



Blanchard Golf Course
Environmental Baseline Assessment
Davis-Monthan AFB, AZ Mar 05



Executive Summary

U. S. Air Force GEM Program

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Environmental Excellence (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide. Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the installation mission. AFI 32-7064 requires a GEM Plan as part of the Integrated Natural Resources Management Plan (INRMP).

The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine all aspects of golf course management to achieve the highest standards of environmental excellence.

GEM Program process

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision



Environmental Compatibility Quotient

Actual ECQ	68
Potential ECQ	84

Potential environmental challenges

The following environmental challenges were identified during the GCEBA process:

- Migratory Bird Treaty Act
- Maintenance complex design deficiency
- Water conservation
- Water quality management
- Installation Restoration Program (IRP) Site

Where do we go from here?

After confirming the environmental challenges (EC), the golf course staff should compile their preferred management approach to each in the context of their long-term goal of providing the best golfing experience for their customers. These management approaches must then be coordinated with installation environmental managers. Finally, the combined environmental and golf staff team should proceed toward finalizing the GEM Plan. The entire process is summarized on the AFCEE GEM program website (<http://www.afcee.brooks.af.mil/ec/golf/>).

Analysis



Course details

Architect	Civil Engineering
Year constructed	1962/1968
Climate	Arid & hot
Average annual rainfall	Nearly 12 inches
Average growing season	Over 320 days
Elevation	2750' ASL
Winds/Prevailing Direction	SE/NW
Total Facility Acreage	165 acres
Par	36-36-72
Yardage/Rating/Slope	Blue- 6611/70.6/128 White- 6155/68.2/119 Red- 5792/72.7/120
Turfgrass	Common/328
Tees-	Common Bermudagrass
Fairways-	Tifgreen
Greens	Mixed/Common
Roughs-	

Course description

The climate in Tucson region is arid, with over 300 days of clear sunny skies and is ideal for the game of golf. Located in the unique and beautiful Sonoran Desert, Arizona's second largest city averages around 12 inches of precipitation a year. Accordingly, the Blanchard Golf Course is not a lush, turf-laden paradise. An efficient irrigation delivery system, high quality water, and informed maintenance practices gleaned from years of experience is what makes great golf in this climate.

Both the Director of Golf and superintendent are veterans with stellar contributions to the game. They have made great strides in making the Blanchard Golf Course one of Tucson's finest golfing venues. The course was not professionally designed and is a relatively nondescript collection of golf holes yet it still provides adequate challenge for its intended customers on a playing surface that many other area courses would relish.

The relatively recent changeover to treated effluent, or recycled water, has proven to be a boon for the management staff and its customers at Blanchard. Not having to rely on pumped, high quality drinking water from one of the world's most overused aquifers has created a more relaxed and flexible long-term situation.



Blanchard Golf Course Aerial Photo

Determining the Baseline (ECQ)

The following is a brief compilation of some of the responses in each of the ten Environmental Compatibility Quotient (ECQ) categories obtained in an interview with the superintendent and the manager conducted during the site visit.

ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Pesticide Use, Storage, & Handling
- Pollution Prevention
- Conservation Practices
- Water Resources
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

Key to checklist responses

- **Yes** = Practice is complete or ongoing and can be verified.
- **Partial** = Practice has been initiated but needs further attention and improvement.
- **No** = Practice is not in place.

ECQ Checklists

The Environmental Compatibility Quotient (ECQ) checklists are a convenient method of assessing the overall performance, implementation, and completeness of an installation's Golf Course Environmental Management Plan. The checklists can be used in many ways including:

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent.
- As an award nomination evaluation by a Golf Course Assessment Team (GCAT).



The snack bar recycles and offers reusable plates and flatware.

Interpreting the ECQ

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two measures obtained as a result of using the ECQ checklists to determine the status or quality of the environmental management program: 1) determining the actual and; 2) potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists. This number represents the current level of the golf course management practice compatibility with the environment
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists. Maybe the most significant measure; the potential ECQ represents a level of compatibility that could be reached by finalizing or fully implementing a particular practice or procedure.

ECQ Scoring Scale

Percent Responses Yes or Partial per Category	Level
93-100%	Advanced
83-92%	Getting there
73-82%	Showing progress
63-72%	Early stages
Less than 62%	Just started



Superintendent Highhouse has the course in superb condition.



