

APPENDIX A

WASTEWATER TREATMENT AND SOLIDS HANDLING COST DATA

A-1. The costs included herein have been related to average wastewater flow so that they may be readily usable for preliminary cost estimating purposes without requiring a preliminary design.

A-2. In order to relate all costs to average wastewater flow, certain assumptions were made. These assumptions are specifically listed on the applicable cost curves and are categorized as follows:

a. Influent waste and wastewater considerations. These include peak to average wastewater flow ratios, influent BOD concentrations, average quantities of sludge produced by specific processes, average efficiencies of upstream treatment units, etc.

b. Unit loading rates. These include total dynamic pumping head, hydraulic detention times, cubic feed of air per pound of BOD, gallons of wastewater per square foot per day, etc.

c. Additional units included in the treatment system package. For example, diffused air aeration system costs are included with the total activated sludge system costs, and carbon regeneration costs are included in the total carbon adsorption system cost.

A-3. The peaking factors and design parameters used for cost development are taken from technical manuals, standard engineering textbooks and other references.

A-4. Construction costs are related to a

EPA-STP index value for December, 1983 of 370. This construction cost index value is a national average, and may be adjusted to a specific geographical location in accordance with AR 415-17.

A-5. It must be recognized that costs obtained from these costs curves are sufficiently accurate for preliminary, planning construction cost estimation *only*. For preliminary cost comparisons, additional costs should be included for items such as engineering, legal, administration, and contingency factors. More detailed cost estimates should be prepared as outlined in TM 5-800-2.

A-6. Costs for lagoons, landfills, land treatment and similar land-intensive systems are not presented due to the extremely wide variations in costs that can be experienced at a given location. The main factors influencing these variations include land cost and availability, soil type and climate.

A-7. Because of uncertainties regarding economies of scale, and in view of the lack of published data concerning costs for treatment plants with design flows less than 1.0 mgd, the curves are presented as broken lines between 0.1 mgd and 1.0 mgd. In this range, the curves should be used with discretion, realizing that the costs are based upon extrapolations of data for larger plants.

A-8. Figures A-1 through A-15 provide approximate costs of unit processes related to system flow rate.

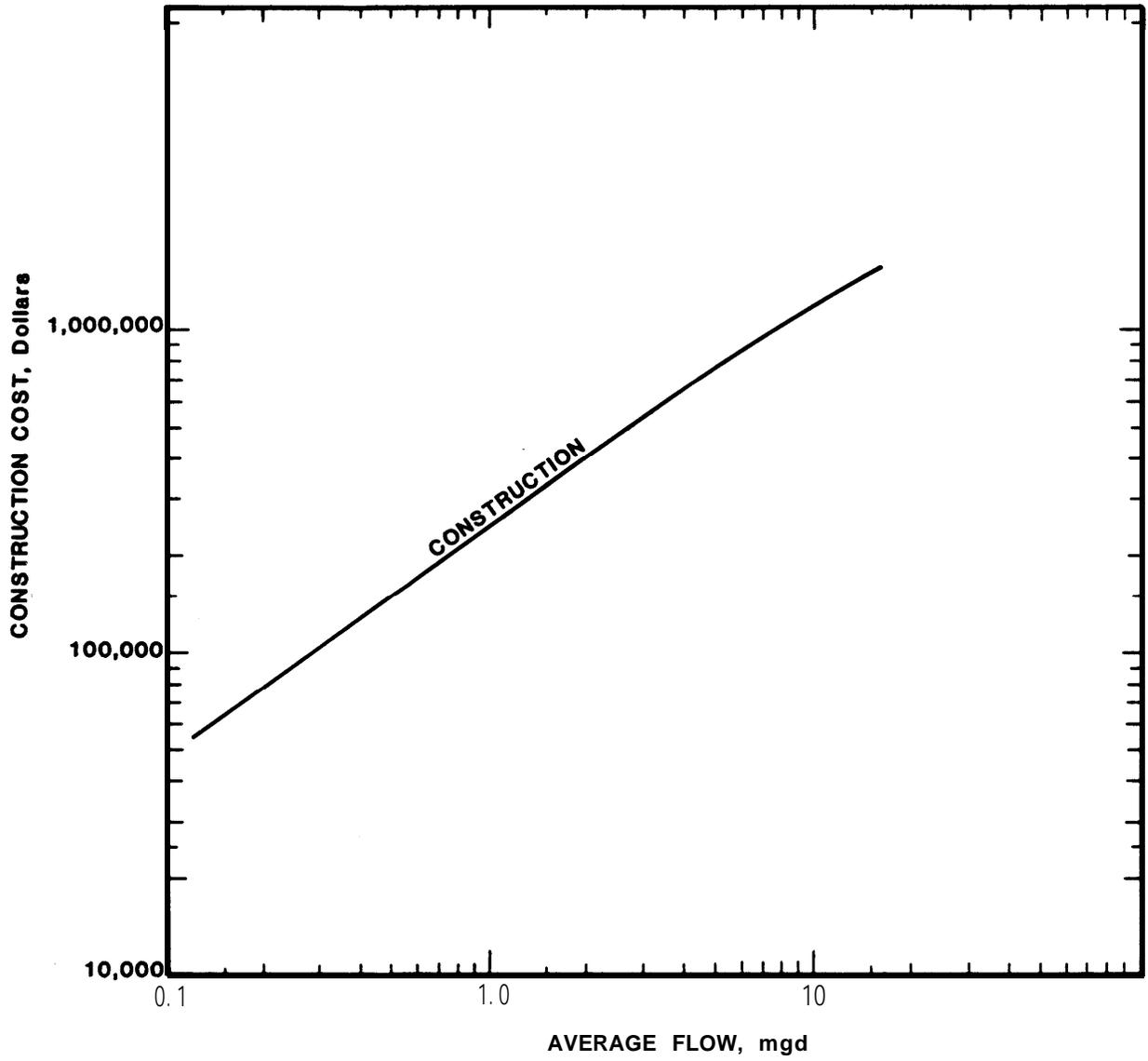


Figure A-1. Cost of raw waste pumping.

