



Gateway Hills & Valley Golf Courses
Environmental Baseline Assessment
Lackland AFB, Texas Nov 02



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Executive Summary

U. S. AIR FORCE GEM PROGRAM GOALS

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 mission.

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 our processes on 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

This report is the result of the analysis step.

GATEWAY HILLS & VALLEY GOLF COURSES LACKLAND AFB, TEXAS ENVIRONMENTAL CHALLENGES

The following environmental challenges were identified during the GCEBA process:

- Environmental Compliance and Management Program (ECAMP)
- Water conservation
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Watersheds, wetlands, and floodplains
- Installation Restoration Program (IRP)

Further information on the environmental challenges at Gateway Hills & Valley Golf Courses can be found in the Conclusion of this Golf Course Environmental Baseline Assessment.

WHERE DO WE GO FROM HERE?

The golf course staff should determine their preferred management approach for the challenges above in context with their ongoing goals of providing the best golfing experience for the money. They should then coordinate these practices with the installation environmental staff to ensure their compatibility with installation wide natural resources and environmental goals and objectives followed by implementation.

Introduction

The golf course environmental baseline assessment (GCEBA) is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan.

The ultimate desire of the program is to provide a foolproof, customer-driven management tool that will free up course managers and superintendents to care for customers and the course. Properly designed and implemented, the program will keep the facility in compliance with the ever-changing environmental rules and regulations.



The Hill's pro shop and staff are among the finest in the Air Force.



Gateway Hills is blessed with rolling terrain and natural beauty.

Goal of the GEM Program

The goal of the Air Force GEM program is to facilitate the creation of an environmentally friendly golf course facility for its customers. The Air Force Center for Environmental Excellence is dedicated to helping provide a way that more rounds can be played on better-conditioned courses that minimize or eliminate negative impacts to the environment. In many cases, our golf courses are being managed compatibly with the environment. The GEM program is the vehicle to document our successes while communicating them to the golfers, our commanders, and the local community.

Program Implementation

Implementation is the most important phase of any initiative where practices and procedures are examined and may undergo significant change. This is especially true of the GEM Plan process. The specifics for the GEM Plan components and directions for their completion will be delineated in AFCEE's ***Golf and the Environment, Guidelines for the 21st Century***.

The GEM Program is derived from many diverse environmental regimes such as the National Environmental Policy Act, the Environmental Compliance Assessment and Management Program, and the ISO 14000 environmental management system. 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 our processes on all aspects of golf course management to achieve the highest standards of environmental excellence. There are five basic steps in the implementation of the GEM Program process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

Analysis

Experienced environmental managers realize the importance of assembling all of the data relevant to a problem prior to determining its best solution. Analysis is the first and most important task of the golf course environmental baseline assessment (GCEBA) and the GCEBA is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan. Properly completing the GCEBA is paramount to the long-term compatibility of an installation's golf course management practices with the GEM Program, and more importantly, the U. S. Air Force's natural resource and environmental management goals and objectives.

GCEBA COMPONENTS

The GCEBA is comprised of the following components:

- Site visit, interviews, and data collection
- Course specific analysis
- Miscellaneous facility review
- Environmental compatibility quotient checklists
- Identification of environmental management challenges
- Summary report

Documentation

It is not enough just to know how to create a successful golf course environmental management program. There has to be a written record of existing site data, maintenance practices, pesticide applications, and other historical golf course activities. By documenting what we know, we will be able to determine how to make better decisions in the future. The completed GEM Plan will be a comprehensive report with a map that will assist in the daily management of the course while providing a convenient vehicle to communicate to our customers the environmental issues that challenge us on our golf course and our plans to deal with them. In order to reach the environmental stewardship goals set by the U. S. Air Force, we must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.

GEM PLAN COMPONENTS

The GEM Plan will be comprised of the following components:

- GCEBA report
- Map of the entire golf course facility grounds depicting locations of the significant environmental management challenges and the golf course facilities
- Booklet that describes the environmental management challenges on the GEM Plan map

- Specific practices that will be employed by the golf course staff to deal with each environmental management challenge after coordination with and approval by the installation environmental staff
- Compilation of best management practices employed at the golf course in their implementation of the GEM program recommendations



View of airfield and beyond from the Valley's 18th tee.

Implementation

Positive and decisive action is the only true measure of the success of a GEM Program. By implementing new practices, whether to knowingly improve the course's role in the environmental stewardship of the installation or to just try new ideas to determine their value, will the golf staff and golfers benefit. The Muroc Lake staff should adopt the GEM Program Environmental Policy and immediately begin finding ways to minimize or eliminate any and all negative impacts to the environment.

Evaluation

In order to ensure the highest quality of customer service and environmental stewardship, there must be continual self-evaluation and improvement. There also should be consistent, on-going measurement of the reduction or elimination of environmental impacts the newly implemented practices have on the course. For example, documenting the reduced use of inputs such as fertilizers, pesticides, and irrigation can be used to demonstrate the increased environmental stewardship of the golf course management practices as well as the overall value of the GEM Program. It is important for U. S. Air Force golf courses to show improvement over time. This can be easily accomplished by regularly evaluating golf course maintenance methods, practices, and management approaches changing when appropriate.

Revision

The very nature of a superior GEM program implies that all documents be regularly maintained to represent the most current conditions. U. S. Air Force golf course managers and superintendents should be constantly looking for ways to improve their environmental stewardship. Acting on lessons learned is right behind initial implementation as the most important aspect of a successful GEM Program. The GEM Plan should be kept as current as possible at all times. Ideally, it should be completely updated at least every three years.



