ATT-56/22, RANDOM TEST SITE LOCATIONS
Part I, Granular Base Course

1.0   SCOPE

This method describes the procedure for randomly determining the location of test sites for sampling on granular base course projects.

2.0   EQUIPMENT

computer, calculator, deck of cards, or pocket book (for the random number generator), paper, a printer for hardcopy records is recommended.

3.0   PROCEDURE

3.1   Distance from Lowest Station and Left Edge of Area

1.   When a test area is selected, determine the number of test sites that will be required within the area.

2.   Use a data sheet as shown in Figure 1.   Record in Line "E" the required number of sites.   For example, if 5 sites are required, enter numbers 1 to 5 in the first 5 columns of Line "E".

3.   For each area, randomly select a random number table using one of the following methods:

   a)   Shuffle a deck of cards, and then pick a card; the card number represents the table number to be used for generating random numbers.

   b)   Obtain 10 small pieces of paper and record on each a number from 1 to 10.   Mix them around with the numbers facing down, and then pick one.   The number on the paper represents the number of the length and width random number table to be used.

   c)   Open a pocket book.   The last digit of the page number represents the number of the plan to be used for the area.   Use table number 10 if the last digit is "zero".

   d)   Use the random number generator on your calculator, or computer, to select a random number.

4.   Record the table number, and the length, width and the lowest station of the area to be tested on lines "A", "B", "C" and "D" respectively.

		NON-BIASED RANDOM TEST SITES ATT-56 Part I, RANDOM TEST SITE LOCATIONS, GBC		

Alberta Transportation

PROJECT	HWY 70:08	GBC	Lift 1 - 60mm

A.	TABLE NO.		3								
B.	LENGTH OF AREA m		400								
C.	WIDTH OF AREA m		13								
D.	BEGINNING STATION		18+736								
E.	TABLE SITE NUMBER		1	2	3	4	5	6	7	8	9	10
F.	LENGTH (RANDOM NUMBER)		0.45	0.77	0.10	0.66	0.20	0.21	0.84	0.64	0.90	0.57
G.	DISTANCE FROM BEGINNING STA. (B*F) m		180	308	40	264	80	84	336	256	360	228
H.	WIDTH (RANDOM NUMBER)		0.62	0.16	0.50	0.92	0.24	0.84	0.83	0.37	0.50	0.63
I.	DISTANCE FROM LEFT EDGE (C*H/10) m		8.1	2.1	6.5	12.0	3.1	10.9	10.8	4.8	6.5	8.2
J.	STATION		18+916	19+044	18+776	19+000	18+816	18+820	19+072	18+992	19+096	18+964
K.	LOCATION m		1.6	-4.4	cl	5.5	-3.4	4.4	4.3	-1.7	cl	1.7
L.	SITE NUMBER		4	8	1	7	2	3	9	6	10	5