Native plants like these yuccas contribute to the course's character.

Overall Management Philosophy & Documentation				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has management demonstrated that the environment is an important part of their responsibilities by initiating the GEM Planning process?	✓		
2	Has the golf course adopted and posted an Environmental Policy?			✓
3	Is the GEM Plan underway or completed, available, and updated regularly?		✓	
4	Is a map of the property highlighting identified environmental challenges such as landfills, threatened or endangered species habitat, restoration sites, floodplains, etc. used in the environmental management decision-making process and is it posted for customers?		✓	
5	Environmental goals, objectives, challenges, projects, and progress are evaluated at least annually and are regularly communicated to employees, customers, management, and the local community?	✓		
6	Are written records of water quality monitoring activities, results, and control measures readily available?		✓	
7	Is there an inventory of bird and mammal species documented, maintained, and readily available?		✓	
8	Is there a general understanding of how course management practices may positively enhance or adversely impact the environment?	✓		
9	Are the environmental impacts of pest control measures such as leaching and runoff potential, toxicity to non-target organisms, soil absorption capacity, pesticide persistence, water solubility, and effects on soil microorganisms and non-target species considered as part of the course management planning process?	✓		
10	Are records of pest treatments employed and their effectiveness maintained and used to guide future pest control decisions?	✓		
	Point totals for each column	5	4	1

Safety, Training, & Awareness				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	All employees are familiar with the GEM program and are trained on the importance of environmental compliance with the goals and objectives of the program as it applies to their duties?			✓
2	All appropriate employees are trained to be familiar with U. S. Air Force, federal, state, and OSHA regulations that apply to storage, handling, and disposal of chemicals used on the property?	✓		
3	All employees are aware that chemical use, storage, and disposal and their potential risks to human health and the environment?	✓		
4	All employees are trained to understand that poor management practices may adversely impact worker health, on- and off-site water quality, local soil health, and wildlife species and their habitats?	✓		
5	A current copy of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property is maintained and readily available for use by employees?	✓		
6	All employees receive documented, regular training on all potential OSHA issues associated with their duties?	✓		
7	Are all golf course pesticide applicators active participants in a local respiratory and pulmonary testing program?	✓		
8	Are pesticides, fertilizers, and other chemicals stored on appropriate shelving in an approved storage facility?	✓		
9	Are golfers notified in the pro shop and on the first and tenth tees about the day's planned or recently completed spraying of any chemical or fertilizer that may be hazardous to human health or public safety?			✓
10	Are key staff members trained regarding water quality and conservation issues pertinent to the course and their particular duties?	✓		
	Point totals for each column	8	0	2

Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are fuel storage/delivery area and equipment managed in accordance with federal, state, and local regulations?	✓		
2	Are installation environmental staff members included in pertinent, on-going course management discussions and plans at scheduled meetings?	✓		
3	Are there golf course staff meetings where environmental management issues are regularly discussed?	✓		
4	Does the director of golf and the superintendent attend ESOHCAMP in-briefings and out-briefings?		✓	
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?		✓	
6	Have all necessary permits been secured and/or updated and their requirements satisfied in a timely manner?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Has the golf course staff submitted their proposed management approach to the identified environmental challenges to the installation environmental staff for coordination and review?			✓
10	Were there less than two major golf course facility-related findings during the last official ESOHCAMP visit?	✓		
	Point totals for each column	7	2	1

Pesticide Use, Storage, & Handling				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest populations regularly using a process to notify management of pest problems and organized into a report or guide so that they can be used for future pest control solutions?	✓		
2	Are there written pest profiles of common pest species with a variety of potential control measures pre-evaluated including alterations in cultural management, biological, physical, and mechanical controls prior to treating the problem on the course?	✓		
3	Are there established and documented aesthetic and functional thresholds for all managed areas to effectively manage pest populations and reduce chemical use?		✓	
4	Is there a specially designed pesticide mixing area where all mixing is performed by appropriately trained personnel?	✓		
5	Has a current list of pesticides and other chemicals stored or used at the golf facility been provided to the appropriate Fire Department(s)?	✓		
6	Is there a written Integrated Pest Management Plan readily available and updated in use at the facility?	✓		
7	If personal protective equipment is required for pesticide use, storage, or handling, is it available for use by trained individuals?	✓		
8	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? <ul style="list-style-type: none"> - the quantity of each pesticide used - the chemical or common name of the active pesticidal ingredient(s) - the pest or purpose for which the pesticide was applied --the date and place of application.	✓		
9	Is the chemical storage structure/area locked, well ventilated, fire proof, and is access limited to select personnel?	✓		
10	Are there designated and documented "no spray" areas around pond, river, stream, or lake edges and have they been communicated to pesticide applicators?	✓		
	Point totals for each column	9	1	0