Quality equipment maintenance is paramount at Gateway Hills.

Course Descriptions



The Hills features one of the best finishing holes in central Texas.

Gateway Hills Golf Course

Gateway Hills Golf Course (The Hills) enjoys the well-deserved reputation as providing the best golf experience for the money in south central Texas. Diverse, beautifully sculpted holes expertly draped over the natural, rolling terrain and the meandering Leon Creek several times over the 18-holes. Bud Gentle and his friendly, able staff maintain the links to the highest possible standards while complying with water supply restrictions and the vast array of environmental instructions and regulations. Superintendent Leroy Kruse is one of the most experienced in the USAF and is dedicated to

providing a positive golfing experience. An aged irrigation system is scheduled for replacement and should ease many of the difficulties currently encountered in growing and maintaining high quality turf in all “in-play” areas.

Leon Creek, which bisects and drains the course property, comes into play several times as the course’s only water hazard. Not only does the creek increase the challenge of Gateway Hills it greatly enhances the aesthetic and natural qualities of the property while functioning as a valuable wildlife corridor.

DETAILS

Architect	COE, Joe Finger (Final)
Year constructed	1940, 1949-50
Climate	Coastal, sub-tropical
Average annual rainfall	28.7 inches
Average growing season	275 days
Winds/Prevailing Direction	NE & SW
Acreage	Total facility- 240 acres
Par	36-36-72
Yardage/Rating/Slope	Blue- 6917/73.1/125 White- 6544/71.2/113 Gold- 5818/67.7/113 Red- 5437/71.5/116
Golf course manager	Bud Gentle
Superintendent	Leroy Kruse
Turfgrass	419 Hybrid Bermudagrass
Tees	Common Bermudagrass
Fairways	328 Hybrid Bermudagrass
Greens	Bermudagrass/Mixed
Roughs	



The Valley's 6th is a beautiful and demanding golf hole.

Gateway Valley Golf Course

Gateway Valley Golf Course (The Valley) is an interesting layout that literally embraces Leon Creek. Bud Gentle and superintendent Leroy Kruse have recently inherited the management of the facility as a result of the closure of Kelly AFB. The course has many fine holes and a couple that one will never forget such as the 17th that rises over 150 feet from tee to green.

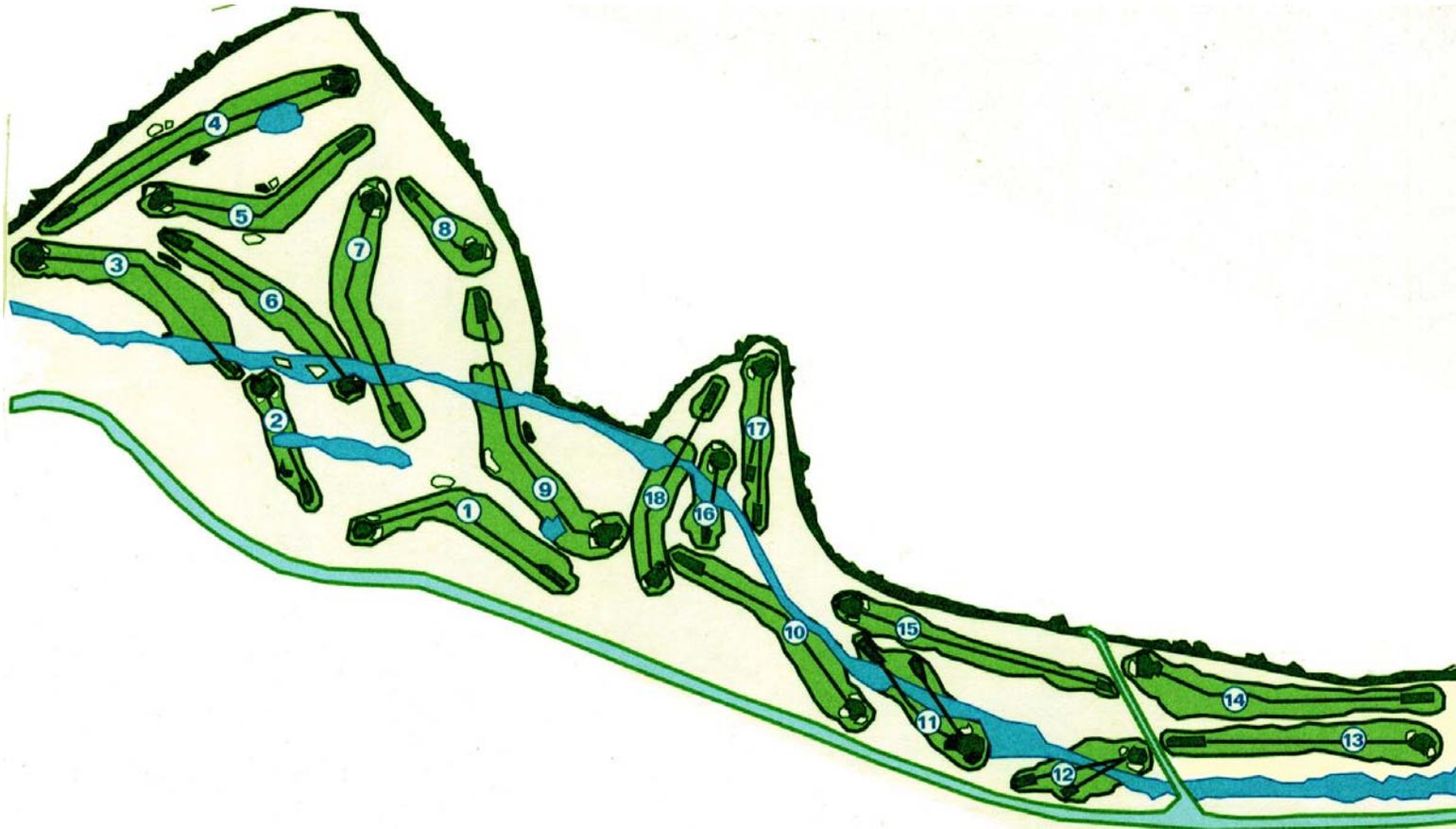
Unfortunately the course is severely hampered by floodwaters and an array of solid wastes and other environmentally unsound materials. Over the last five years the course has lost many months of business due to damage caused by at least three floods. Two

