APPENDIX A
SAMPLE CALCULATIONS FOR DETERMINING PAVEMENT THICKNESS INDEX
CORING LAYOUT ILLUSTRATION FIGURE

The following is an example of the steps used to determine the thickness index for a section of pavement.

PART 1

This example is based on ten cores and a project let in English. Cores, from a metric project, measured in millimeters, would be evaluated by the same steps and in accordance with the metric pay schedule.

Given: T = Design thickness of pavement = 7.0 in.
N = Number of Cores = 10
Core lengths = 7.40, 7.10, 8.10, 7.60, 7.95, 8.25, 9.70, 7.90, 8.10, 8.00

STEP 1: $\bar{x}$ **= mean thickness =** $\frac{\sum X}{N}$

$\sum X = 7.40 + 7.10 + 8.10 + 7.60 + 7.95 + 8.25 + 9.70 + 7.90 + 8.10 + 8.00 = 80.1$

$\bar{x} = 80.1 \div 10 = 8.01$ $\bar{x} = 8.01$

STEP 2: $S = \frac{\sum (x - \bar{x})^2}{\sqrt{N-1}}$

S = standard deviation of the sample

Core #	$x - \bar{x}$	$(x - \bar{x})^2$
1	7.40 - 8.01 = -0.610	-0.610 x -0.610 = 0.372
2	7.10 - 8.01 = -0.910	-0.910 x -0.910 = 0.828
3	8.10 - 8.01 = 0.090	0.090 x 0.090 = 0.008
4	7.60 - 8.01 = -0.410	-0.410 x -0.410 = 0.168
5	7.95 - 8.01 = -0.060	-0.060 x -0.060 = 0.004
6	8.25 - 8.01 = 0.240	0.240 x 0.240 = 0.058
7	9.70 - 8.01 = 1.690	1.690 x 1.690 = 2.856
8	7.90 - 8.01 = -0.110	0.110 x -0.110 = 0.012
9	8.10 - 8.01 = 0.090	0.090 x 0.090 = 0.008
10	8.00 - 8.01 = -0.010	-0.010 x -0.010 = 0.000
		= Sum = 4.314

$S = \sqrt{4.314 \div 9} = \sqrt{0.479} = 0.69$ **S = 0.69**

STEP 3: **TI = thickness index** = $(\overline{x} - S) - T$

TI = (8.01 - 0.69) - 7.00

TI = 7.32 - 7.00 = 0.32 **TI = 0.32**

PART II

The following illustrates the procedures to follow when a thick core would qualify, at the contractor's option, to be removed from the analysis for thickness determination. (Based on the above example.)

Given: T = 7.0
N = 10 - 1 removed = 9

Contractor's Option:

S = 0.69 (from Part I)

Three standard deviations = 3 x S = 2.07

Core length at which contractor can choose to remove the core from the TI (up to 10% of the total number of cores)

T + 3S = 7.0 + 2.07 = 9.07

The core that is 9.70 thick would qualify for removal.

STEP 1: $\overline{x} = \frac{\sum X}{N}$

$\sum$X = 7.40 + 7.10 + 8.10 + 7.60 + 7.95 + 8.25 + 7.90 + 8.10 + 8.00 = 70.4
= 70.4 $\div$ 9 = 7.82 = 7.82

STEP 2: S **=** $\frac{\sum (x - \overline{x})^2}{\sqrt{N-1}}$

Core #	$x - \bar{x}$	$(x - \bar{x})^2$
1	7.40 - 7.82 = -0.420	-0.420 x -0.420 = 0.176
2	7.10 - 7.82 = -0.720	-0.720 x -0.720 = 0.518
3	8.10 - 7.82 = 0.280	0.280 x 0.280 = 0.078
4	7.60 - 7.82 = -0.220	-0.220 x -0.220 = 0.048
5	7.95 - 7.82 = 0.130	0.130 x 0.130 = 0.017
6	8.25 - 7.82 = 0.430	0.430 x 0.430 = 0.185
7	9.70 - 8.01 = 1.690	1.690 x 1.690 = 2.856
8	7.90 - 7.82 = 0.080	0.080 x 0.080 = 0.006
9	8.10 – 782 = 0.280	0.280 x 0.280 = 0.078
10	8.00 - 7.82 = 0.180	0.180 x 0.180 = 0.032
		= Sum = 1.138

$S = \sqrt{1.138 \div 8} = \sqrt{0.142} = 0.38$

S =0.38

STEP 3: TI = ($\bar{x}$ **-** S) - T

TI - (7.82 - 0.38) - 7.00

TI = 0.44

TI - 7.44 - 7.00 = 0.44

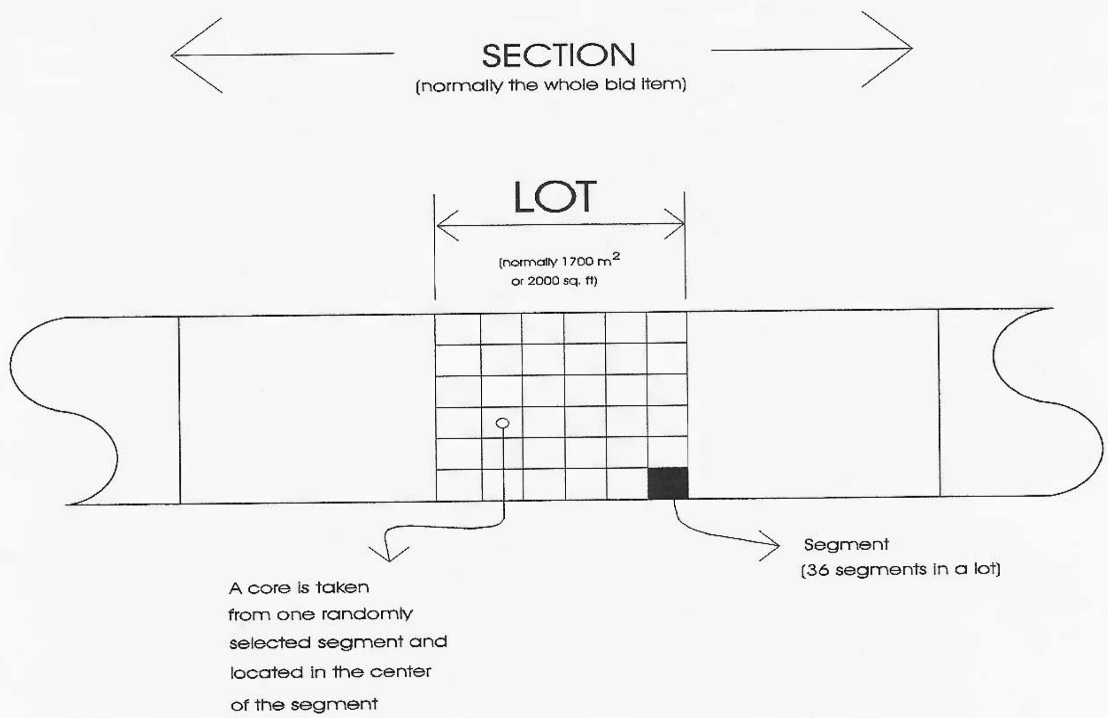
SECTION
(normally the whole bid item)
LOT
(normally 1700 m2
or 2000 sq. ft)
Segment
(36 segments in a lot)
A core is taken
from one randomly
selected segment and
located in the center
of the segment

Figure 1