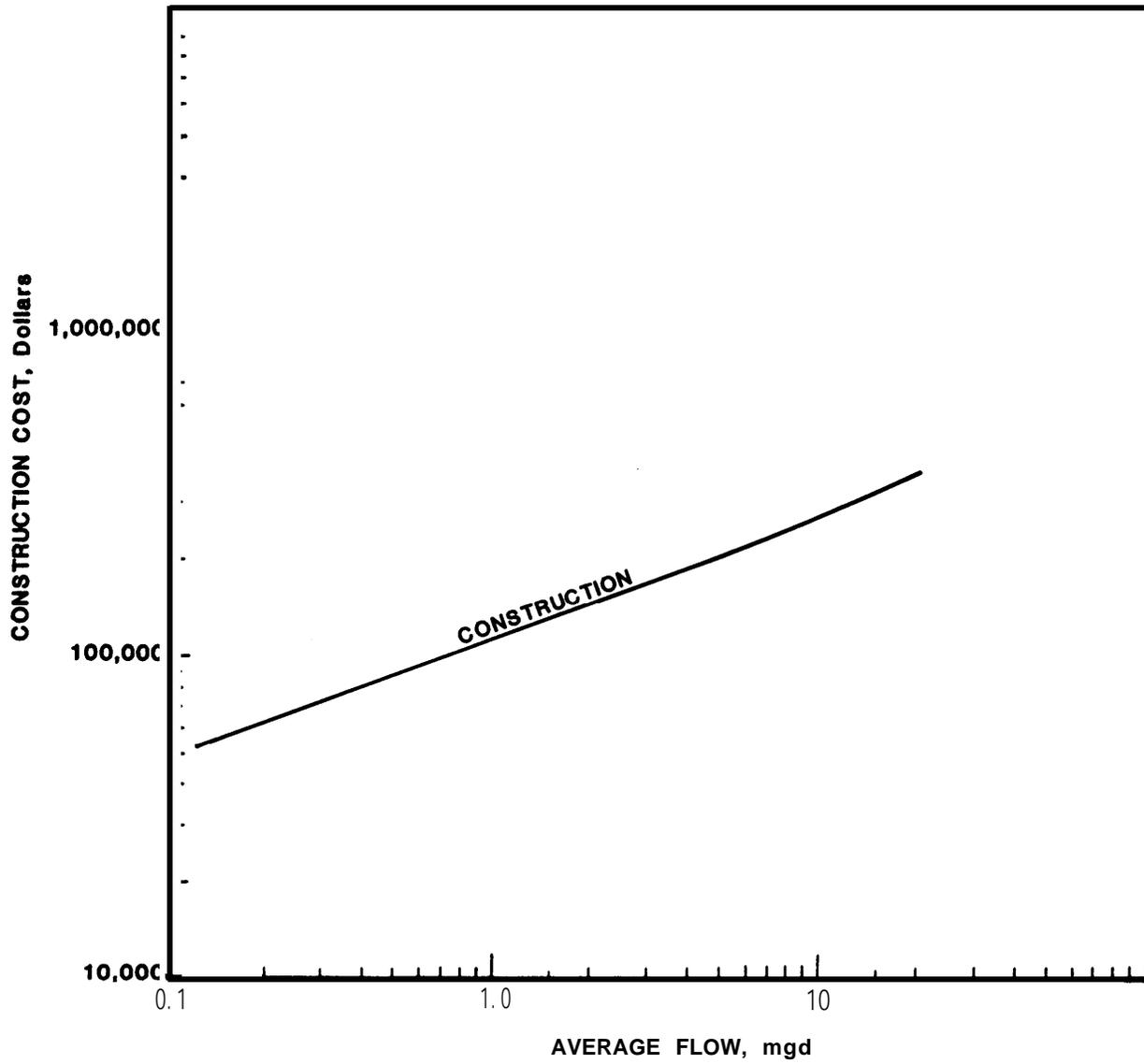


Figure A-2. Cost of preliminary treatment.

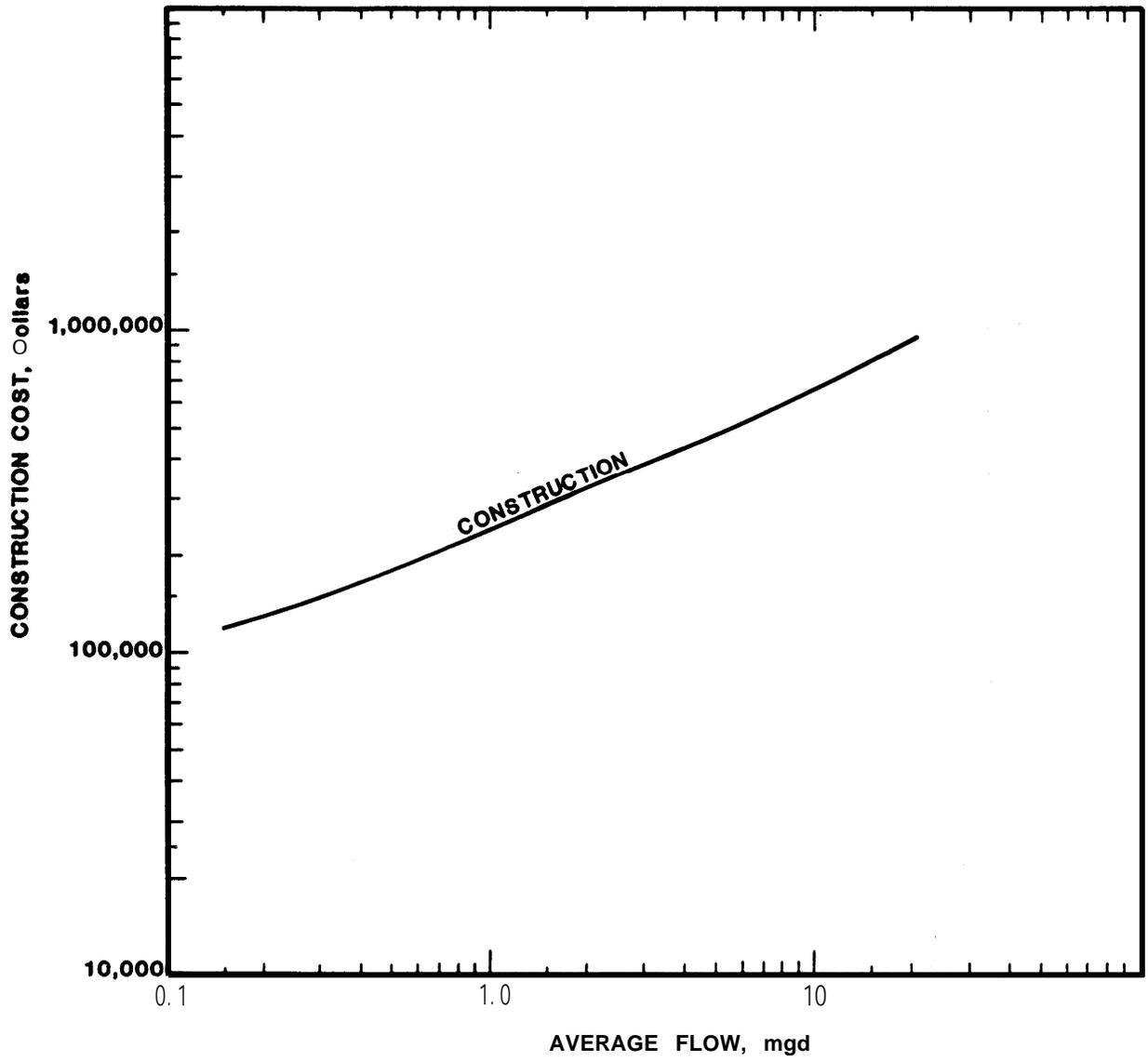


Figure A-3. Cost of primary clarifiers.