of these have been categorized as an at least one hundred year variety. The course's soils are clay based and do not drain well. Turf quality is improving yet still not to the level desired by the Gateway staff.

The largest obstacle facing the U. S. Air Force, Lackland AFB, and the Gateway Valley staff is the impending environmental restoration project. The Texas Commission on Environmental Quality has prescribed that the landfills below many of the course's holes be "capped" with 24 inches of clay and then revegetated. This will mean wholesale changes to include rebuilding a large portion of the course

DETAILS

Architect		Kelly Civil Engineering
Year constructed		1968
Climate		Coastal, sub-tropical
Average annual rainfall		28.7 inches
Average growing season		275 days
Winds/Prevailing Direction		NE & SW
Acreage		Total facility- 200 acres
Par		36-36-72
Yardage/Rating/Slope		Blue- 6869/73.2/126
		White- 6422/70.8/124
		Gold- 5868/69.5/121
		Red- 5354/70.0/119
Golf course manager		Bud Gentle
Superintendent		Leroy Kruse
Turfgrass	Tees	Bermudagrass mix
	Fairways	Common Bermudagrass
	Greens	328 Hybrid Bermudagrass
	Roughs	Bermudagrass/Mixed



Gateway Valley Golf Course

Miscellaneous Facility Review

Although the course is primary to the enjoyment and eventual return of most of Muroc Lake’s customers, the support facilities play a huge role in the overall success of the operation. This section of the GCEBA will examine the following facilities for their aesthetic, functional, and environmental values:

- Clubhouse/pro shop/snack bar
- Practice areas
- Maintenance complex
- Cart barn
- Infrastructure



Gateway Hills clubhouse.



Gateway Valley clubhouse.

Clubhouse

The Gateway Hills clubhouse is the product of many well-meaning projects spread out over time. Functioning relatively well, its replacement has been the topic of conversation for many years. Securing funds and project approval have so far been prohibitive to any action being taken. Optimism still lives on in the Gateway staff’s minds.

The Gateway Valley clubhouse exhibits a little more cohesive design attempt, yet upon examination is a remarkably similar assemblage of many projects. The Valley features a good snack bar and adequate sized pro shop but poorly located restrooms detract.



The Hills' driving range.



The Valley's putting green.

Practice areas

Both of Lackland AFB's golf courses are outfitted with a driving range, short game practice area, and a properly sized putting green. Mats are in use frequently at the Hills' course as teeing ground is minimal. Short game practice areas may be improperly sited at the Valley. The Hills course has a frequently used shag ball area where players can bring their own equipment and practice throughout the daylight hours. This is a highly desirable convenience for customers in fast becoming less frequently seen around the U. S. Air Force and the golfing world.



The Valley's short game practice area is a long way from the pro shop.



The Gateway Hills golf cart storage facility.

Cart barn

The cart barns at both courses are ripe for replacement or improvement. The Hills' may be using a portion of the old Lackland Officer's Club facility. The Valley's is a metal Butler-type building. Replacement fleets should consider utilizing batteries rather than gasoline to ease growing concerns of the air quality in the San Antonio region.

Infrastructure

This section examines important elements of a quality golf course that are difficult to group into another category. Cart paths are in fair to poor condition. The parking lots are in good. Landscape development attempts have been marginally successful. There is a site amenity group near most teeing areas on the Hills course. Overall, the course signage is adequate.



The interior of the Valley's cart barn.

Maintenance complex

The two course's maintenance complexes are relatively comfortable and functional. Both are organized and nicely maintained but the Hills' seems more adequately sized. Neither storage yard is too large enough for an attractive equipment parking arrangement but they work.



The Gateway Valley maintenance facility and storage yard.



The Gateway Hills equipment storage yard.



Minimal covered equipment storage space at Gateway Valley.

Assessment Summaries

The following is a brief compilation of some of the opportunities and constraints observed in each of the ten Environmental Compatibility Quotient (ECQ) categories during the site visit conducted in Oct 01.

ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Course Playability
- Pollution Prevention
- Conservation Practices
- Aesthetics & Naturality
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

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).



Appropriate signage protects customers and employees alike.



It usually takes four well-played shots to birdie the Hills' unique 10th.

Determining the Environmental Compatibility Quotient

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two ways to use the ECQ checklists to determine the status or quality of the environmental management program: determining the actual and potential environmental compatibility quotients.

