LANDFILL: One Alternative

"We are rapidly dissipating our land resources in metropolitan areas to the extent that sanitary landfills in many instances offer the only alternative for reclamation of recreational development sites."

–Buddie Johnson

Sanitary landfill areas can offer land-starved cities new sites on which to build golf courses and parks. That the "old city dump" must be eliminated, has been recognized by all levels of government. New regulations spurred by public pressure are forcing local governments to reclaim these offensive heaps for public use.

Sanitary landfill is an effective, economical and proven method for the permanent disposal of garbage, dry trash and combustible rubbish. The result of the process is a reclaimed site that can be used for recreational or industrial purposes. Basically, landfill is refuse that has been placed in a trench, compacted and covered daily with shallow layers of dirt fill. If done properly, the familiar problems of rodents, vermin, odor, insects and fire are eliminated.

We are a nation of ravaging consumers. It has been aptly stated that this country throws away more than most nations consume. Americans are now facing a crisis in the disposition of waste. The effects of waste disposal must be considered in light of an ever-lengthening list of relevant factors. Where will we put our waste? How will it affect our underground water supplies, and so on. Unless stricter controls are implemented to curb the proliferation of disposables of all kinds, the problem of waste disposal will become more severe. How will this country deal with this problem, and what will it mean to the golf industry?

Through sanitary landfill, this country can solve two of its pressing problems: disposition of waste and the creation of viable recreational land sites

by BUDDIE JOHNSON

NATIONAL GOLF FOUNDATION CONSULTANT
PACIFIC SOUTHWEST REGION

THOROUGH PLANNING WILL DO THE JOB

Tom Lowry, a civil engineer and recognized authority in the field of sanitary landfills, is convinced that the key is proper planning. "Every community should develop a master plan for growth. Each should decide where its sanitary landfills will be located and hopefully determine what it eventually wants to see there. The second step is to engage the services of qualified architects and waste disposal experts who will ensure that the best methods of operation will be carried out to meet that community's needs," states Lowry. His company, Harding-Lawson Associates of San Francisco, has demonstrated the value of this advice on many of their projects in various parts of the world. Because real estate people use a different crystal ball than municipal planners, it is possible that landfill sites will wind up near residental areas. For this reason, the master plan must be flexible. The best planning procedures would include input from county officials. This has best been illustrated in San Diego County, where a 20-year master plan for refuse disposal has been completed, including two fills that eventually will be used for golf course sites.

Echoing most experts in the field, Lowry believes that the sanitary landfill is elementary engineering and in most cases poses no special problems. To be done economically and successfully, it should be handled like any other engineering project, which includes studies, drawings and specifications. The pre-planning is especially important if a golf course is planned for the site, because basic contours and elevations can be more easily engineered at the beginning.

Most cities have taken the problem of waste disposal too lightly. They have either burned their refuse, fed it to hogs or found a convenient hole in which to bury it. With not much more effort and money, refuse can be disposed of safely, without harm to the environment. Officials can gain knowledge from previous study data that indicate depth of fill, plan of operation, amount of earth fill needed, provision for proper drainage and the probable life expectancy of the site for fill purposes.

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Typical dump site before reclamation (left). Three-year-old landfill-created Monterey nine holer (right) is still serving Los Angeles' golfers.

The city of Phoenix has done an excellent job in this regard. The basic elevations were included during the fill time to meet the specifications of a proposed golf course on their Cave Creek Park site. Golf course architect, Arthur Jack Snyder, had already given to city engineers initial plans and specifications for the course. The golf course will cost less, because less topfill will have to be moved for contouring.

The need for land is urgent, particularly around most metropolitan areas. This fact is clearly reflected in the tremendous shortage of golf facilities in and around urban areas. Officials of these city-suburban complexes would do well to imitate the actions of Phoenix officials by planning a golf facility, tailoring the fill to meet that use and present the plan to zoning officials at an early date. Even that task is not easy. Public officials in many cases must be super salesmen and must be able to overcome the public's bias toward "dumps." Oratory isn't enough; only facts and proper planning are a proper defense against this prejudice. Opponents will challenge the choice of certain areas. Thus a planner must know costs, projected population densities, future refuse needs and have a clear plan for the ultimate use of the site. In other words, he must have a well-thought-out and documented master plan.