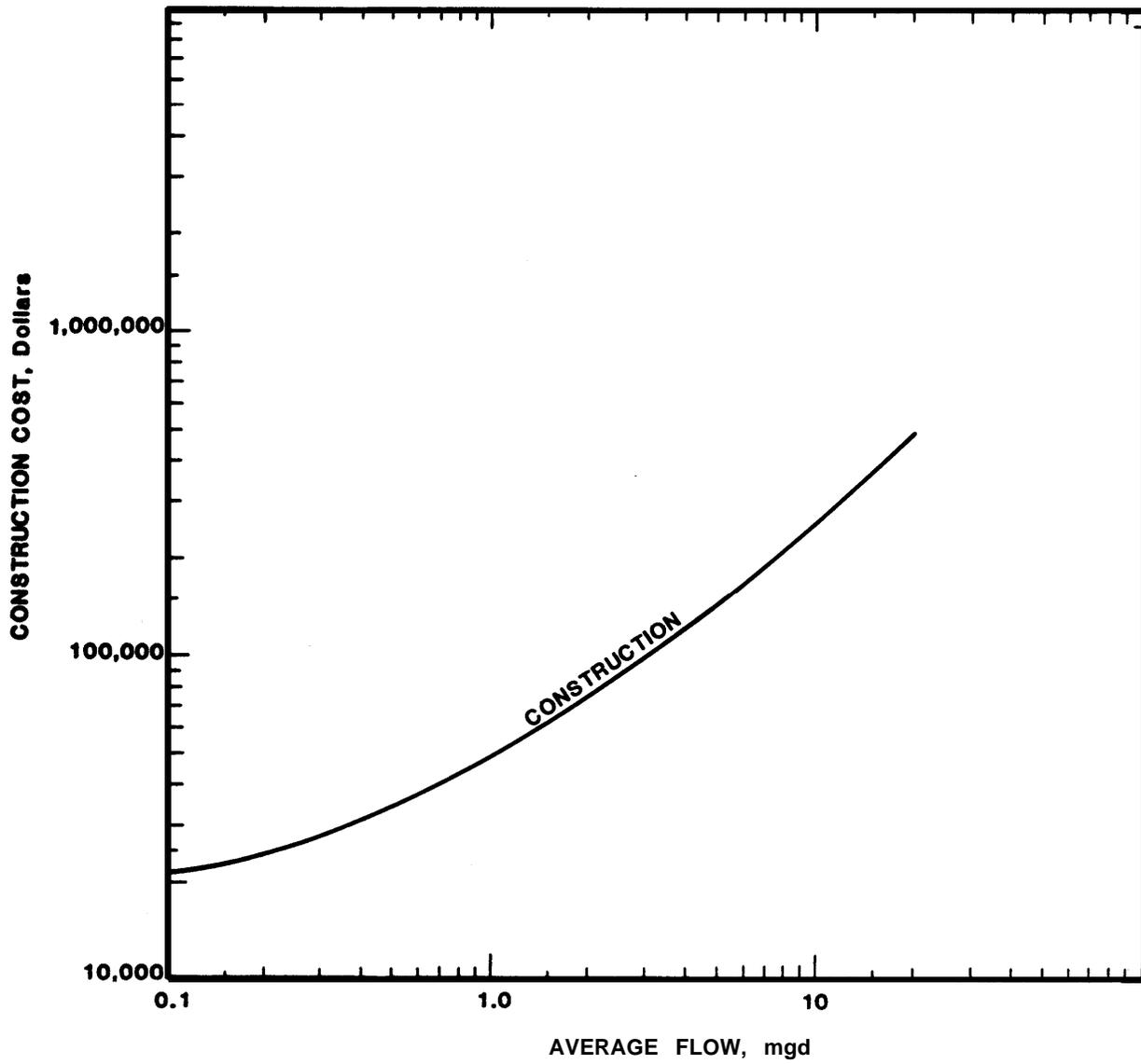


Figure A-4. Cost of FeCl₃ addition.

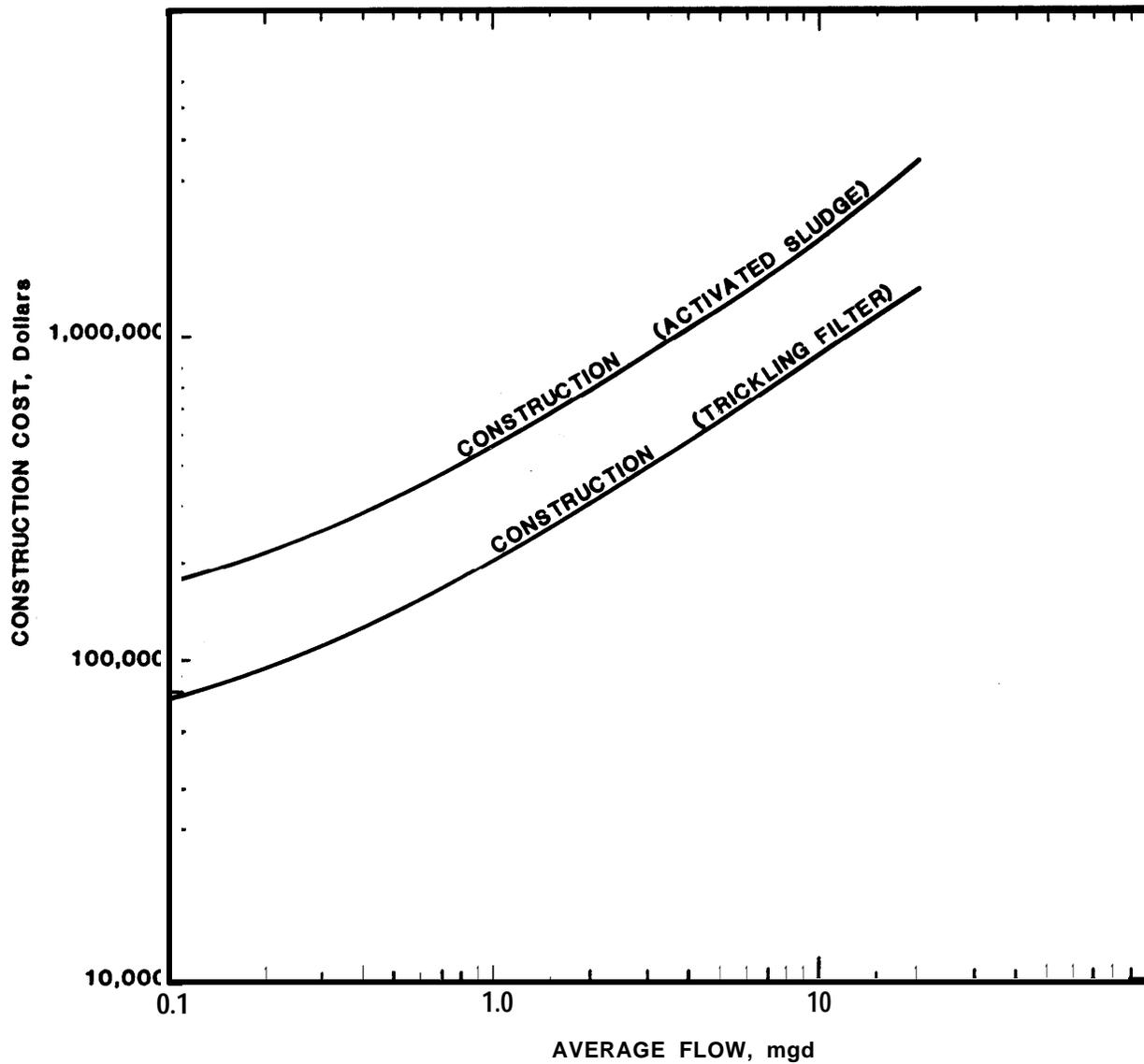


Figure A-5. Cost of activated sludge.