Pollution Prevention				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated and documented "minimally-maintained" or natural vegetative buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and pesticide applicators?			✓
2	Has the Installation Spill Plan been amended to include the golf course facility and is there a spill containment kit at each required location and are there spill containment procedures in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all liquid pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on pallets or shelves to keep them off the floor?	✓		
6	Have all the golf facility employees regularly received documented and approved HAZCOM and safety and health training?	✓		
7	Are grass clippings blown off equipment with compressed air instead of or prior to washing?		✓	
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Has the watershed in which the course resides and contributes runoff to been identified and documented on a regularly updated and readily available map to aid the golf course staff in the management of their facility?		✓	
10	Are appropriate quantities of fertilizers applied during weather conducive to reducing the potential for leaching and runoff?	✓		
Point totals for each column		7	2	1

Conservation Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?		✓	
2	Are there officially and appropriately designated minimally maintained areas on the golf course facility grounds?	✓		
3	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use?			✓
4	Has all "non-target" irrigation (ponds, natural, or out of play areas, etc.) been eliminated or minimized?			✓
5	Have flow meters been installed to monitor water use and detect potential waste?	✓		
6	Has the entire golf course facility property been examined for critical habitats, threatened or endangered species, wetlands, floodplains, and historical/cultural resources?	✓		
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?			✓
8	Does the snack bar utilize reusable plates and silverware for use by customers throughout the facility's operating hours?	✓		
9	Have all potential maintenance practices for designated "minimally-maintained" or natural areas been coordinated with the installation Bird/Wildlife Aircraft Strike Hazard (BASH) officer and environmental management personnel?	✓		
10	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?	✓		
Point totals for each column		6	1	3

Water Resources				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, fish kills, and sedimentation?	✓		
2	Are wash and wastewater kept from making direct contact with surface water and are they recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
3	Outdoor irrigation of non-golf course landscape areas are regularly monitored and maintained for leaks and efficient performance?	✓		
4	Has the golf course staff coordinated with stormwater management planning requirements from the installation's environmental staff?			✓
5	Have part circle irrigation heads been installed where possible to preserve water resources and reduce maintenance while minimizing potential negative impacts to surrounding minimally maintained areas?	✓		
6	Are all water feature maintenance tasks coordinated with the installation natural resource manager and bird/wildlife aircraft strike hazard (BASH) officer?	✓		
7	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?	✓		
8	Are moving water bodies such as streams or creeks that pass through the golf course regularly monitored for water quality both upstream and downstream of the course?	✓		
9	Does the facility have a Drought Management Plan written, ready, and available if, or when, irrigation restrictions may be instituted and required by the community or the installation?			✓
10	Are water quality problems immediately reported to supervisors and appropriate installation environmental staff members for instruction and direction?	✓		
Point totals for each column		8	0	2

Maintenance Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is there a written, regularly updated, and readily available Golf Course Maintenance Plan?	✓		
2	Does the Maintenance Plan include individual plans such as Integrated Pest Management, Tree Management, Hazard Communication, Drought Management, Water Feature Management, and a Site-Specific Spill Prevention Response Plan?		✓	
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular and documented procedures in place to continually improve soil health such as topdressing, organic amendments, aeration, and drainage?	✓		
5	Is there a regularly-updated and readily-available map of the course's "hot spots" requiring special care or regular attention?			✓
6	Is all maintenance equipment maintained and cleaned in a manner that eliminates the potential for spreading of pest or disease contamination?		✓	
7	Has there been a complete examination for potential negative environmental impacts of all aspects of the golf course facility operation including the snack bar and grill, clubhouse, pro shop, and maintenance complex?	✓		
8	Is contour mowing used to conserve fuel and increase playability and aesthetics?		✓	
9	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?		✓	
10	Are soil tests and plant tissue analysis used to determine nutritional requirements?	✓		
	Point totals for each column	5	4	1

