

# Sports Field Design, Construction, and Renovation: What Works - What Doesn't

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## Elevations

Elevations could be either real-world or assumed.

A real-world elevation is actual feet above sea level.

An assumed elevation is a fictitious number given to a stationary object.

Elevations are used to compare specific points on or off the field and to calculate the percent of slope.

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## Benchmark

A benchmark is a stationary object that is located somewhere off but close to the field like a catch basin or a concrete surface with a footer.

A benchmark is used to keep elevations consistent like when moving the instrument to a new location.

A benchmark is either real-world or assumed.

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## Percent of Slope

The difference between two elevations divided by the distance between them.

$$5.35 - 4.93 = .42$$

$$.42 \div 35 = .012 \text{ or } \underline{1.2\%}$$

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What's the cause of the standing water?  
The answer I get most often is - "low spots."  
They say "We'll just fill them in."



I say "Don't do it - That won't work"

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This problem is caused by a grass hill at the edge of the skinned area.



The grass hill is extremely hard to see in person and even harder to photograph.

That's because the hill is very well camouflaged by the grass.

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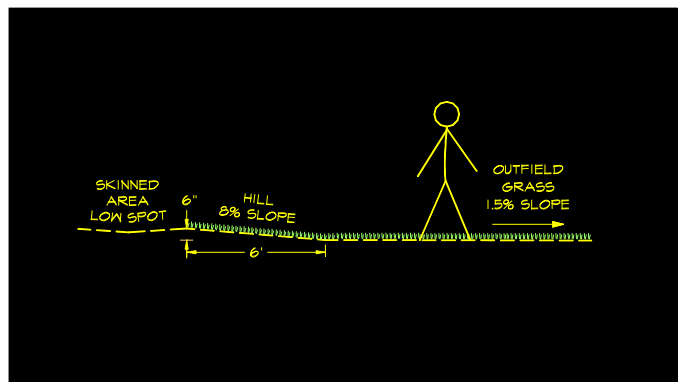


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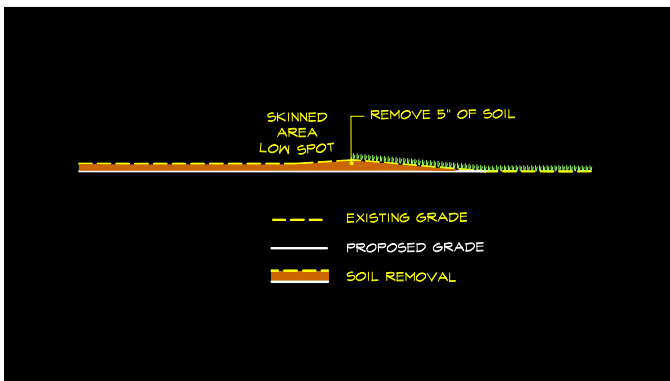
How to correct this problem:

- Check the existing outfield grade to make sure it slopes away from the infield and for percent of slope.
- Use that percent of slope to calculate the proposed elevation of the skin material at the grass edge.

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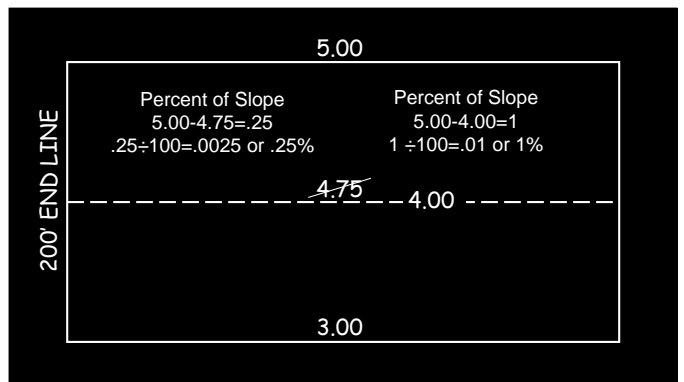


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Review of this case:

- Standing water and poor surface drainage was caused by filling in low spots (for many years) instead of removing the hills and regrading.
- Hills are probably present along all skinned area edges.
- Preventive practices: When dragging, stay away from the grass edge. Remove skin material that accumulates in the grass by removing lips regularly.