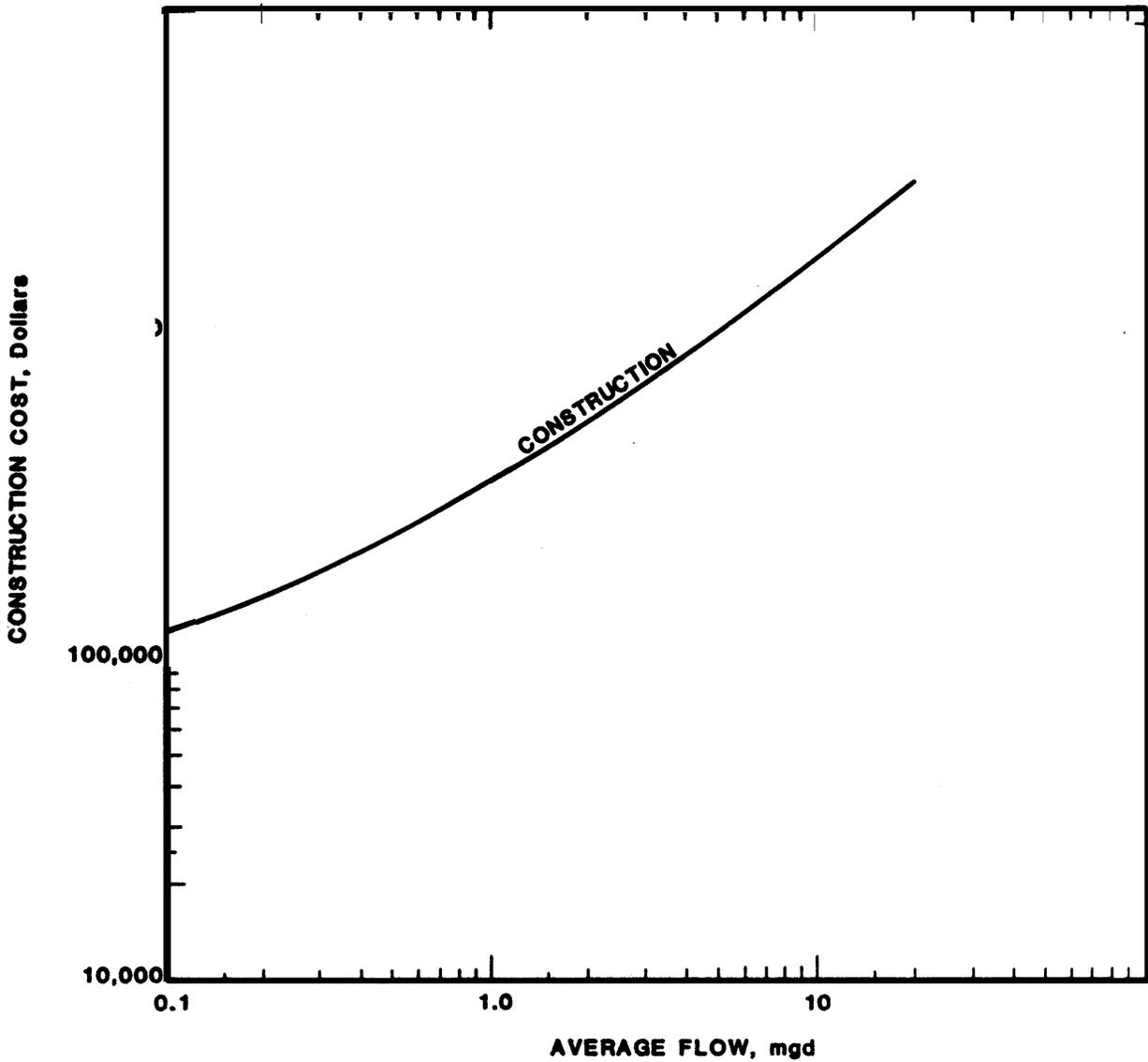


Figure A-6. Cost of high rate trickling filter.

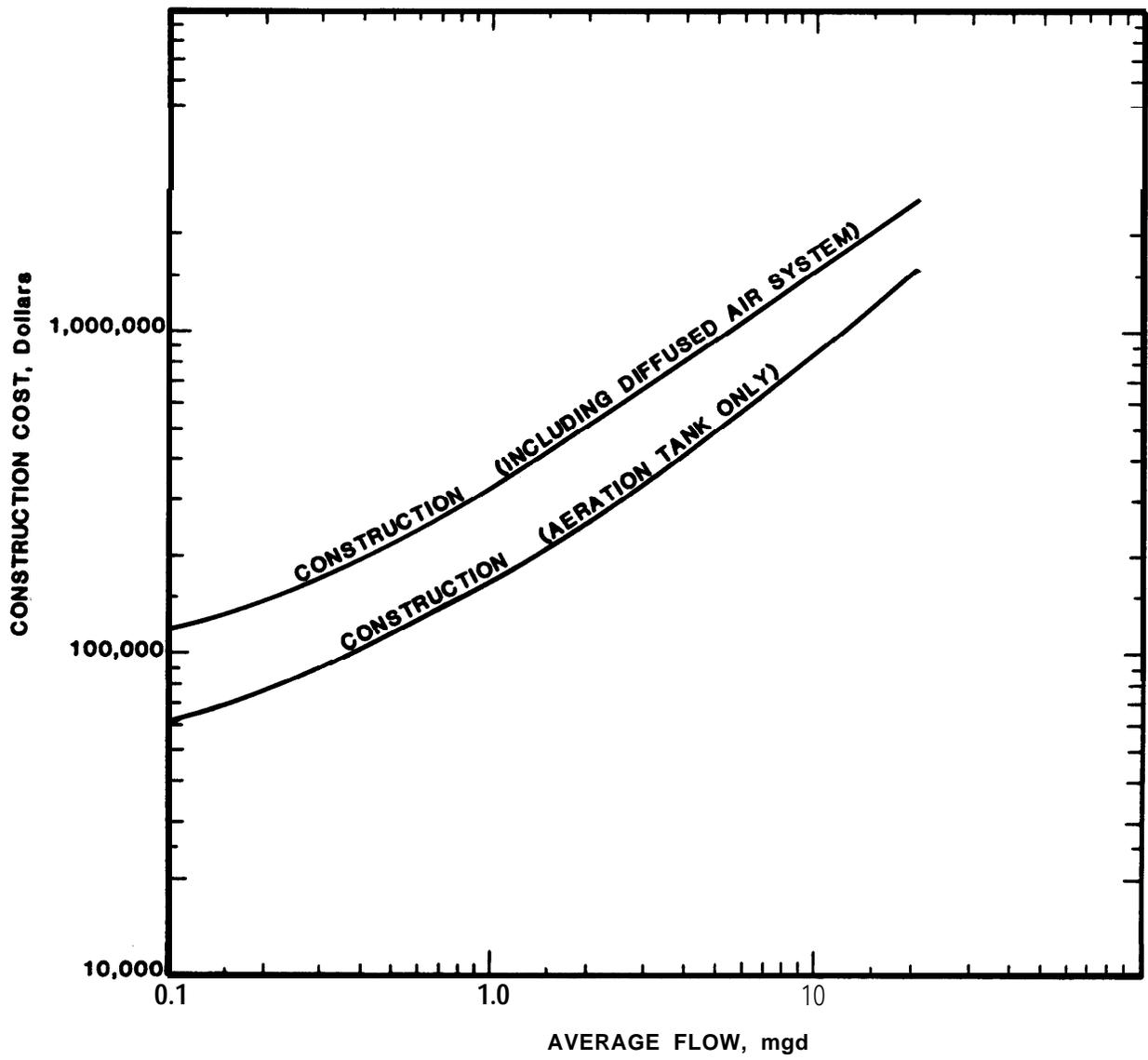


Figure A-7. Cost of suspended growth vitrification system.