- **Actual ECQ-** the total percentage of "Yes" responses for all ten checklists.
- **Potential ECQ-** the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists.

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 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

Overall management philosophy & documentation

GEM PROGRAM GOALS

- Enhance the installation ecologically and economically
- Demonstrate that the golf course is managed with consideration for the unique conditions of the ecosystem of which it is a part
- Document management practices to promote more widespread understanding and appreciation for environmentally sound golf course facilities

OPPORTUNITIES

- Compile and document actions already taken
- Demonstrate environmental stewardship
- Create “continuity” document
- Utilize installation environmental management geographic information system and civil engineering digital aerial photographs for mapping requirements



Superintendent Leroy Kruse fully embraces the USAF GEM program.

CONSTRAINTS

- Lack of funding and staff time
- Need computer hardware and software upgrades to increase overall efficiency and provide high speed internet access
- Minimal coordination and team work among installation environmental and BASH personnel

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 environmental opportunities or constraints such as wildlife habitat, water resources, sensitive landscapes, special management zones, etc. posted for customers?			✓
5	Environmental goals, objectives, issues, 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 wildlife species and habitats?	✓		
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	3	2

Safety, training, & awareness

GEM PROGRAM GOALS

- Educate all employees on the benefits of an ecosystem based golf course environmental management program
- Store and handle all potentially harmful products to minimize employee exposure
- Regularly train employees on the potential health hazards associated with their duties
- Involve entire staff in ensuring a safe golfing opportunity for their customers

OPPORTUNITIES

- Expanded training for all employees a must
- Ensure employee's health is prime consideration
- Demonstrate real concern for player health and safety
- Utilize AFCEE for on-site golf course environmental management training

CONSTRAINTS

- Lack of funding
- Training scheduling makes it difficult to involve much of the staff at one time



Safety messages are posted in the Gateway Hills maintenance employee break room.

Safety, Training, & Awareness				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	All employees are familiar with the GEM Plan and are trained regularly on the importance of environmental performance and compliance with the goals and objectives of the program?			✓
2	All appropriate employees are trained to be familiar with USAF, federal, state, and OSHA regulations that apply to storage and handling of chemicals used on the property?	✓		
3	All employees are aware that chemical manufacturing, use, storage, and disposal may pose 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	Chemical applicators are encouraged to apply for continuing education programs and receive regular training to maintain currency?	✓		
7	The chemical storage structure/area is locked, well-ventilated, fire proof, and access is limited to select personnel?	✓		
8	Pesticides, fertilizers, and other chemicals are stored on plastic or metal shelving?	✓		
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 and safety?	✓		
10	Are key staff members trained regarding water quality and conservation issues?	✓		
	Point totals for each column - Response percentage	8	1	1

Compliance

GEM PROGRAM GOALS

- Make management practices integral with appropriate regulatory requirements and procedures
- Guarantee safe, healthy, and enjoyable experience for golfers while ensuring long-term operation of the facility
- Utilize installation expertise regularly on all matters dealing with bird aircraft strike hazards, regulators, impact analysis, and cleanup

OPPORTUNITIES

- Assemble all documents in one place
- Do more than what is required
- Turn compliance from a chore to a marketing approach to increase playership
- Ensure ECAMP results are outstanding

CONSTRAINTS

- Inconsistent interpretations of compliance actions among installation, MAJCOM, and ECAMP evaluators confuses and confounds
- Incomplete technical training and experience on environmental issues creates difficulties



The Hills' pesticide storage is appropriately signed and secured.

Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is fuel storage/delivery managed in accordance with federal, state and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at regularly scheduled meetings?		✓	
3	Are there regularly scheduled staff meetings to discuss environmental management issues?	✓		
4	Does the director of golf and the superintendent attend ECAMP 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	Are MSDSs readily available for all required substances?	✓		
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	Are oil/water separators operating properly and correctly maintained?	✓		
10	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) (not the product name) - the pest or purpose for which the pesticide was applied --the date and place of application. 	✓		
	Point totals for each column - Response percentage	7	2	1

Course playability

GEM PROGRAM GOALS

- Create desirable playing conditions through the utilization of sound, ecosystem based environmental management practices
- To daily offer and enjoyable and challenging yet fair golfing experience for all levels of golfers
- Establish a open, courteous, and friendly relationship between the course manager, the superintendent, and the customer to maintain enthusiasm and interest



Gateway Hills boasts some of the finest greens in San Antonio.

OPPORTUNITIES

- Increase number of rounds played annually by 5-10%
- Improve challenge while maintaining equitable playing conditions for all levels of golfers
- Maximize variety in course set-up by including a diversity of challenging pin placements and numerous tee locations
- Continue focusing maintenance efforts on in-play areas of the course

CONSTRAINTS

- Increase contour mowing for greater definition of fairway landing areas
- Incomplete cart path improvement project including curbing near greens and tees
- Number 9 green is too tough!