FIGURE 1

Non-biased sample plan
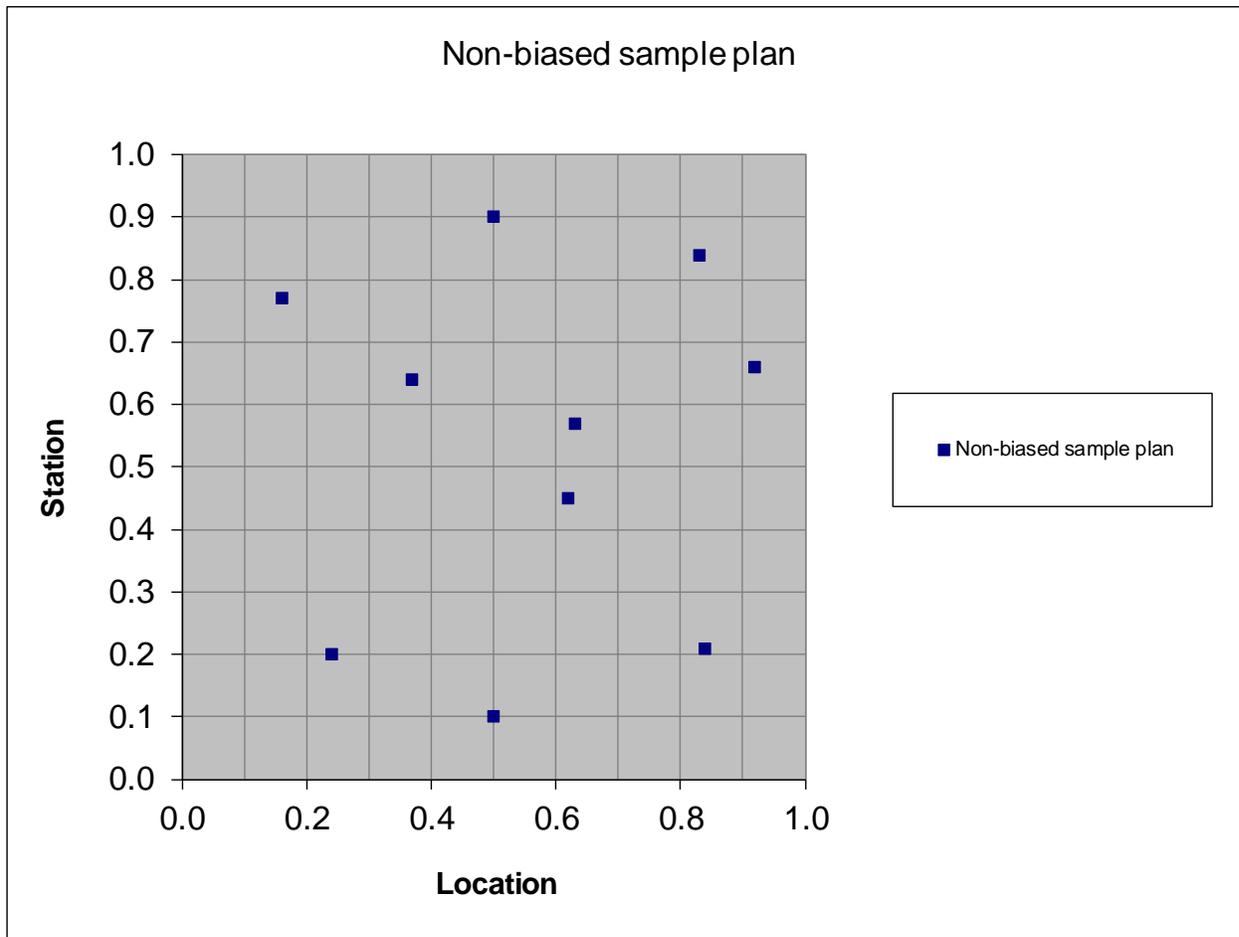
TABLE NO.	TABLE SITE NO.	1	2	3	4	5	6	7	8	9	10
1	LENGTH RANDOM NO.	0.08	0.90	0.48	0.75	0.36	0.88	0.78	0.07	0.11	0.60
	WIDTH RANDOM NO.	0.23	0.36	0.85	0.61	0.45	0.06	0.92	0.49	0.92	0.21
2	LENGTH RANDOM NO.	0.38	0.13	0.75	0.33	0.88	0.60	0.89	0.17	0.42	0.01
	WIDTH RANDOM NO.	0.54	0.96	0.70	0.35	0.27	0.17	0.83	0.49	0.91	0.23
3	LENGTH RANDOM NO.	0.45	0.77	0.10	0.66	0.20	0.21	0.84	0.64	0.90	0.57
	WIDTH RANDOM NO.	0.62	0.16	0.50	0.92	0.24	0.84	0.83	0.37	0.50	0.63
4	LENGTH RANDOM NO.	0.93	0.78	0.49	0.10	0.20	0.70	0.92	0.40	0.00	0.35
	WIDTH RANDOM NO.	0.07	0.63	0.42	0.25	0.87	0.45	0.92	0.18	0.62	0.68
5	LENGTH RANDOM NO.	0.72	0.07	0.91	0.51	0.02	0.58	0.41	0.15	0.32	0.76
	WIDTH RANDOM NO.	0.87	0.10	0.24	0.12	0.38	0.73	0.41	0.50	0.80	0.50
6	LENGTH RANDOM NO.	0.36	0.37	0.82	0.65	0.10	0.57	0.04	0.50	0.20	0.90
	WIDTH RANDOM NO.	0.20	0.67	0.64	0.17	0.46	0.73	0.07	0.40	0.11	0.25
7	LENGTH RANDOM NO.	0.40	0.13	0.84	0.52	0.94	0.44	0.10	0.54	0.23	0.62
	WIDTH RANDOM NO.	0.18	0.62	0.97	0.53	0.23	0.82	0.35	0.66	0.09	0.06
8	LENGTH RANDOM NO.	0.50	0.14	0.82	0.67	0.20	0.13	0.55	0.88	0.87	0.16
	WIDTH RANDOM NO.	0.25	0.98	0.70	0.67	0.57	0.22	0.64	0.78	0.10	0.21
9	LENGTH RANDOM NO.	0.18	0.71	0.52	0.25	0.93	0.05	0.06	0.85	0.80	0.55
	WIDTH RANDOM NO.	0.52	0.18	0.62	0.18	0.88	0.17	0.98	0.96	0.31	0.23
10	LENGTH RANDOM NO.	0.84	0.40	0.60	0.10	0.08	0.38	0.24	0.66	0.82	0.80
	WIDTH RANDOM NO.	0.13	0.86	0.24	0.12	0.57	0.47	0.85	0.61	0.39	0.84