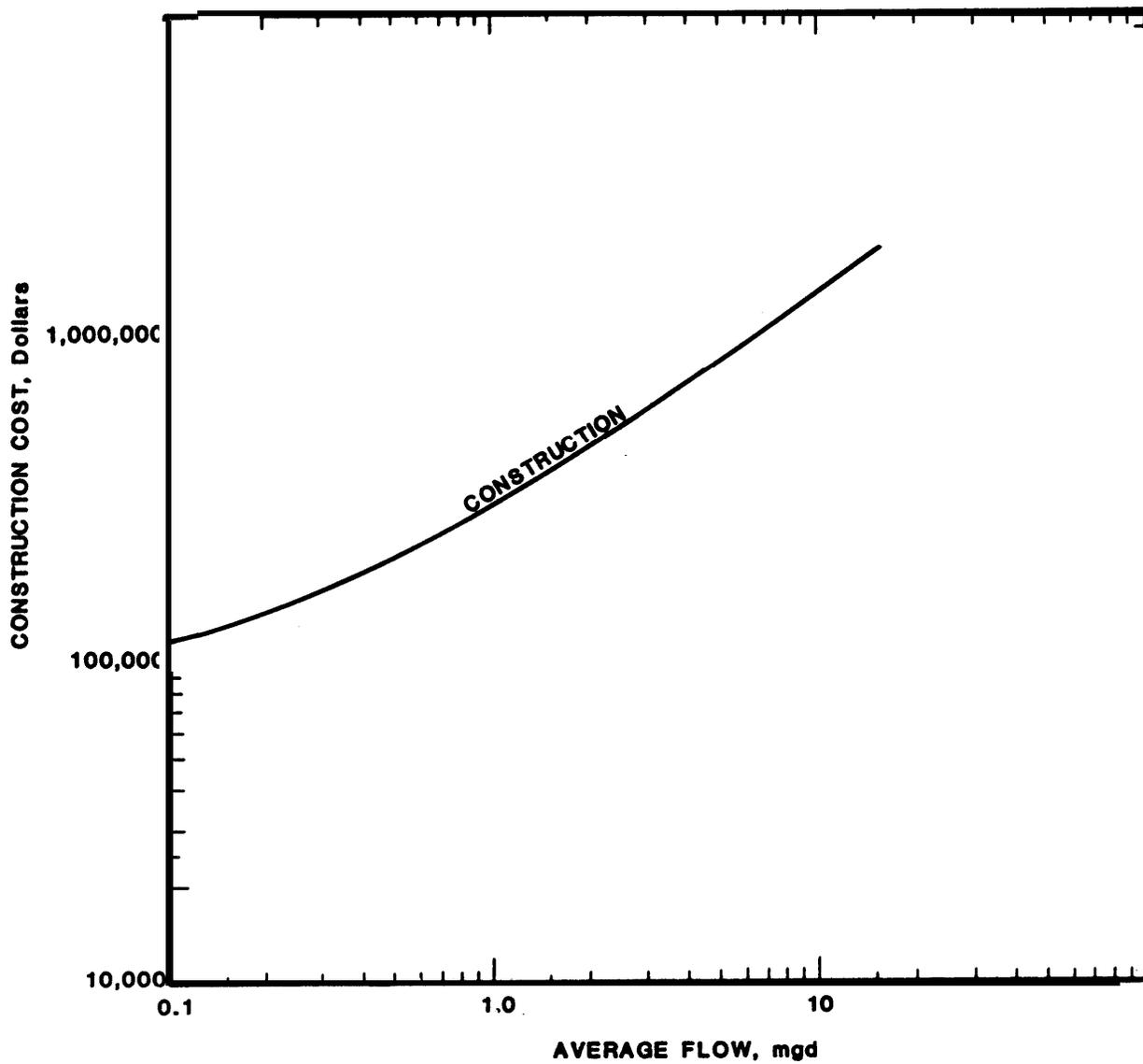


Figure A-8. Cost of final clarifiers.

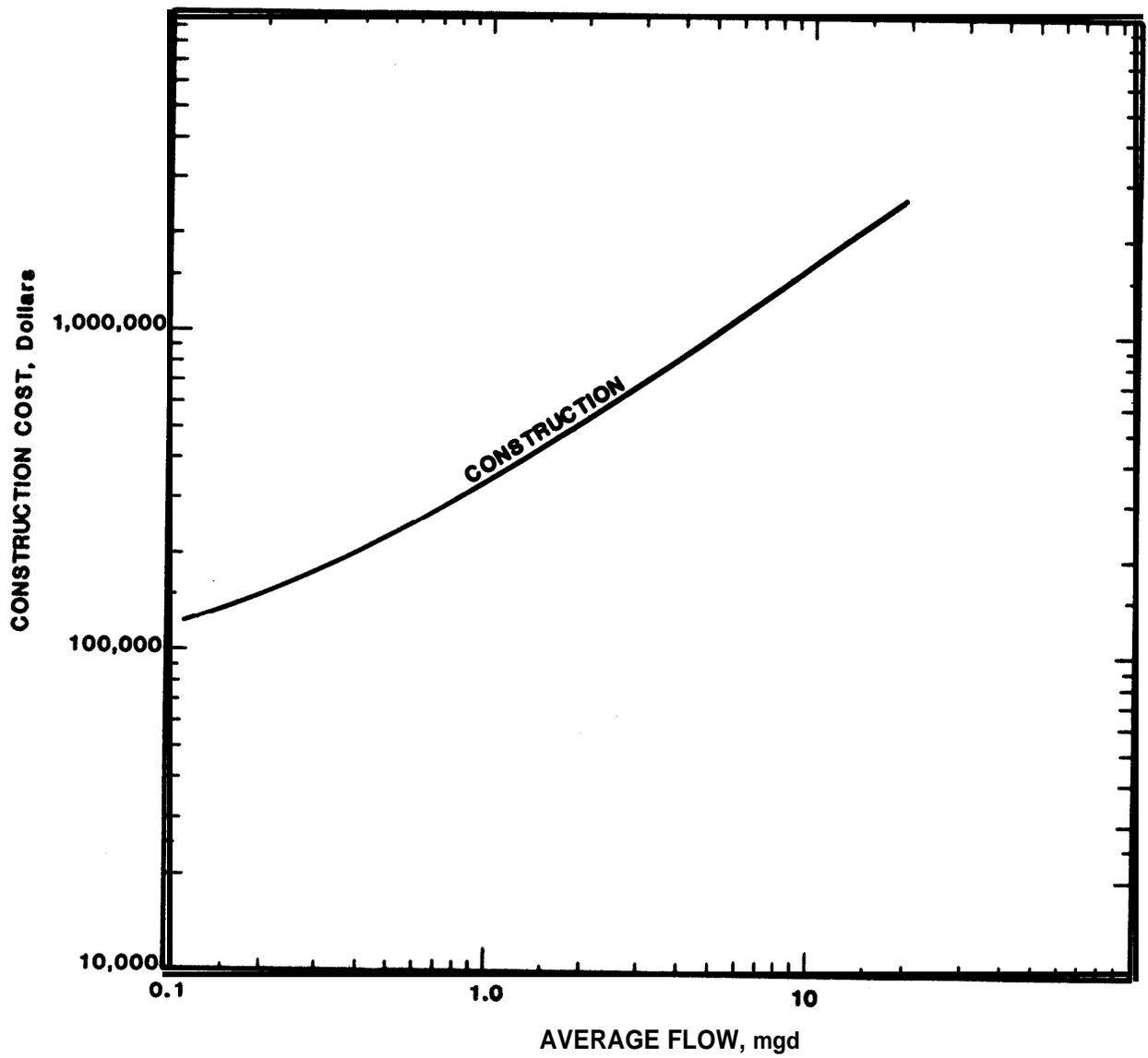


Figure A-9. Cost of two stage lime clarification.