Course Playability				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Pin placements and tee markers are regularly moved to minimize the impacts of play while increasing the enjoyment and diversity of the experience of the customer?	✓		
2	Course has sufficient number of tees to satisfy need of all types of golfers and their individual talent levels?		✓	
3	At least 75% of the greens are proportionally sized for the average length of approach shot for required all levels of golfers?	✓		
4	The speed of the greens is appropriate to their contours and size?	✓		
5	Fairway width and turf quality is sufficient for equitable challenges to all levels of golfers?	✓		
6	Roughs are regularly maintained to produce an equitable challenge to all levels of golfers?	✓		
7	Course conditioning and maintenance practices do not contribute to extending average playing times?	✓		
8	Extraneous fairway bunkers have been eliminated or converted to grass bunkers to help speed play?	✓		
9	Is bunker sand of appropriate quality and consistency?	✓		
10	Is proper drainage maintained near at least 95% of all greens and tees?	✓		
Point totals for each column - Response percentage		9	1	0

Pollution prevention

GEM PROGRAM GOALS

- Employ practices that eliminate or avoid the potential for polluting the environment
- Guarantee that the golf course facility will not allow chemicals, fertilizers, detergents, or petroleum products they use outside their property boundaries
- Create and utilize a comprehensive pollution prevention plan for all aspects of the golf course and its facilities

OPPORTUNITIES

- Further reduce solid waste streams from clubhouse operations
- Increase the use of slow release fertilizers
- Regularly provide training for all employees on the specifics of pollution prevention and how they can help
- Create covered fueling area

CONSTRAINTS

- None



Quality pollution prevention equipment keeps Gateway Hills in good standing with Lackland's environmental staff.

Pollution Prevention				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated "no-mow" areas and established "no spray zones" and buffer areas around pond, stream, or lake edges and have they been communicated to mower operators and technicians?	✓		
2	A spill containment kit is readily available and spill containment procedures are in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all 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	Wash and wastewater is kept from making direct contact with surface water and is recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
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	Does the fuel storage and delivery area comply with local, state, and federal regulations?	✓		
10	Are slow-release fertilizers used to reduce the negative potential for runoff?	✓		
Point totals for each column - Response percentage		10	0	0

Conservation practices

GEM PROGRAM GOALS

- Use natural resources efficiently while respecting their long term value to the local community and the mission of the USAF
- Provide important greenspace benefits
- Closely monitor and manage water use to prevent unnecessary depletion of installation or local water resources



Many acres of the Hills' "out-of-play" areas have been removed from regular, intense maintenance saving labor, fuel, time, and wear and tear on equipment.

OPPORTUNITIES

- Incorporate contour mowing procedures
- Designation of certain areas as "environmentally sensitive"
- Increase communication with customer on conservation practices that are already in place
- Work more closely with installation natural resources manager
- Provide detailed input to the scheduled update of installation integrated natural resources management plan (INRMP)

CONSTRAINTS

- Potential for the next commander to change course maintenance practices such as discontinued care of "out-of-play" areas
- Inaccurate statements in recently completed Lackland BASH Plan may be potentially harmful to golf course maintenance and conservation efforts

Conservation Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?			✓
2	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?		✓	
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, out of play areas, etc.) been eliminated or minimized?	✓		
5	Have flow meters been installed to monitor water use and detect potential waste?	✓		
6	Have part circle irrigation heads been installed where possible to save water 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 wildlife habitats and their maintenance practices been coordinated with the installation BASH officer and environmental management personnel?		✓	
10	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?		✓	
Point totals for each column - Response percentage		4	4	2

Aesthetics & Naturality

GEM PROGRAM GOALS

- Create and maintain an attractive golf course facility that requires minimal outside chemical or fertilizer inputs
- Utilize native or indigenous plant materials exclusively
- Consider every aspect of the golf course facility as a positive contributor to the overall satisfaction of the customer



Gateway Hills utilizes natural contouring and native plant materials.

OPPORTUNITIES

- Increase number and variety of new native trees added to course every year
- Elimination of patchy turf areas in roughs through the use of pine straw and revised cultural practices
- Plant native understory trees and shrubs in areas where play will not be impacted
- Increase the use of “contour” mowing of fairways to highlight hazards and landing areas
- Improve signage and cart paths

CONSTRAINTS

- Funding to expand landscape improvements to select areas on the course
- Location and appearance of cart barn
- Course is blessed with “too many trees already” by some of the customers

Aesthetics & Naturality				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is the area near the clubhouse attractively landscaped and maintained?	✓		
2	Is there an appropriately located and attractive facility sign and has the on course signage been designed and maintained attractively?	✓		
3	Does the course seem to be part of the natural landscape and overall contours?	✓		
4	Are pest-resistant and drought-tolerant native trees, shrubs, groundcovers, or their cultivars used in landscaped areas?	✓		
5	Are there "targeted", highly visible areas where flowering annuals or perennials are appropriately maintained?		✓	
6	Are the relative numbers of the prominent deciduous, evergreen, and flowering golf course trees balanced and at least 75% native species?	✓		
7	Are the maintenance facility and the course's miscellaneous "outbuildings" maintained sufficiently and/or screened from view?		✓	
8	Is there an attractive and well-maintained site amenity group (bench, washer, etc.) at least 75% of the tees?		✓	
9	Do the driving range, practice areas, and parking areas present a positive image?	✓		
10	Is the cart barn integrated into the overall landscape plan of the course or the area in which it is located?		✓	
Point totals for each column - Response percentage		6	4	0

Maintenance practices

GEM PROGRAM GOALS

- Integrate the concept of ecosystem management into all course management decisions and practices
- Employ the principles of integrated pest management
- Document all activities for future reference



Heavy shade and minimal teeing area limits the quality of the turf here at the par-three, 8th at Gateway Hills.

