## CIVL 3137 Homework 1

| Sieve              | Cumulative Mass |
|--------------------|-----------------|
| Opening            | Retained (g)    |
| 19 mm (3/4")       | 0.0             |
| 12.5 mm (1/2")     | 64.0            |
| 9.5 mm (3/8")      | 254.6           |
| 4.75 mm (No. 4)    | 883.4           |
| 2.36 mm (No. 8)    | 1390.3          |
| 1.18 mm (No. 16)   | 1678.3          |
| 0.6 mm (No. 30)    | 1851.8          |
| 0.3 mm (No. 50)    | 1992.0          |
| 0.15 mm (No. 100)  | 2071.6          |
| 0.075 mm (No. 200) | 2120.9          |
| Pan                | 2195.6          |

1. Results of a sieve analysis on a 2197.0-g sample of crusher-run gravel are as follows:

Calculate the gradation curve (percent passing as a function of sieve opening) and plot it (by hand) on both a standard graduation chart and a 0.45-power graduation chart downloaded from the course website. NOTE: If you wish, you can use a spreadsheet to do the calculations, but include at least two sample calculations (by hand) for two of the middle sieve openings.

- 2. What is the nominal maximum aggregate size of the aggregate in the previous problem?
- 3. Would this aggregate qualify as uniformly graded, open-graded, gap-graded, or dense-graded?
- 4. Calculate the FHWA theoretical maximum density curve for an aggregate with a maximum size of ¾" and plot the results on both of the graphs you produced in Problem 1. NOTE: If you wish, you can use a spreadsheet to do the calculations, but include at least two sample calculations (by hand) for two of the middle sieve openings.
- 5. If you needed to sample this aggregate from a stockpile in the construction yard, how large of a field sample would you need to retrieve? How many times would you have to split the field sample to get a small enough sample to do the gradation analysis?