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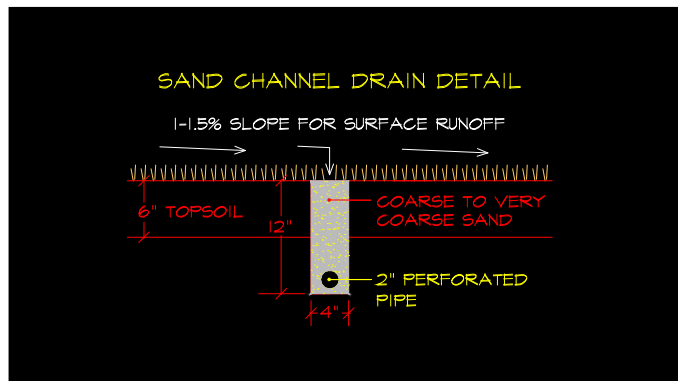
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### SAND CANNEL DRAINAGE SYSTEM

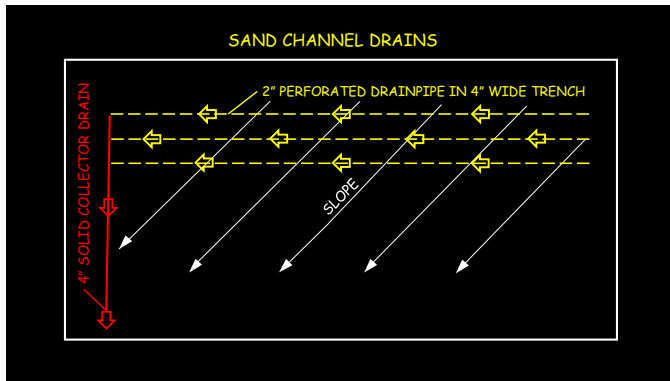
This system has a drain pipe that is centered on a ½" bed of sand at the bottom of a narrow shallow trench and filled to the surface with sand.

They work great for sports fields because of their ability to remove surface water and subsurface water from soggy areas of the field.

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**Type of Pipe Used for Sand Channel Drains**  
 2" corrugated perforated pipe with narrow slots or  
 1" wide x 6" deep cloth-rapped polyethylene drains also known as strip drains

**Type of Sand Used for Sand Channel Drains**  
 Coarse to very coarse with less than 5% passing the 100-sieve screen sometimes referred to as washed concrete sand

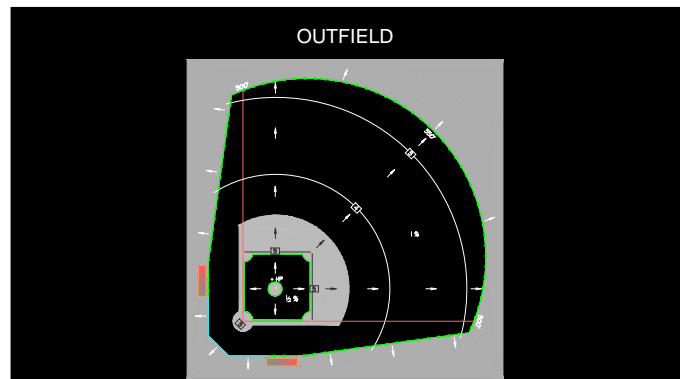
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**Does laser grading work on all infields and skinned areas?**

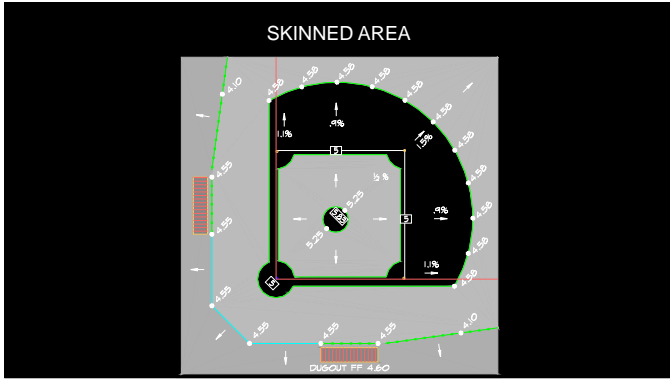
The short answer is **NO** unless those areas were designed for laser guided equipment.

The same percent of slope is required everywhere laser guided equipment is being used.