OPPORTUNITIES

- Incorporate increased contour mowing procedures
- Increased training and involvement of staff on integrated pest management procedures
- Utilize civil engineering digital aerial photos to locate and monitor “hot spots”
- Compile written pest profiles of common pest species

CONSTRAINTS

- Improve tree care to eliminate risk, improve aesthetics, and grow better turf
- Eliminate poorly drained, in-play areas
- Increase number of trained scouts

Maintenance Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is contour mowing used to conserve fuel and increase playability and aesthetics?		✓	
2	Are there designated non-maintained or minimally maintained buffers around core wildlife habitats?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular procedures in place to continually improve soil health such as organic amendments, aeration, and drainage?	✓		
5	Is there a map of the course's "hot spots" requiring special care or regular attention?			✓
6	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest populations using scouting forms to record the type, severity, location, and treatment of pest problems and organized into a report or guide so that they can be used for future pest control solutions?		✓	
7	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?			✓
8	Are there established and documented aesthetic and functional thresholds for insects, fungal diseases, and weeds for all managed areas to precisely and effectively manage pest populations and reduce chemical inputs?	✓		
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 - Response percentage		5	3	2

Customer relations & education

GEM PROGRAM GOALS

- Ensure that the customer knows that their opinions count and will be acknowledged, assessed, and acted upon
- Educate the customers about the benefits of environmentally responsible golf course management and the future of the game and the environment
- Enlist customer support and assistance on caring for the course and its facilities as well as GEM Plan goals

OPPORTUNITIES

- Provide a more convenient, on-going vehicle to solicit customer opinions and concerns
- Create a location to communicate environmental management goals and maintenance plan
- Involve installation youth through rules and instruction clinics

CONSTRAINTS

- None



Consider using a wall somewhere in the clubhouse to communicate the facility's environmental plan to the customer.

Customer Relations & Education				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in a long-term customer educational program that is regularly updated and documented?			✓
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?		✓	
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 Council, Civil Engineering, Environmental Management, the Services manager, and commanders by course management?		✓	
5	Are there warning signs posted near parking lots to make highly sensitive individuals aware of the potential danger to their health and are all state posting requirements being met?			✓
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 when drinking reclaimed or otherwise non-potable water?	✓		
8	Are there interpretive signs posted to highlight key habitats or have appropriate areas 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	3	4	3

Miscellaneous special projects & activities

GEM PROGRAM GOALS

- Educate the local community about the benefits of an environmentally responsible golf course management approach is for the future of the game and the environment
- Reach out to school children to raise their awareness and appreciation for the game of golf and the GEM Plan principles
- Further the great game of golf at all times in as many ways as possible

OPPORTUNITIES

- Conduct field trips at the course for local school children
- Enlist the assistance of local city and county officials on golf course environmental planning initiatives
- Initiate Earth Day course improvement fundraiser golf tournament
- Educate customers about the benefits of an environmentally friendly golf course



A tour of the Gateway Hills maintenance facility could be a valuable learning experience for local school children.

CONSTRAINTS

- Need to demonstrate dedication to “growing” the great game of golf to non-golfers and area youth
- Lack of time

Miscellaneous Special Projects & Activities				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for the next year that would communicate 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 planned that may provide for future environmentally-related projects?		✓	
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	3	4	3

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	5	3	2
2	Safety, Training, & Awareness	8	1	1
3	Compliance	7	2	1
4	Course Playability	9	1	0
5	Pollution Prevention	10	0	0
6	Conservation Practices	4	4	2
7	Aesthetics & Naturality	6	4	0
8	Maintenance Practices	5	3	2
9	Customer Relations and Education	3	4	3
10	Miscellaneous Special Projects & Activities	3	4	3
	Composite points & response percentage	60	26	14

GCEBA Results

* Gateway Hills & Valley Golf Courses, Lackland AFB, TX

- Actual ECQ (# of "Yes") = 60 "Early Stages"

- Potential ECQ (Actual ECQ plus "Partial") = 86 "Getting There"

Conclusion

Overall, the Gateway Hills Golf Course facility and staff at Lackland AFB are among the very best the Air Force has to offer. The course design is of exemplary quality while the conditioning of the course usually rates high. The clubhouse and pro shop are large enough to accommodate the regular customer traffic at the course.

Environmentally, the staff regularly practices a majority of the basic tenets of an ecosystem-based golf course management program. The largest problems facing them are documenting their on-going efforts, taking proper credit for their regular, environmentally- sound practices, and communicating them to the customer. And, like most Air Force golf facilities, little funding is available. In this light, with much credit and thanks to Bud Gentle and Leroy Kruse, Gateway Hills Golf Course is well on its way to being one of the best examples of the Air Force's GEM program in progress.

The ECQ Summary on the following page highlights the following areas for improvement at Lackland AFB:

- Overall Management Philosophy & Documentation
- Conservation Practices
- Customer Relations and Education
- Miscellaneous Special Projects and 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 visits) of pests, maintenance practices, and other areas where improvements may be made or exemplary practices are encouraged for continued use to create the best possible golf facility.



The Hills' fuel tanks inside of maintenance facility fencing.



A wonderful panorama greets players starting at the Hills course.



A new bridge over Leon Creek at the Gateway Hills Golf Course.



The Hills' 16th is a neat short par four.



The Hills course could use a few cart path improvements.



The Hills utilizes a utilitarian site amenity group.



Leon Creek flows gently through the course...most of the time.



The Hills 10th challenges from the get go.



