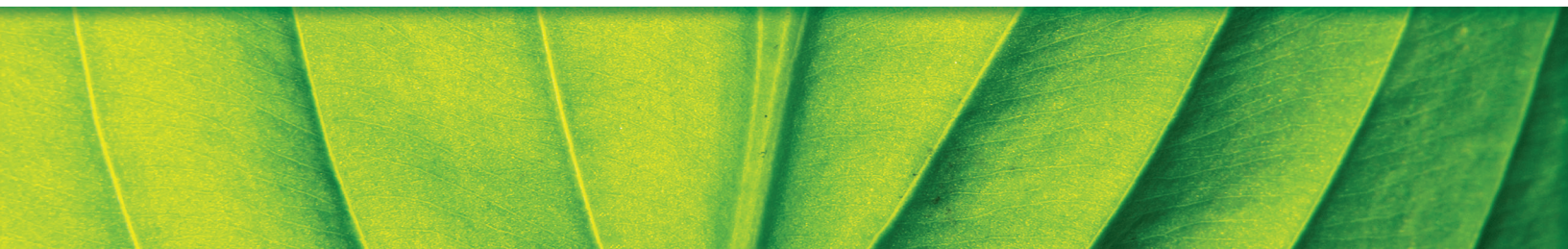
In **1989**, TAA and other parties began remedial action to address groundwater contamination north of Los Reales Road, known as the Tucson Airport Remediation Project (TARP). In September **1994**, a pump and treat remedy entered routine operation,

removing since its inception over 3,700 pounds of trichloroethylene (TCE) from the groundwater.

In **1992**, TAA again received an Award of Excellence for the TUS Xeriscape garden on the airport entrance roadway.

There are aircraft washracks at both airports; and in **1992**, a water recycling wash rack was installed at Ryan Field.

Since **1995**, TAA has managed a Storm Water Pollution Prevention Program to minimize the impacts of airport operations on storm water. Currently, under ADEQ's Multi-Sector General Storm Water Permit Program, both Tucson International Airport and Ryan Airfield have Storm Water Pollution Prevention Plans that include those users at each airport who engage in activities covered by the ADEQ program.



A **1997** Record of Decision selected for the Airport Property a remedy with four separate components: soil vapor extraction of volatile organic compounds (VOC) contamination in Vadose Zone soils; containment, and restoration of VOC-contaminated groundwater in the Shallow Groundwater Zone; excavation of polychlorinated biphenyl (PCB) and metals-contaminated soils and sediments for off-site disposal; and closure of the TAA Landfill.

In **2000**, TAA partnered with the University of Arizona, Soil, Water & Environmental Sciences Department to participate in a series of grant-funded studies on passive water reuse and water harvesting at TUS, implemented on the grounds of the airport.

In **2003**, as part of the TUS Terminal Expansion Project, hands-free faucets in all restrooms as well as waterless urinals in the men's restrooms were installed, saving an estimated 40,000 gallons of water per urinal per year.

In **2007**, TAA celebrated the completion of the Airport Property Soils and Groundwater Treatment Facility, which is designed to remove VOC contamination from the Vadose Zone and shallow groundwater zone (SGZ). With the beginning of routine operation of this facility, all portions of the TUS Area Superfund Site now have active remedies in place.

In **2008**, hands-free faucets and waterless urinals were installed in TAA's new Warehouse and Maintenance facilities.