Customer Relations & Education				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in a regularly updated, documented, and on-going customer educational program?		✓	
2	Is there a conveniently located and highly visible place at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted for customers?			✓
3	Do the course manager and superintendent actively communicate with customers to determine and document their points of view?	✓		
4	Is there active and regular communication with the golf management staff, civil engineering, environmental management, the Services manager, and commanders by course management?	✓		
5	Does the golf staff regularly survey their customers on how they rate the various elements of the golf course facility?	✓		
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?		✓	
7	Are there signs appropriately located to warn golfers of hazards around or near recycled or otherwise non-potable water?	✓		
8	If applicable, have areas of the course been designated "Environmentally Sensitive Zones" per USGA rules?	✓		
9	Are course staff members trained regularly on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game and to teach all levels of golfers the rules of the game?	✓		
	Point totals for each column	7	2	1

Miscellaneous Special Projects & Activities				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for the near future that would demonstrate the compatibility of the course's management methods with protection of the environment?	✓		
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?	✓		
3	Are there tournaments or other events planned that may educate customers on the environmental challenges faced by the golf staff at this installation?			✓
4	Are there regular field trips for local students or other local community groups hosted at the course?	✓		
5	Are there projects planned to eliminate or minimize a potential erosion problem?	✓		
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?			✓
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?	✓		
9	Is your course an active participant in the USAF Golf Environmental Management Program?	✓		
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	Point totals for each column	6	0	4

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	5	4	1
2	Safety, Training, & Awareness	8	0	2
3	Compliance	7	2	1
4	Pesticide Use, Storage, & Handling	9	1	0
5	Pollution Prevention	7	2	1
6	Conservation Practices	6	1	3
7	Water Resources	8	0	2
8	Maintenance Practices	5	4	1
9	Customer Relations & Education	7	2	1
10	Miscellaneous Special Projects & Activities	6	0	4
	Composite point total/response percentage	68	16	16

GCEBA Results

* Blanchard Golf Course, Davis-Monthan AFB, AZ

- Actual ECQ (# of "Yes") = 68 "Early stages"

- Potential ECQ (Actual ECQ plus "Partial") = 84 "Getting there"

Potential environmental challenges

One of the important results of the GCEBA process is the identification of potential environmental challenges (ECs) to be addressed in the long-term GEM Planning process. After confirming each EC, the golf staff will determine the best management approach that will satisfy the goals of the golf facility from the course playability and customer satisfaction perspectives first. Then the golf staff's preferred management approach should be coordinated with the installation's environmental staff for refinement, coordination, and approval.

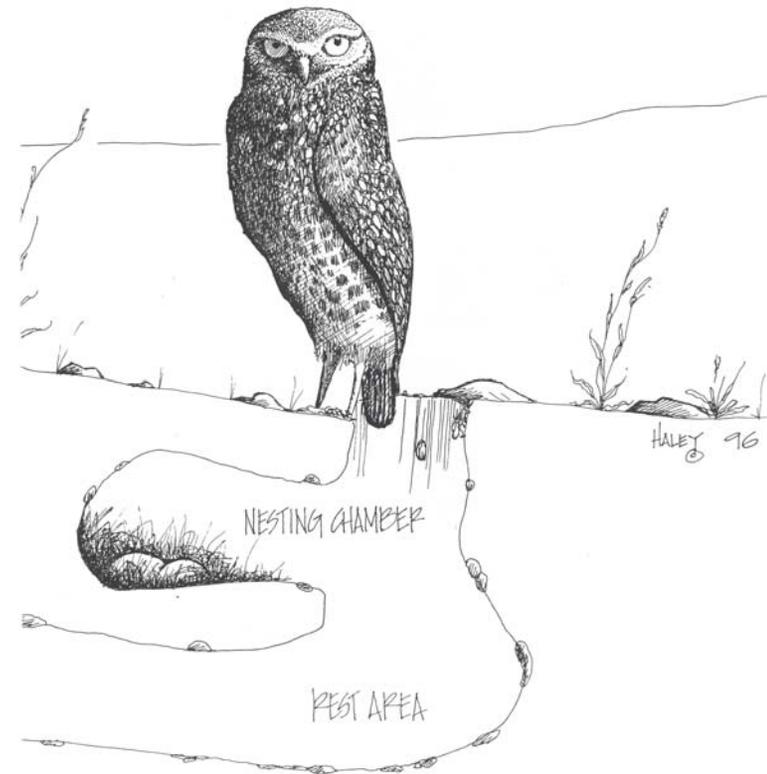
Ultimately, the combined environmental and golf staff team should proceed toward finalizing the GEM Plan. The entire process can be viewed at the AFCEE GEM website (<http://www.afcee.brooks.af.mil/ec/golf/>).