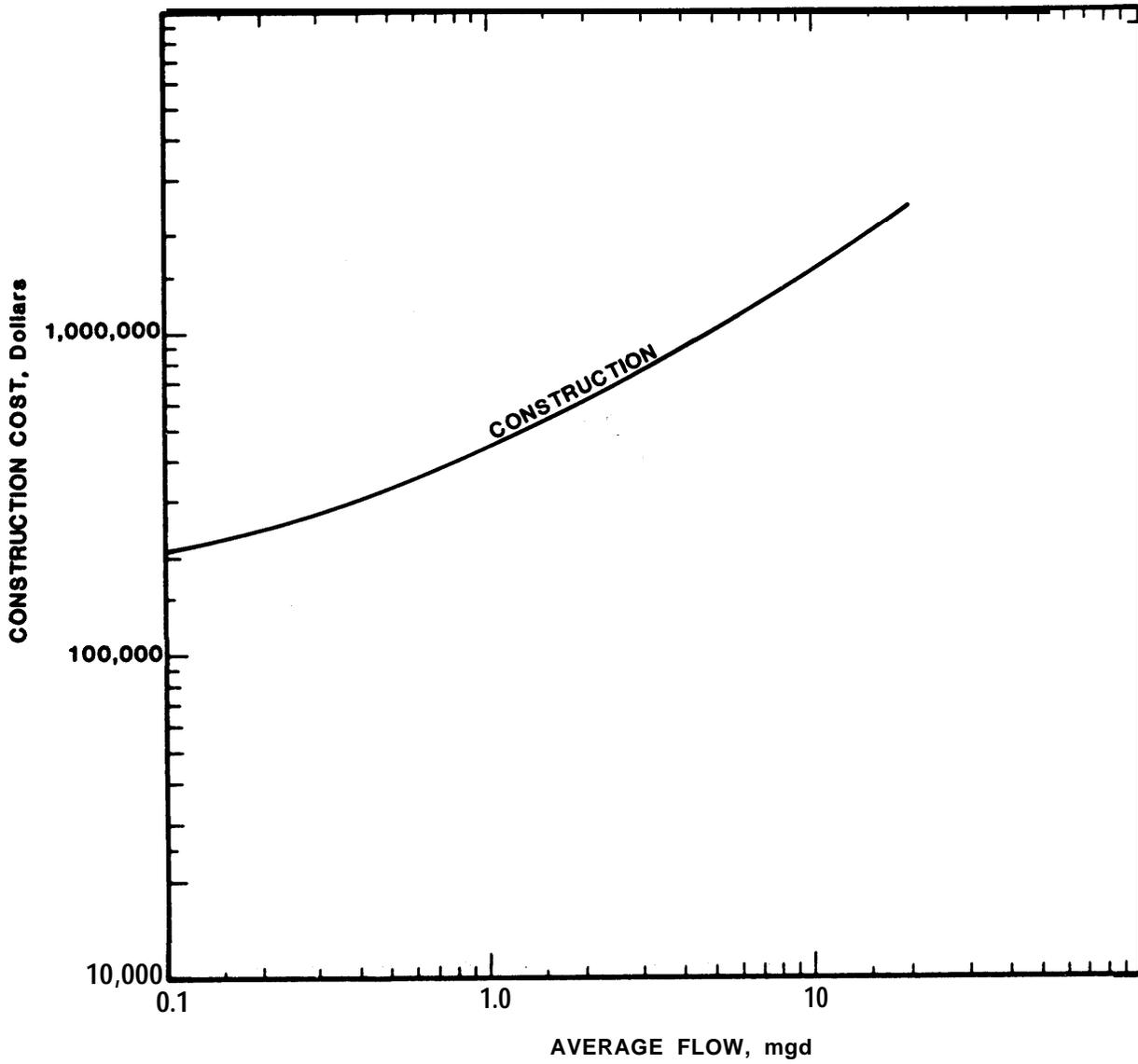


Figure A-10. Cost of multi-media filtration.

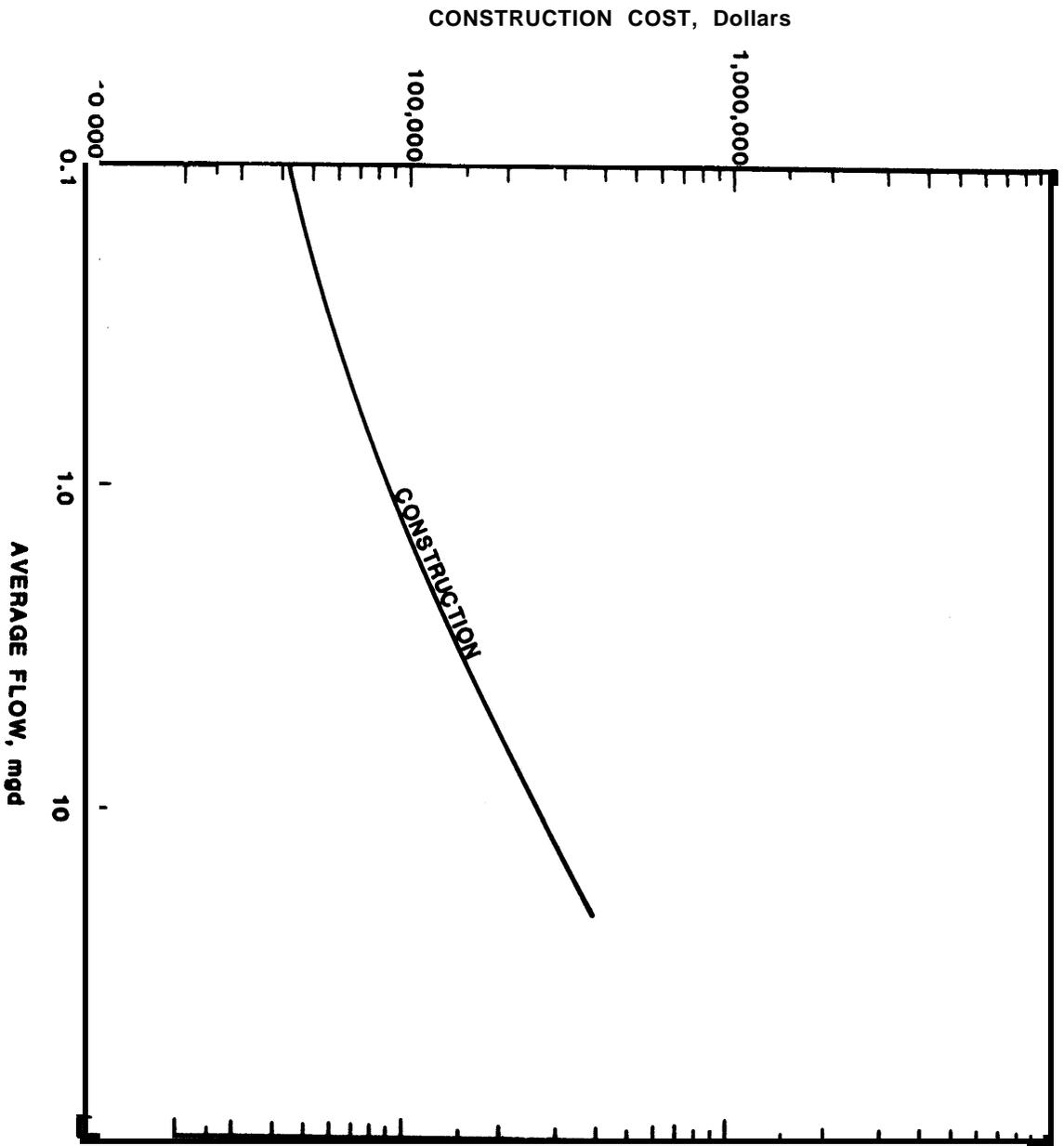


Figure A-11. Cost of chlorination.