Drainage problems occur even on the best of courses.



Nutria thrives in a Valley water feature.



Leon Creek flow may be hindered by vegetation and deposition.



Habitat is where you find it.



Yep, there's a golf course out there.



Bunkers are constantly being washed out by flood events at the Valley.



Water over the road to the Gateway Valley clubhouse.



Nice design at the Valley's snack bar and grill dining area.



Damage caused by recurring floodwaters confounds Valley staffers.

Environmental challenges

One of the important results of the GCEBA process is the identification of significant issues or challenges that should be addressed in the long term GEM Planning process. Ideally, the golf staff will address each issue from the best way to satisfy the goals of the golf facility and acceptable levels of course playability and customer satisfaction. The golf staff's preferred management approach for these issues should then be coordinated with the installation's environmental staff for refinement, coordination, and approval.

The GEM Plan would then consist of the environmental challenges, the approach to their management, a map showing where these challenges occur on the golf course, a booklet that describes the mapped challenges, goals and objectives for future years, and a set of best management practices. Ideally, these components would be inserted into the Integrated Natural Resources Management Plan (INRMP) and receive regular updates.

The following environmental challenges were identified during the GCEBA process at Gateway Hills & Valley Golf Courses, Lackland AFB, Texas:

- Environmental Compliance and Management Program (ECAMP)
- Water conservation
- Bird/Wildlife Aircraft Strike Hazard (BASH)
- Watersheds, wetlands, and floodplains
- Installation Restoration Program

ENVIRONMENTAL COMPLIANCE AND MANAGEMENT PROGRAM (ECAMP)

Although the ECAMP was intended to be a helpful and friendly check on an installation's regulatory compliance, it has evolved into something nearly universally dreaded. Inconsistent interpretation of the rules, eager and inexperienced team members, and a disdain for "paper work" all contribute to the less than ideal situation. Lackland golf courses have generally been in great shape but the Oct 02 "Environmental Audit Report" cited the Valley course for improper storage of chemicals, not completing weekly waste container inspections, not providing monthly pesticide application records to the installation pest management shop, and their pesticide applicator's respirators were not receive the required periodic fit testing. All of these issues were immediately rectified. Compliance is a daily task. There are no excuses for violations. AFCEE expects the Gateway staff will continue their stellar historical performance on this issue in the future.

WATER CONSERVATION

Water use by the golf industry is the number one issue affecting its future. It certainly is at Lackland AFB as the San Antonio area is constantly under general watering restriction year round. The Hills course recently acquired a new irrigation system that should help tremendously in minimizing waste. They are also set to begin using San Antonio Water System recycled water further alleviating the U. S. Air Force's dependency on groundwater in the San Antonio area.

The INRMP includes a “Water Conservation Policy” (WCP) for the installation that delineates Lackland AFB’s commitment to “helping preserve our primary source of water, the Edwards Aquifer”.

More significantly, as a result of a formal consultation with the U.S. Fish & Wildlife Service in compiling with Section 107 of the Endangered Species Act, a special group called the San Antonio Department of Defense signed a Biological Opinion (BO). The BO commits all parties to “rigorous water conservation efforts”. To complicate matters, trigger values and stage numbers do not correspond with local efforts. The WCP delineates five water conservation stages and their respective triggers. The golf course has specific watering days and timeframes as well as conservation requirements for each as summarized below:

- Stage I Reduce by 1.6 times base usage
- Stage II Reduce by 1.4 times base usage
- Stage III Reduce by 1.3 times base usage
- Stage IV Reduce by 1.185 times base usage
- Stage V Same as Stage IV

The WCP defines base usage as the average of the three lowest values of the months of November and December 1995 and January and February 1996. Due to the significance of the discussion above, the golf course staff should compile a Drought Management Plan that assesses and prioritizes specific course based water requirements to prepare for unforeseen shortages or interruptions in supply of recycled water.

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)

The installation’s Bird & Wildlife/Aircraft Strike Hazard (BASH) Plan depicts the golf course as a potential problem. It was unclear if the golf course staff had an opportunity to review the document prior to its completion, but there may be a potential liability for the golf course if the final version contained similar language as the draft. It is paramount that the golf course staff ensures that they actively participate in the compilation of plans like BASH as well as the planned update of Lackland’s integrated natural resource management plan. Additionally, there were no Services representatives listed as members of the Bird Hazard Working Group.

The INRMP lists 31 bird species and 1 bat species as having a potential to be involved with an aircraft collision. Other than transitory flocking birds, the INRMP identifies three potential bird threats to include roosting grackles in housing areas, doves and meadowlarks near the airfield, and nighthawks feeding near the airfield. There is no explanation as to why the actual enclosed BASH Plan highlights the golf courses as a potential threat and the INRMP does not.



When it rains hard upstream, the Valley course becomes inundated.