The following potential environmental challenges were identified during the GCEBA process at Blanchard Golf Course, Davis-Monthan AFB, AZ:

- Migratory Bird Treaty Act
- Maintenance complex design deficiency
- Water conservation
- Water quality management
- Installation Restoration Program (IRP) Site

MIGRATORY BIRD TREATY ACT

There are no endangered or threatened species present on Davis-Monthan AFB. Several burrowing owls, a relatively common Sonoran Desert resident, make the installation their home and are protected under the Migratory Bird Treaty Act. Care must be taken to ensure that no owls are injured or worse as a result of the course's management practices.



The burrowing owl is protected under the Migratory Bird Treaty Act.

MAINTENANCE COMPLEX DESIGN DEFICIENCY

According to a letter dated 22 July 2003 from 355 AMDS/SGPB, Military Handbook 1028/8A, *Design of Pest Management Facilities*, “pesticides/herbicides shall be stored in an area sealed or separated from clean areas. These areas will have a ventilation system that provides a minimum of 6 air changes per hour. The design of the system should also maintain a negative pressure in the areas relative to the clean areas.” The subject of this letter was to notify the golf staff that a Risk Assessment Code of 3 was assigned to this facility. These are design deficiencies that the golf staff needs assistance from civil engineering to overcome.



Poor design left this gap in the ceiling between the pesticide storage room and the fertilizer storage room.



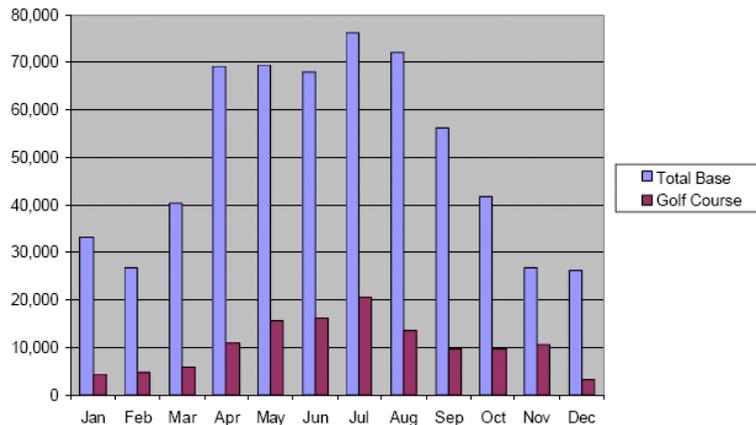
The recycled water ponds on the far east side of the property only hold enough water for less than two days of Blanchard’s irrigation needs.

WATER CONSERVATION

Water is the limiting factor to everything in Tucson. Water is also Davis-Monthan’s only major production utility. According to the General Plan, the installation “is totally dependent on subsurface water. It produces, treats, and distributes its own water for consumption and fire protection”. Davis-Monthan AFB operates eleven wells extracting water from the Tinaja Beds and the Fort Lowell Formation of the Tucson Basin aquifer. The aquifer is located between 250 and 350 feet below ground. Over time, the water level in this aquifer has dropped 50 to 100 feet under the base due to the pumping of these precious water reserves. Unfortunately, more water is removed from the aquifer than is replaced each year. This trend is expected to continue indefinitely. Davis-Monthan

AFB and the golf staff, since the course is a major user of water resources, must continue its long-running conservation efforts. Use of native plants, efficient irrigation systems, and rapid repair of leaks are paramount to the long-term success of the installation and the golf course.

Intuitively, most of the water, whether for human consumption or for irrigation, is used during the summer months. As the excerpted General Plan graphic below shows, winter consumption is roughly less than a fifth of the annual usage totals. Recycled water use ranges from a summer peak of nearly 20 million gallons per month to a winter use total of nearly 3 million gallons per month. The General Plan states that the “use of recycled water accounts for a reduction of one-sixth of the total amount of water annually consumed on the base”.



Comparative water use during a typical year. The golf course use figures show recycled, or treated effluent water.