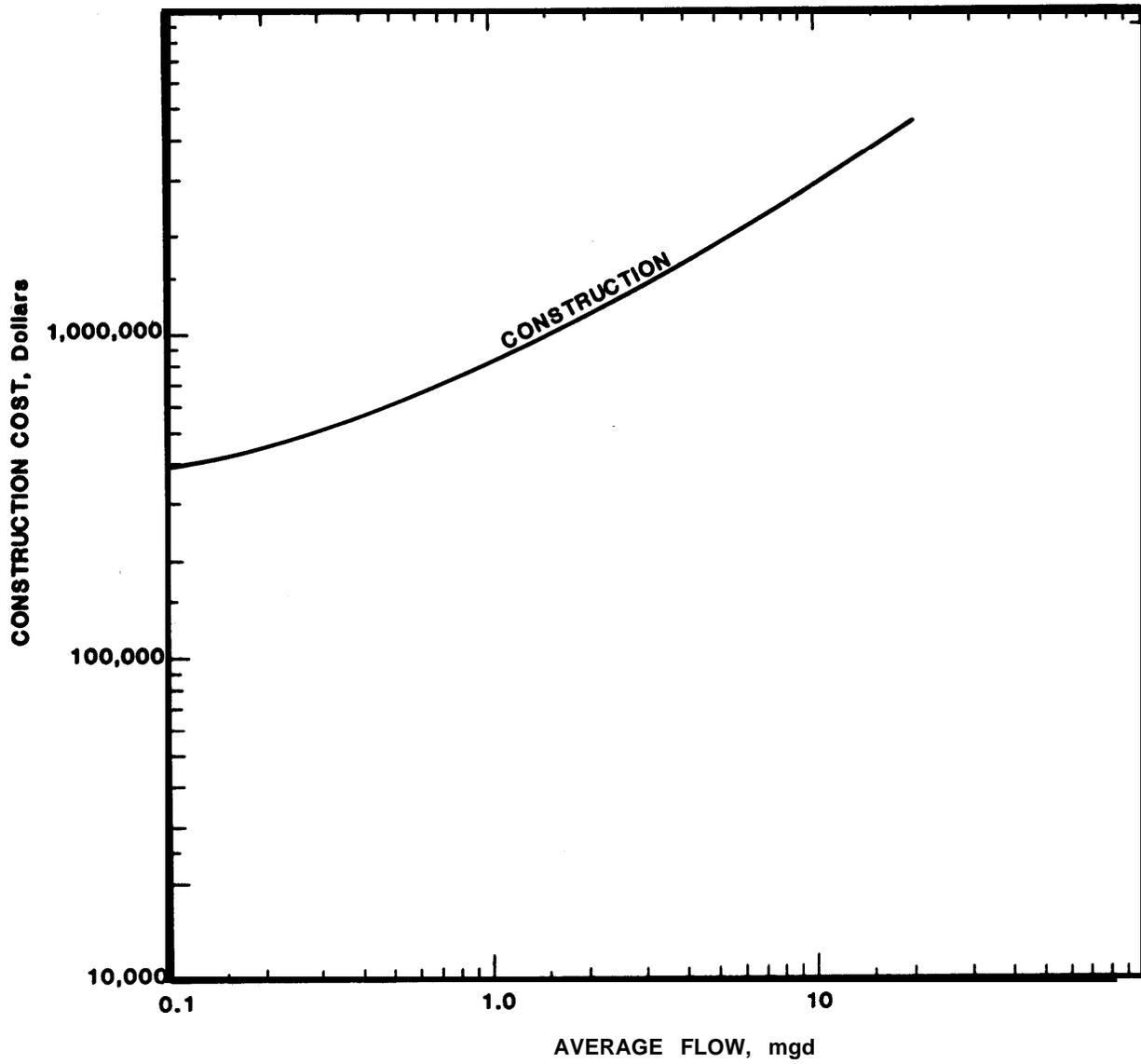


Figure A-12. Cost of granular carbon adsorption.

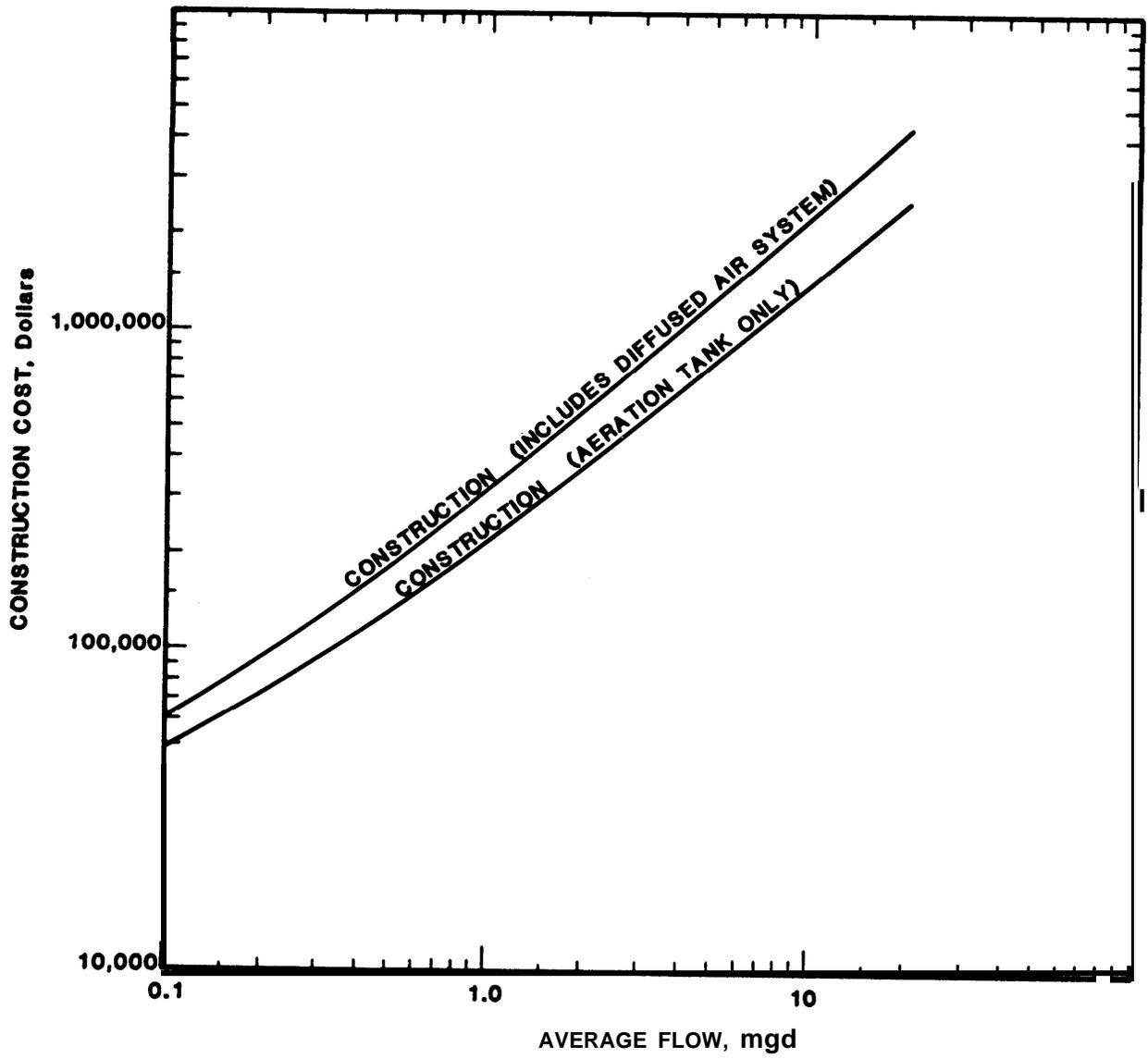


Figure A-13. Cost of two stage anaerobic digestion.