One unique feature of sanitary landfill is that it is practical for a city of 2,000 or two million. In all cases, there are unique advantages: improved operation and environmental control of waste disposal; quality control, protecting the environment by preventing air and water pollution normally associated with disposal site operations; consultation of other public agencies and private consultants to develop better operating techniques, training or personnel, selecting and using equipment. All these lead to better economy and public service. What politician or public servant could ask for more?

Because sanitary landfills improve land, they can be located much closer to residential and industrial areas than was previously believed. It makes sense to locate them as close to the sources of waste as possible, because this cuts down on hauling costs. The most popular formula used in determining acreage requirements is expressed as "1-1-1." This simply means that one cubic yard of compacted refuse for one person for one year is needed. Between 9,000 and 10,000 cubic yards of compacted refuse can be deposited in one acre per year, working to a compacted depth of six feet. Based on these figures, a town of 5,000 will require one-half acre per year, if the fill is to be done efficiently. In areas dotted with small towns, a county-wide system can be adopted. This system makes future recreation available to all inhabitants and each city could share in the costs.

COSTS ARE REASONABLE

A wide range of costs has been reported relative to sanitary landfill. The total cost of the fill is the sum of the land costs, plus site development, plus landscaping and improvement costs. Land for a landfill has ranged from $2,000 to $20,000 an acre in Los Angeles alone. Leasing land can cost from $.04 to $.50 per cubic yard of space used. Depending on the degree of compaction obtained, lease costs per ton range from $.06 to $.50.

The most recent purchase of landfill acreage by Los Angeles was $2,000 an acre. The site has been planned for 2,000,000 cubic yards per acre with an average depth of 124 feet. It can easily be seen that by greater depth and more efficient compaction methods, much money can be saved. As for future land use, especially if a golf course is planned, the total site cost would be very small in proportion to the ultimate value of the finished product.

OPERATING FACTORS

There are two basic methods used to create sanitary landfills: the area method and the trenching method.

The area method is normally used in low or uneven areas. Refuse is dumped, compacted and covered in a gravel pit or gully. With this method, use of "cells" provides a systematic organization to the project. A cell is one day's deposit. Side by side, cells are repeatedly used to create level, usable expanses for eventual landscaping. In all area methods, enough cover should be extracted from adjoining slopes (or bottom of the working surface) to provide at least a six-inch layer daily and a final layer of at least 24 inches.

The trenching method, sometimes called the "cut and fill" method is used where level ground is available. It has three variations:

1. The single progressive trench is dug for one day's refuse and cover material is obtained by further trenching;
2. The single trench is one long trench with excavated material windrowed on both sides to use for cover. Trench width should be twice the tractor width for best compaction;
3. The dual trench method uses one trench excavated the length of the site. After refuse is dumped, the cover material is brought from a parallel trench two or three feet from the first.

Perhaps the most notable problem of sanitary landfills is the production of methane gas. A by-product of the interaction between bacterial and organic material, methane gas has its most obvious effect on plant life. The Rancho San Joaquin GC in California's Orange County has eight-year-old trees that are stunted and huge expanses or grassy areas that have no grass. The gas in Phoenix's Cave Creek project killed the first 20 rows of an adjacent orange grove. Across from San Francisco, Alameda's second municipal golf course is dotted with pathetic trees, bushes and strangely colored grasses — all the result of methane gas poisoning. Coupled with such things as "bedsprings" rising out of the ground as a result of pool compaction, this golf course provides fun for only the hardy and non-discriminating player.

Methane gas tends to diffuse vertically, but has been known to travel horizontally by as much as several thousand feet. When this happens, the greatest danger is to nearby buildings. The gas enters along insulated water or sewer pipes to enclosed spaces beneath the building. Avoiding this problem is especially imperative if a golf clubhouse is to be built on landfill.