WATER QUALITY MANAGEMENT

The protection of Waters of the United States is a primary concern for all U. S. Air Force installations. The Army Corps of Engineers administers this program under the auspices of the Clean Water Act. The large wash that drains the AMARC area to the south of the golf course bisects the facility forming a minor hazard for Blanchard customers to negotiate several times during their round. All maintenance activities should be coordinated with installation environmental staff to ensure compliance with all applicable requirements.



Although hard to believe, this manmade wash originating in AMARC and bisecting the golf course is a protected by the U. S. Army Corps of Engineers as a Water of the United States.

INSTALLATION RESTORATION PROGRAM (IRP) SITE

Site SS-43, formerly the location of the maintenance complex is located behind the driving range. Very low concentrations of chemicals, hydrocarbons, and metals from the golf operation were found in the surface soils. A qualitative risk assessment was performed and due to the “relatively nontoxic nature of petroleum hydrocarbons, health-based risks are considered low. No further action was recommended by the study completed in July 2002.

The concern, if any, for the golf course is to consider the study if there are any development plans for this site.



The small building is in the general area of the IRP site.



Conclusion

Terry Wilks and his staff have moved the overall golfing experience at Blanchard Golf Course at Davis-Monthan AFB from fair to good. The condition of the course is better than ever. With the addition of the recycled water, the course's future is more secure as the region is in throes of one of its worst droughts in history. Air Force golf in Tucson, Arizona is in capable hands.

Areas needing improvement

The ECQ Summary on the previous page highlights the following areas for relative improvement:

- Overall Management Philosophy & Documentation
- Pesticide Use, Storage, & Handling
- Miscellaneous Special Projects & Activities

The gallery

This section of the report will be where some of the more revealing photographs (of the literally hundreds taken during the site visit) of pests, maintenance practices, and other areas where improvements may be made to create the best possible golf facility within the limited budget and support of the mission.



Ground squirrels, or pocket gophers, are a major pest in Tucson.



Curbing like this is out of scale and regularly causes damage to carts.



Indigenous Aleppo pines nicely frame the tee shot at the 3rd.



Several mature trees have succumbed to the climate or old age.



Little to no contouring typifies the Blanchard Golf Course.



Quality locker room has proven to be a poor investment.



Derelict equipment has been slated for DRMO disposition for months.



Some of the trees and shrubs may have been planted too close to play.



Bibliography

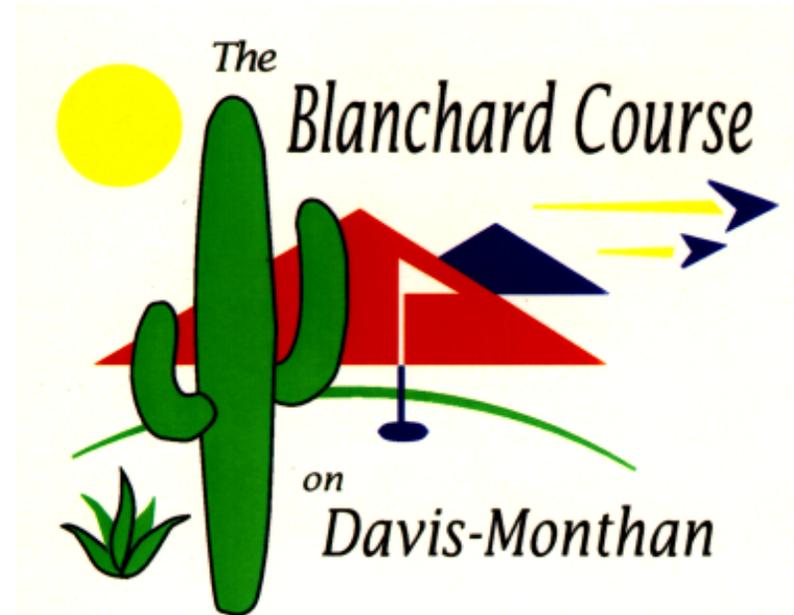
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**Air Force Center for Environmental Excellence
Technical Directorate
Environmental Science Division**

For additional assistance or more information, please contact:
U.S Air Force GEM Program Manager – 210-536-3719 - DSN 240-3719
AFCEE/TDE, 3300 Sidney Brooks, San Antonio, TX 78235-5112

Please visit our Golf Course Environmental Management Program website:
<http://www.afcee.brooks.af.mil/ec/golf/>