



Groundskeeper in Paradise

Building New Sports Fields in Hawaii (Or Moving Mountains, Re-Plumbing Artesian Springs and Then Some. . .Like NOT Using the Local Sand!) Part I

by George P. Toma

I have made countless trips to Hawaii to prepare fields for the NFL Pro Bowl, the all-star game held in Honolulu each year since 1979. Getting the Pro Bowl fields in shape, including natural grass practice fields, requires advance work, of course. So more than one trip to Hawaii is involved. But it's sun and fun duty and I regard the main event as a privilege—like attending a reunion of the stars of the game.

This Hawaiian sports classic has always been played on artificial turf. But this is about to change. After 2001 all Pro Bowl matches will be played on

natural grass fields. The word is that Aloha Stadium will have real grass for next year's game, even if it's sod installed just for that day.

The grounds program and crews for all 21 events have been directed by me or my son, Chip. Since he



An ideal backdrop for a worksite. Photos courtesy Hal Dickey

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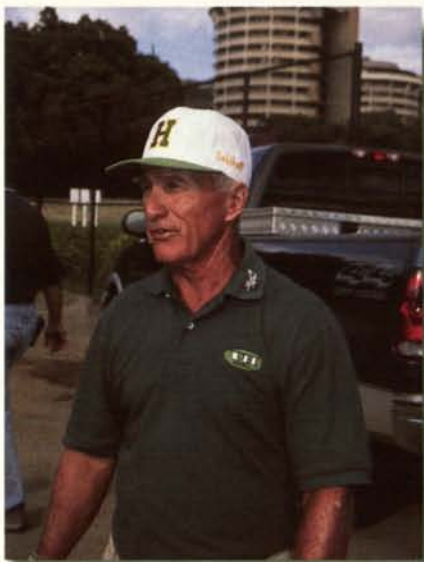


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Toma prepares for another day at the "office."

was named head groundskeeper for the NFL four years ago, Chip Toma has been in charge. So now I work for him, at least on certain projects.

It's become a January ritual for us: Get the Super Bowl ready, then we're Honolulu bound. Chip usually is in flight during the Super Bowl and I leave the next day. The big difference in 2000 was that I stayed in Hawaii until November.

I signed on as sports field consultant with the University of Hawaii, staying on the island until November. My assignment: Upgrading the turf and maintenance of the stadium field for girl's softball, and getting a new soccer field and football practice field up from scratch.

These three fields are at the university's Manoa campus. This is about halfway between Diamond Head volcano and the Waieki resort district, only 10 minutes from either by car. At the university all the athletic facilities and parking use up every square foot of an area known as the Lower Campus or Quarry area, which is where the new football and soccer fields are. They replace two old football fields built nearly 20 years ago in a two-tier arrangement on old quarry ledges. I saw them when they were new. We were looking for Pro Bowl practice fields, but they were rejected by the league even back then.

Renovate or Start Over?

We didn't try to renovate these old fields. It wouldn't have been worth the effort—their design, drainage and compaction problems were that bad. Everyone involved agreed that starting over was our only option. On Nov. 19, 1999, the excavators moved in and the old fields were torn out.

Building new fields at this site wasn't easy. It practically required moving a mountain and re-plumbing an artesian spring. Not to mention getting grass up and playable for football in three months using a root-zone mix that contained no sand.

The cost of building a sports field, like almost everything else in



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Hawaii, is a lot higher than on the mainland. Nearly everything, except maybe fruits and flowers, has to be shipped in—including suitable sand! The sand around Honolulu or anywhere on Oahu is way too fine for our soil mix needs. This probably explains why the old fields had so many problems. They were built with hauled-in clay silt and no sand. We had the soil tested and it had a pH of 7.9 and the infiltration capacity was zilch—would you believe only 0.3 inches per hour!

Water also had been a serious problem with the old fields and it was a major fact in the site prep done for the new ones. There is a large underground spring in the hillside just above the upper field. A drainage system had been installed alongside and under the old fields. Actually, it did a fair job of collecting the spring water but the field's surface was poorly drained.



The architects and engineers, Belt Collins Hawaii, had a water study done. Monitoring the flow rate of the old drainage system they

estimated that it discharged between 85 to 100 GPM. This would have been more than enough to irrigate the new fields. But using this

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An encouraging sample of the developing rootzone system.

tions and providing quick drainage during heavy rains. But the budget was tight because of the enormous amounts of money going into other parts of the project.