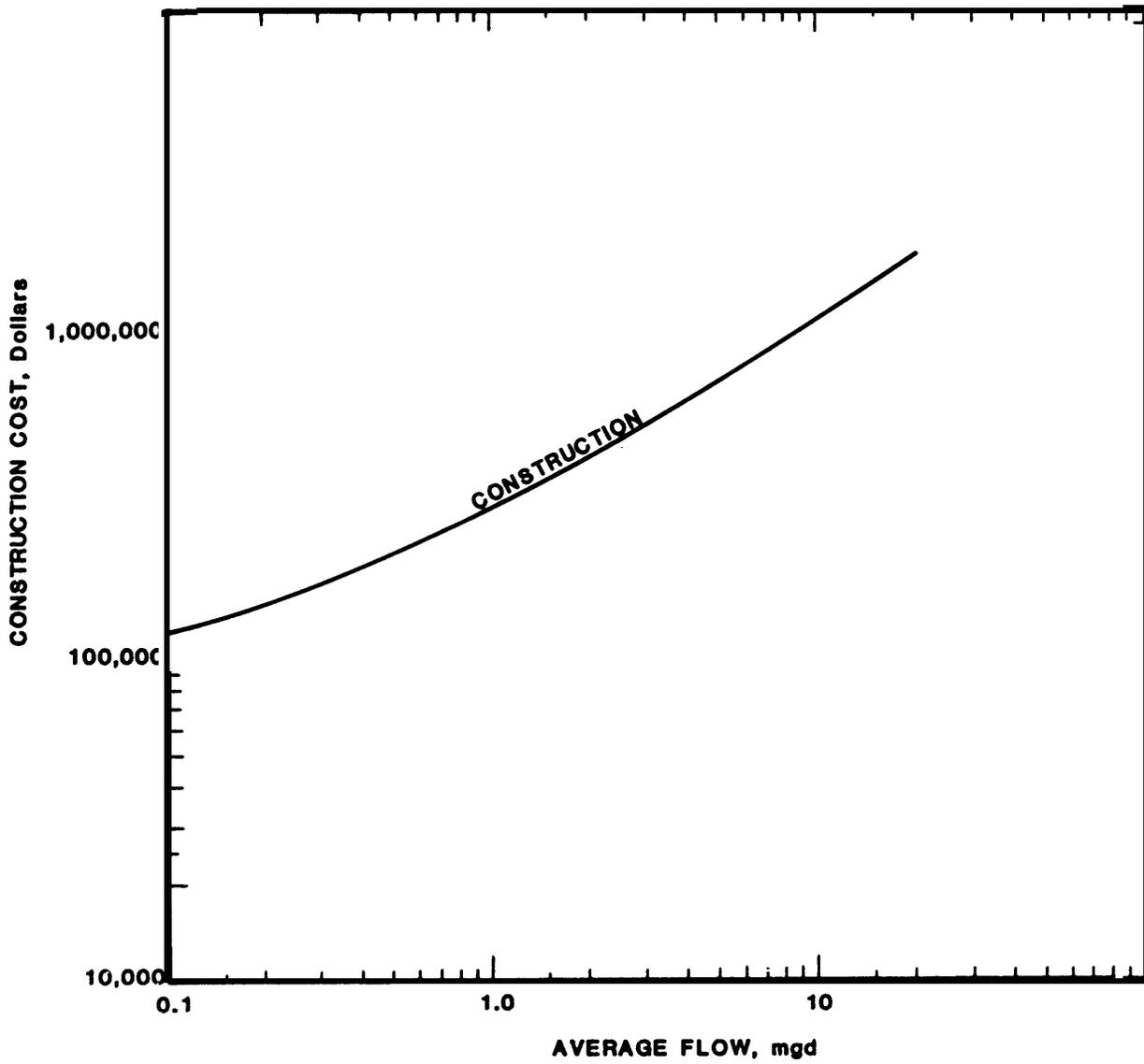


Figure A-14. Cost of vacuum filtration.

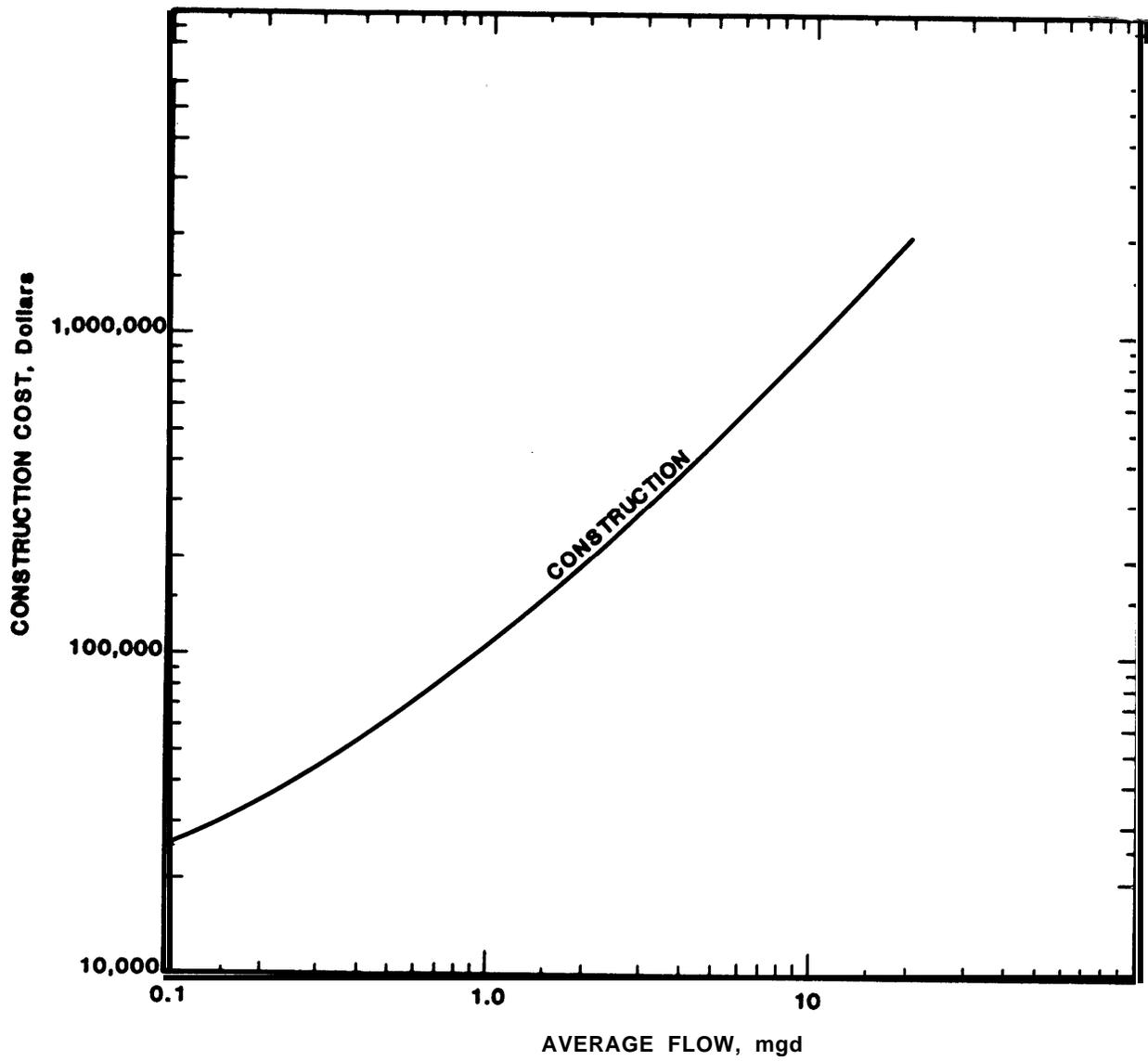


Figure A-15. Cost of sludge drying beds (uncovered).