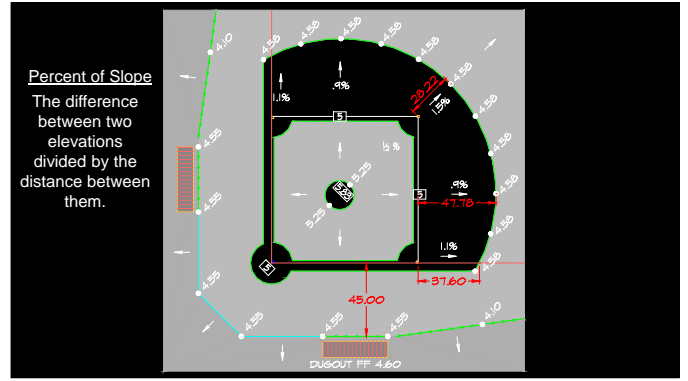
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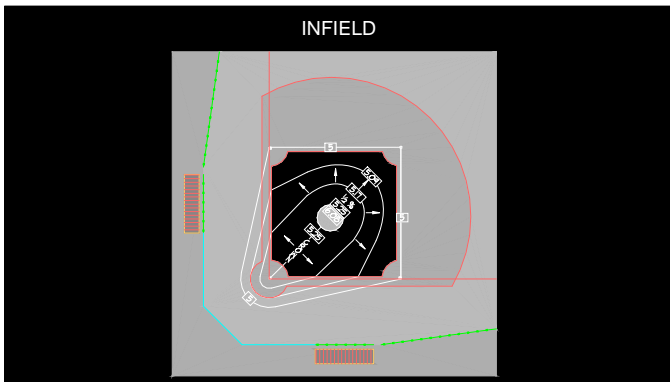
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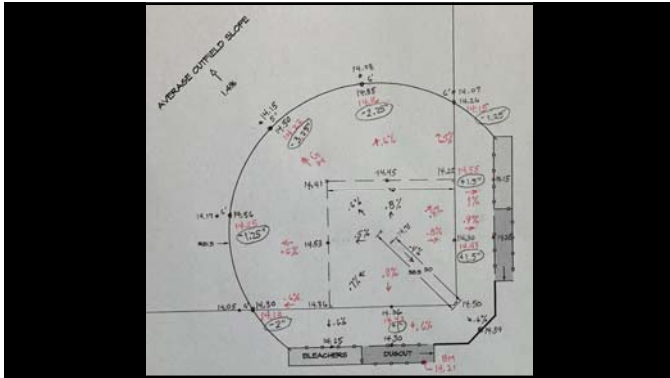
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### Standard Elevation Rod

**Points to Remember:**

- The higher the number, the lower the land; they're called rod readings, not elevations.
- To get an elevation, there's math involved. Take a rod reading at the benchmark. Add the rod reading to the benchmark. The answer is called "height of the instrument" or "HI".
- To get an elevation, subtract all rod readings from the HI.

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### Direct Elevation Rod

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### Direct Elevation Rod Detail

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### Comparing Inches to Decimals

INCHES	DECIMAL
1	0.08
2	0.17
3	0.25
4	0.33
5	0.42
6	0.50
7	0.58
8	0.67
9	0.75
10	0.83
11	0.92

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### Equipment recommendation for contractors and sports field managers

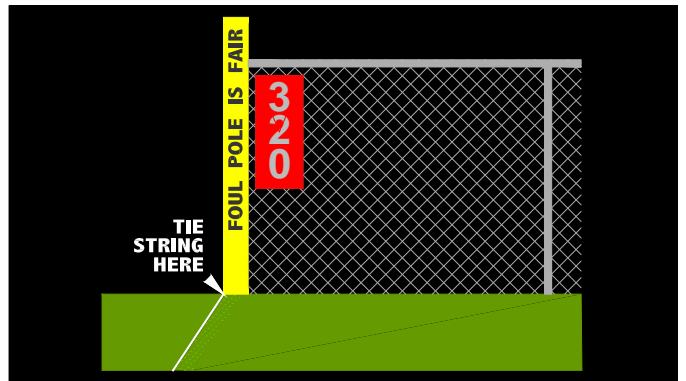
Laser level w detector & tripod

Direct elevation rod, detector bracket, & carrying case

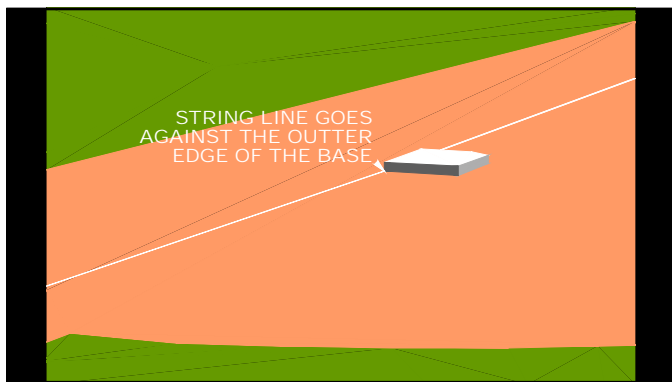
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# FOUL LINE LAYOUT AND BASE INSTALLATION

