

MINE 202 SURFACE MINING

ASSIGNMENT #2 OPEN PIT OPTIMIZATION

DUE DATE: 03/04/2017

QUESTION : Figure 1 illustrates a section of a placer gold deposit open pit layout to be optimized to generate the mineable reserves, maximum pit value and the associated stripping ratio for production planning purposes. The unit cost of mining waste and ore from the first row (bench) is \$4.00/tonne, and this unit cost will increase by \$2.50/tonne/bench beneath the first bench. The unit ore processing cost is \$27.00/tonne. The block dimensions are 12 m (high) X 12 m (width) X 12 m (thick). The respective average ore grade and the mill recovery efficiency are 0.06 oz/tonne and 88%. Gold price is \$1250/oz. The density of ore and waste blocks are 2,3 and 2,5 tonne/m³ respectively.

1. Given the above data, estimate the total costs, total revenues and the economic block values for extracting waste blocks and extracting and processing ore blocks from each bench.
2. Using the floating cone algorithm, obtain the optimized pit layout, the mineable reserves, the optimized pit value.
3. Using the 2D Lerchs-Grossmann's algorithm, obtain the optimized pit layout, the mineable reserves, and the optimized pit value.
4. Compute the associated stripping ratios in tonne/tonne, bank cubic meters/tonne and bank cubic meters/bank cubic meters.
5. Compare your results in (2) and (3).

W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W
W	W	W	W	W	W	W	O	O	O	O	O	W	W	W	W	W	W

Figure 1. 2D Section of a Gold Deposit