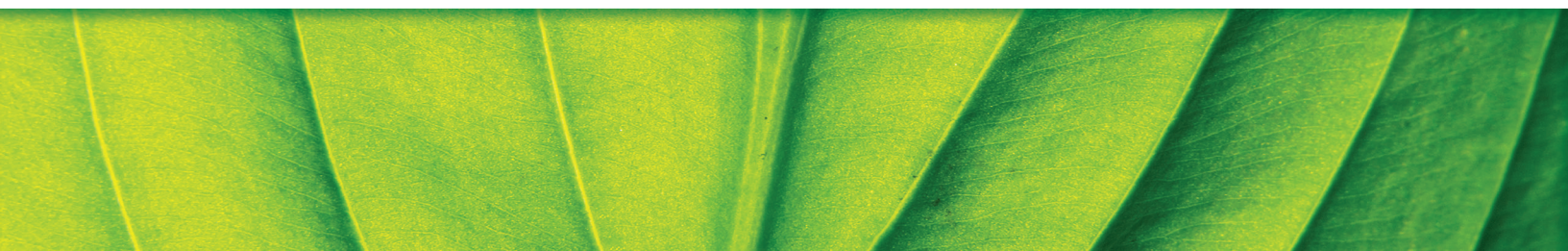
In **2011**, all waterless urinals in the men's restrooms were replaced with less labor intensive, low flow urinals that will still save thousands of gallons of water per year. TAA custodial cleaning products, such as glass and surface cleaners and toilet and floor cleaners, are systematically being transitioned to Green Seal products.

In **2012**, TAA achieved two milestones in long-term environmental remediation projects. Clean-up of PCBs was completed in and around the Tucson Industrial Center three-hangar area and an old construction landfill at Aero Park Boulevard and Nogales Highway was also capped in accordance with state and federal requirements.

In **2013**, TAA replaced the old induced-draft cooling towers with new flow-thru technology cooling towers to lessen environmental impacts, increase safety during maintenance activities, improve electrical efficiency and dramatically reduce water use.

In **2016/2017** TAA recycled the concrete removed from the Apron Reconstruction project and utilized the millings on the perimeter roadway.

In **2017**, TAA utilized the millings from the Runway Rehabilitation project on the runway overruns and perimeter roadway.



In **2017**, TAA installed one water fountain with filtered bottle fillers on each concourse.

In **2017**, TAA removed two 20,000 AVGAS underground fuel storage tanks eliminating the potential of fuel leaking into the soil.

In **2017**, TAA upgraded the cathodic protection system to protect from erosion of pipes and potential of fuel leaking into the soil.

In **2017**, TAA constructed new catch basins around the gate hydrant outlets to prevent fuel spills from reaching the soil.



Community/Employee Outreach

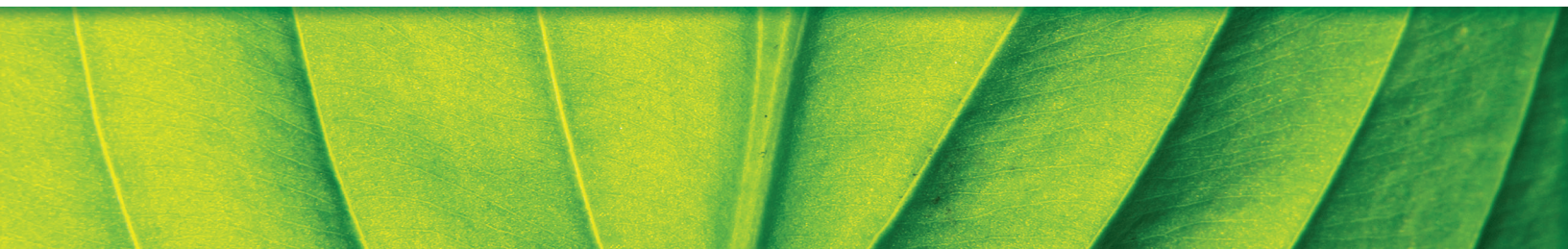
TUS has had a program in place for more than 30 years to educate airport employees about FOD (Foreign Object Debris), and five years ago launched a monthly airfield walk to police the airside and pick up debris.

As part of the projects to remediate TCE-contaminated soil and groundwater, TAA staff has worked closely with airport area neighborhoods to keep them apprised of activity to remediate contamination on and around the airport. This extensive community outreach effort has included door-to-door canvassing of residents in affected areas, hosting public open houses, tours of treatment facilities, participation in community advisory boards and forums, and creation of art murals at well sites.