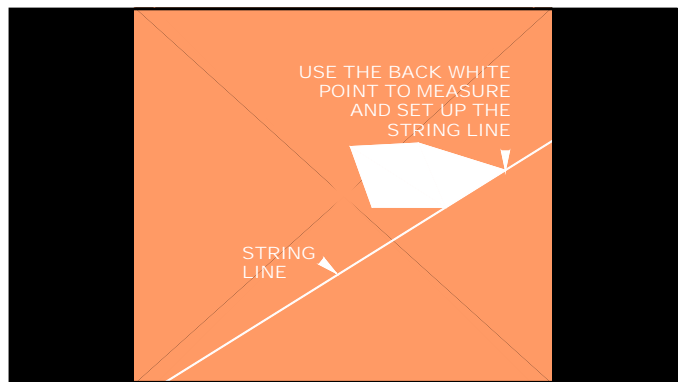
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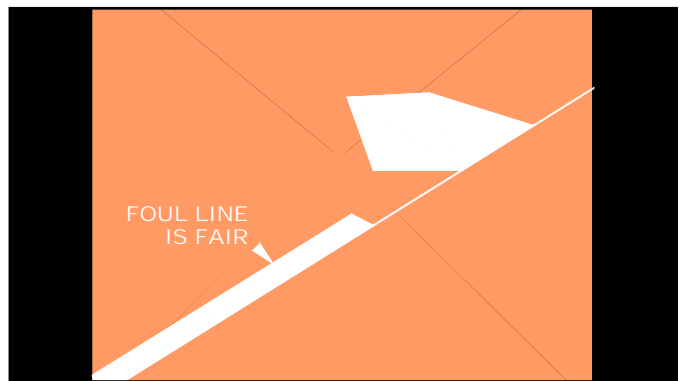
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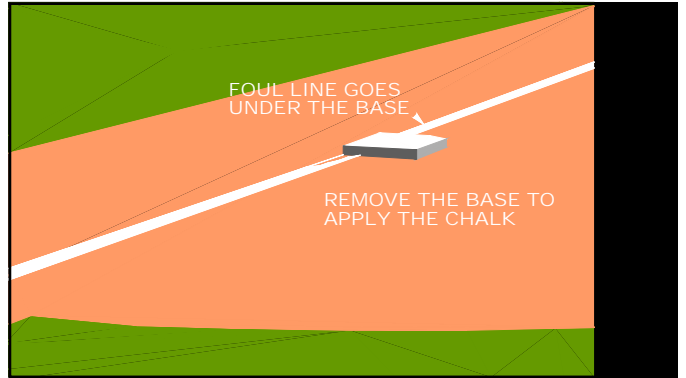
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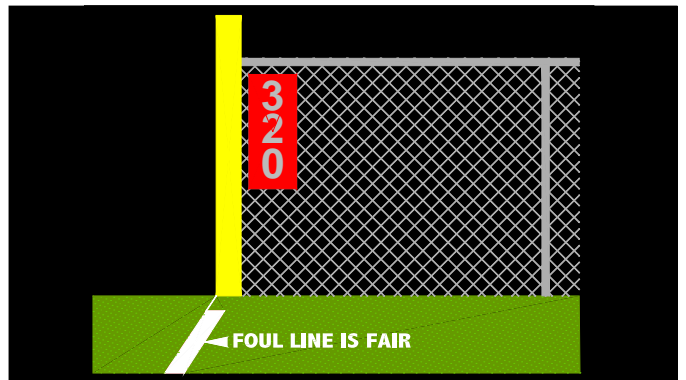
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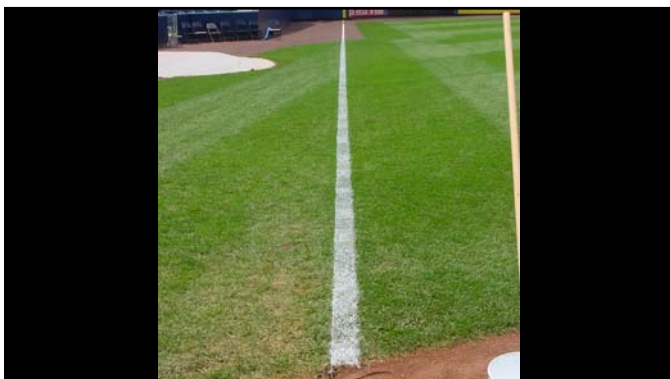
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