FIGURE 2

5.   Obtain from Figure 2 the length and width random numbers off the required Table number and for the required number of sites. Record the Length Random Number in Line "F" and the Width Random Number in Line "H".

6.   Calculate the distance in metres that each site will be from the lowest chainage of the test area (Line "E") using the formula:

Distance From Lowest Station (m) =   Length of Area x Length Random Number

7.   Calculate the distance in metres that each site will be from the left edge of the test area (Line "I") using the formula:

Distance From Left Edge of Area (m) =   Width of Area x Width Random Number

3.1   Pre-Determining the Station and Location

Determine the approximate station and location of a test site as described below. However the calculated stations and locations are tentative. Slight deviations may occur, depending on the condition of the test site.

1. If there are no chainage equations along the length of the test area, calculate the tentative Station of each test site (Line "J") as follows:

    Station = Lowest Station + Distance from Lowest Station

2. If the "Width of Area" (Line "C") represents the right half of the road, the Distance from Left Edge of Area (Line "I") is the tentative Location (Line "K") of the test site. In this case, all locations are right of centerline.

3. If the Width of Area (line "C") represents the left half of the road, calculate the approximate Location (line "K") of the test site as follows:

    Location = Distance from Left Edge of Area - Width of Area

    In this case, all locations are left of centerline.

4. If the Width of Area represents the total width of the road, calculate the tentative Location (Line "K") of the test site using the formula:

    $$\textbf{\textit{Location = Distance from Left Edge of Area} - \frac{\textbf{\textit{Width of Area}}}{\textbf{\textit{2}}}}$$

    If the result is positive, record the Location as RT (right of centerline).

    If the result is negative, record the Location as LT (left of centerline).

    If the result is zero, record the Location as CL (centerline).

5. Number the test sites using the site with the lowest station as Site #1, the next highest station, as Site #2, etc.

6. When testing, locate each test site by stepping out or measuring the calculated distances from the established reference points (previous chainage and centerline of test area).

7. Obtain the actual station and location of the test site allowing for adjustments for irregular areas and proceed with the testing.