The usable surface area of the old quarry site had to be enlarged at a tremendous cost. The fields are at the base of a mountain. Big power shovels and giant dump trucks spent weeks taking out chunks of basalt stone as big as a car. Tons of fist-sized rocks and gravel had to be sifted out of the dirt. More than 7,000 cubic yards of rock and debris were hauled off. About 60 percent of it came from cutting away the hillside to

make a place for the drill area. The upper field also had to be moved into the hillside to allow the old gridiron layout on the lower level to be widened 80 feet to accommodate soccer field dimensions.

The football layout actually measures a field and a half—160 x 360-ft. regulation sized field with a 160 x 180-ft. drill area added on at one end. In addition, there's a 20-ft. apron around the football field and drill yard. Ditto for the soccer field.

By Dec. 21, the football field excavation had been completed and graded to a depth of 18 inches below the final field level. This allowed for a 6-inch layer of gravel under the 12 inches of root zone soil. Approximately 4,000 feet of perforated plastic drain lines were installed for the two fields. All the drain pipes and irrigation lines were placed at a minimum depth of 18 inches to reduce chances of their being punctured by the Vertidrain Aerator's 16-inch tines.

water would have involved well licenses and providing storage, as well as raising environmental issues.

Instead, the architects focused on how to prevent the spring water from causing wet and slippery field condi-

tion and providing quick drainage during heavy rains. But the budget was tight because of the enormous amounts of money going into other parts of the project.

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There are four 4-in. perforated drain tiles which run the length of the football field and drill yard. At a

midway point, these cross over and empty into a 12-in. collector tile. This line and one just like it from the soc-

cer field discharge into an 18-in. tile that goes to the sewer main.

Budget Feature: Sand Drains

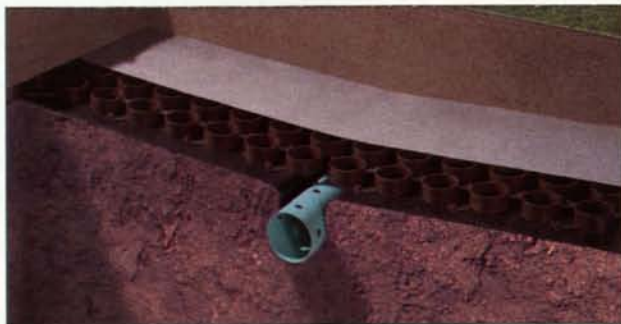
The only sand used in constructing the fields went into what are called "sand drains." After the 12 inches of root zone mix has been graded and rolled, a trencher dug grooves 4 in. wide x 12 inches deep every 10 feet running lengthwise down the football field. They are 20 feet apart on the soccer field, which isn't so close to the artesian spring. The sand drains are covered as the field is dragged. A total of 350 tons of Maui dune sand was used to fill the drainage grooves on both fields. Although it's too fine for root zone mixes, this sand works okay for these drains. Maui sand costs \$40 a ton versus \$60 a ton for good silica sand that comes from Australia.

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continued on page 17

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Toma surveys his work while catching some rays.

budget fields are common and so are sudden, heavy downpours and shallow ground water on most sites. Ignore this and your field can be under water a lot. I'll say this: on football fields as high crowned as ours (18 inches), they do a surprisingly good job.

We decided to use compost as a big component in our root zone mix. From the outset, it was felt that repeated and aggressive aeration might be essential. Also, frequent top dressing. Compost sources were narrowed down to two good compost yards that offered consistent and comparable material. Also, their green waste turnover was large enough to meet our needs.

Mixing the Rootzone Mix

Approximately 3,500 cubic yards of compost was hauled in for the root zone mix-40 percent compost and 60 percent soil by volume. The soil and compost were blended on-site, using big front-end loaders with bucket capacities rated at about four cubic yards. To get a 40/60 proportion the loaders scooped four buckets full of compost for every six scoops of soil added to the pile.

Front end loaders also did the mixing by scooping and folding the compost and clay silt together repeatedly. In hindsight, I think a better mix could be gotten using a blade on a parking lot. After putting out the right proportions, windrowing them together repeatedly ought to give a good mix. Better still, Brewer Environmental, the big turf supply wholesaler in Hawaii, rents a big capacity Renco portable soil blender. It wasn't available when we needed it, but that's the way to go.

Sodding a field for football with Tif 419 Bermudagrass like we used would have cost around \$35,000 to maybe \$50,000 on the mainland. In Hawaii it would have been more like \$150,000! You can see why we didn't lay sod. We went with sprigs.

Look for "Groundskeeper In Paradise, Part II" in next month's issue of SPORTSturf. Toma will detail his grow-in program and how his combination of aeration, fertilizers and biostimulants grew grass so tough their new Toro grunted when they cut it.

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