TAA's noise abatement program, launched in the early **1990s**, has included similar outreach activities for airport area residents that have been ongoing for more than 20 years. In addition, TAA participates with numerous governmental and military organizations - Pima Association

of Governments, Davis Monthan Air Force Base, Arizona Air National Guard, and others to address community concerns.

As part of its airport wide recycling campaign initiated in **1992**, Tucson Airport Authority staff developed a comprehensive promotional campaign. It included depositing collection containers in the back areas of the terminal complex, collaborating with airlines to collect cardboard, cans, glass and paper, educational forums for employees and tenants, and creating a logo used in messaging and on containers.

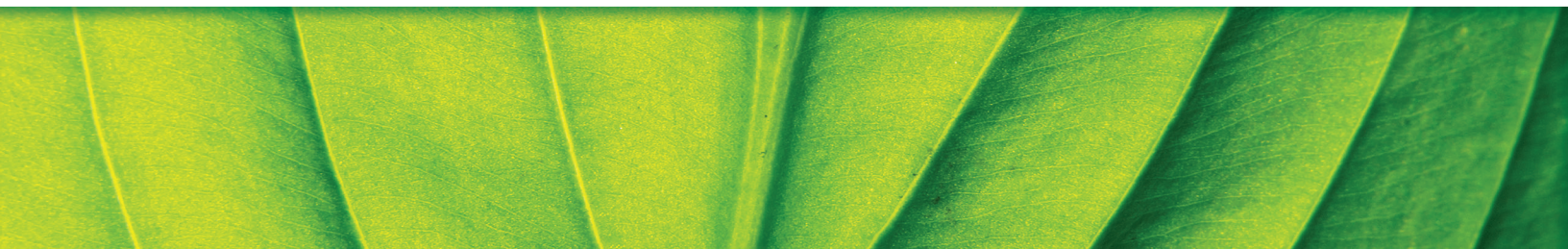


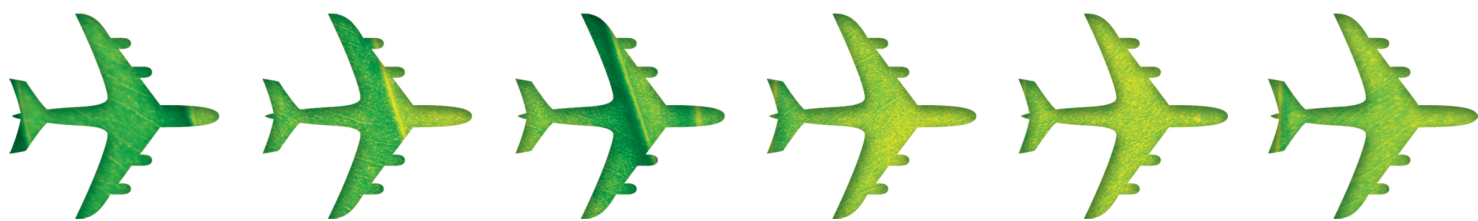
This effort continued with the START program, Saving Tucson Airport's Resources-Today!, intended to raise awareness about consumption of resources. Using a unique logo on signs and other collateral material, TAA branded the effort to draw attention to the issue.

The introduction of a free-of-charge Cell Phone Waiting Lot at TUS in **2004** has been publicized extensively via electronic as well as traditional media. The free parking lot offers visitors a place to await arriving customers alleviating roadway congestion and pollution as well as promoting energy conservation. The lot is very popular with Tucsonans based on anecdotal feedback and usage.

Tucson Airport Authority was a host site for Beat Back Buffelgrass Day in **2012**, kicking off a joint effort with the State of Arizona Division of Emergency Management and the Southern Arizona Buffelgrass Coordination Center (SABCC) to eradicate buffelgrass at the airport and the Mission Road Complex, thanks to a grant from FEMA.

In **2017**, TAA completed the four-year project to reduce Buffelgrass on its property. The herbicide mitigation efforts reduced the Buffelgrass coverage on TAA property by an astounding 94.4%.





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