The most successful treatment of this potential problem has been that of engineers from the University of Washington on Seattle's Union Bay Landfill site. They used extensive piping to vent the gas and burn it at the surface.

From all present indications, sanitary landfills will be prime municipal golf course sites. It is also reasonable to expect that city governments will lease finished landfills to private developers for golf course construction. The problems are still

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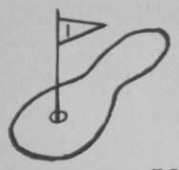

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fine-leaved, low-growing varieties with short thin rhizomes; and under mowing, they develop a turf appearance similar to the better Chewings fescues. Types such as 'Golfrood' have demonstrated good salt tolerance. Some of the most leaf spot resistant varieties are found in this group. The creepers are generally poor seed producers. Also, they may be destroyed by dollar-spot disease in New Jersey.

The spreading-types of fescue (*F. rubra* subsp. *rubra* L.) also flower in the late afternoon. They have 56 chromosomes, wider leaves, long spreading rhizomes and good seedling vigor. They are not as tolerant to close mowing and grow less dense than the creeping or Chewings-type varieties. Under New Jersey conditions, they have performed well in roadside tests when used alone or in mixtures with Kentucky bluegrass varieties. Their good seedling vigor makes the spreading fescues particularly valuable as a companion grass in the establishment phase. 'Boreal' and 'Ruby' are representatives of the spreading type fescues. A synthetic of six regionally adapted spreading fescues was developed at Rutgers in 1970. It is being tested at various locations under close and high mowing and it is receiving intensive study in New Jersey for roadside use Early performance has been favorable and seed increase is in progress in Oregon for contemplated release as 'Fortress'.

The hard fescues (*F. longifolia* Thuill.) have received considerable attention since the development and release of 'Biljart' hard fescue in Holland (better known in the U. S. as Scotts C-26). Because of the success of this new hard fescue variety, turfgrass breeders in both the U. S. and Europe are collecting hard fescues from old turf areas and initiating breeding programs with this species. The better hard fescues produce a turf comparable in texture and growth habit to the better varieties of Chewings-type fescue, have a slower vertical growth rate, resist some diseases better, and offer adaptation to some poor soil conditions. The color of C-26 hard fescue is an attractive deep green that persists in spite of moderate drought. Cool season dormancy often persists well into midspring which may be objectionable. The hard fescues have weak seedling vigor, fill in only by tillering, and appear to be rather slow to recover from wear and physical injury when grown in pure stands. Hard fescues flower in the nursery shortly after daybreak and the pollination season occurs prior to flowering of *F. rubra.*

The sheep's fescue types (*F. ovina L.*) are usually blue-gray in color. Their leaves are more prostrate than most grasses under mowing. The unusual leaf orientation and color contrast with other turfgrasses and contribute to heterogeneity as opposed to blending in mixtures. Sheep's fescues often predominate in shady or droughty areas that have been under low maintenance. This species flowers at mid-day (approximately) under New Jersey conditions and appears to be distinct and reproductively isolated from hard fescues. □

LANDFILL *from page 36*

many, but the technology exists to overcome them. The question now is, "Will we use it?"

SITE PLANNING CONSIDERATIONS

DO'S

1. Keep it convenient to refuse production centers;
2. Keep away from drinking and irrigation water supplies;
3. Consider possible future land use;
4. Consult state and Federal public health offices for assistance;
5. Use cover materials that are workable in all weather conditions and temperatures;
6. Take advantage of good public relations resulting from a shift to sanitary landfill program;
7. Use modern, efficient site equipment.
8. Plan to use secondary access routes to site.

DON'T'S:

1. Disturb natural drainage;
2. Locate on or near springs;
3. Locate on exposed rock strata;
4. Depend on clay or gumbo if avoidable;
5. Locate where access roads may be sometimes flooded;
6. Locate where trucks must be routed through residential areas.