WATERSHEDS, WETLANDS, & FLOODPLAINS

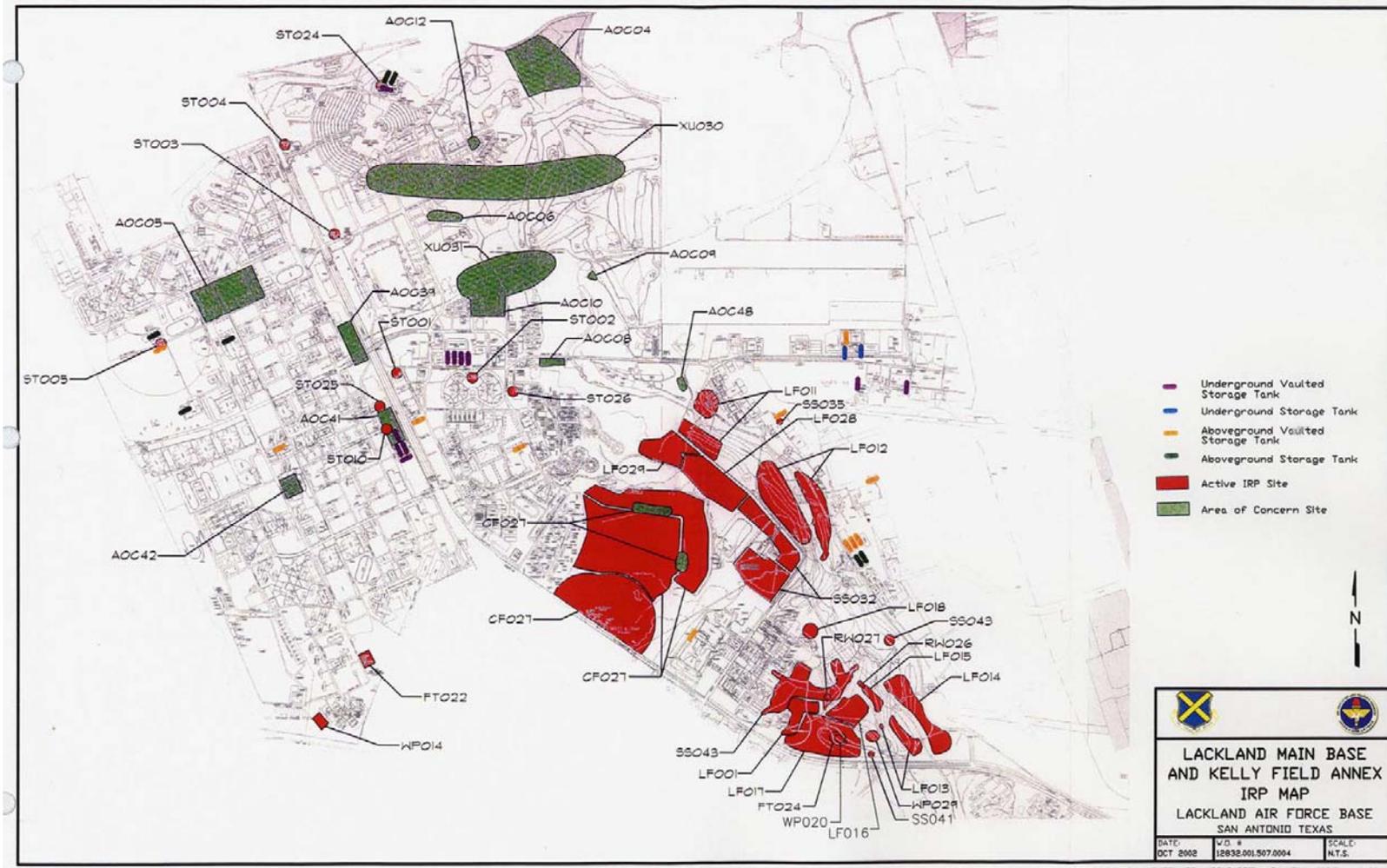
According to a map dated Jun/Jul 99 accompanying the enclosed INRMP appendix, the Gateway Hills course has delineated wetlands in a small unnamed perennial tributary of Leon Creek directly in front of the teeing area of the 9th hole. Several unidentified grasses, blunt spikerush, green bulrush, and dotted smartweed were identified as residing in this area. There was no information directly available on specifically delineated wetlands at the Valley course in the INRMP but their occurrence is highly likely.

According to the INRMP, Leon Creek is a thirty-six mile long intermittent stream that rises in northwestern Bexar County and flows southeast through Lackland and its two golf courses. Unfortunately, with the continuous urbanization and rapid development upstream in metropolitan San

Antonio, runoff quantities continue to increase. Predictably, both courses have received significant damage during the last five years as the area has experienced at least two 100-year floods and several other large precipitation events. The Valley course has been severely hindered by the shifting flow channel as well as unbelievable flooding over the years. Due to environmental concerns, extreme care must be exercised prior to significant changes to any of the regular maintenance performed along these water features.

INSTALLATION RESTORATION PROGRAM (IRP)

Contaminated groundwater plumes have been present at the Gateway Valley Golf Course location for many years. The ongoing IRP projects are closing in on finalization in the mother of all restoration projects. The final remedial process agreed to by state regulators will result in a 24-inch clay cap roughly over the areas highlighted in red on the next page. The project has been estimated to cost the U. S. Air Force approximately \$50M to include rebuilding the golf course. Holes that will be affected include: 3, 4, 5, 6, 11, 12, 13, 14, & 15. Project closeout could be accomplished in 2033 after successful completion of long term monitoring. This massive effort will be phased to limit interruption of business at the course. It is yet to be seen how determined Lackland AFB, Air Education & Training Command, and the U. S. Air Force will be to follow through on the stated goal to rebuild the course.



Excerpt from Draft Integrated Natural Resources Management Plan, October 2002

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Gateway Valley Golf Course



Gateway Hills Golf Course



For additional assistance or more information, please contact:
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<http://www.afcee.brooks.af.mil/ec/golf/>