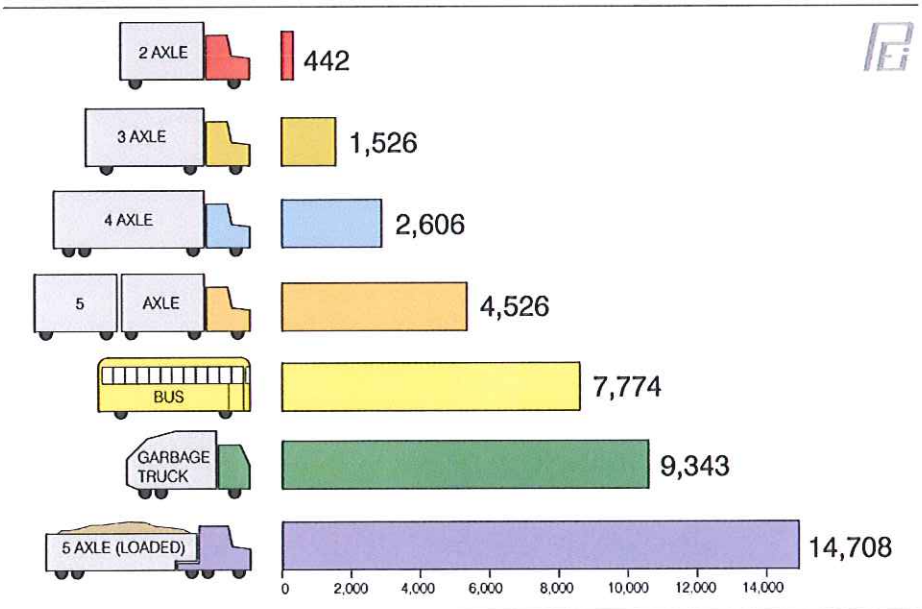
SECTION IV
Structural Evaluation

PEI performed a structural evaluation of the campus roads as part of the scope of work. The structural evaluation consisted of non-destructive deflection testing, coring to determine the pavement's existing structural section and evaluation of collected native soil samples to determine the resistance values (R-Values) for design and analysis purposes. This section summarizes our approach and findings.

TRAFFIC INDEX ANALYSIS

The Traffic Index (TI) is a measure of the number of ESALs expected in the traffic lane over the pavement design life of the road. The Traffic Index does not vary linearly with ESALs, but exponentially. A discussion of ESALs and loading is contained in Section II, Pavement Background, of this report. In simplified terms, a traffic index is an indication of the amount of loading that the pavement can expect to experience over the pavement's design life. Cars and light trucks have little impact on the pavement structure. Larger/Heavier trucks have very significant impacts on the pavement due to the high axle weights. The impact of trucks is measured in equivalent single 18,000-pound axle loads (EALs). The total EALs are converted into a design Traffic Index (TI).

To illustrate the impact of heavy vehicles, PEI developed the following chart:



COMPARATIVE VEHICLE PAVEMENT STRESS
(S-10 BLAZER = 1 VEHICLE UNIT)

Image provided courtesy of Pavement Engineering Inc.

Note that heavy vehicles have a large impact on pavement life and pavement performance.

When designing or evaluating the structural capacity of a pavement, the anticipated loading, or traffic index, directly impacts the calculation. The higher the traffic index the more structural section is needed.

PAVEMENT THICKNESS AND CORING

PEI cored the existing pavement at approximately 500 foot maximum intervals or a minimum of 2 cores over each street segment. At each core location, the total structural pavement section (AC & AB) was determined. A coring log is provided for each street as part of the evaluation summary.

R-VALUE

During the coring operation, PEI collected samples of the native soils under each pavement section where directed and determined the R-Value of each of sample.

The R-Value test measures the response of a compacted sample of soil to a vertically applied pressure. The test is used for pavement design with thicknesses of each layer dependent on the R-Value of the layer below and the expected level of traffic loading, expressed as a traffic index.

In pavement design, the lower the R-Value, the more structural section is needed to 'bridge' the soil and provide a well performing pavement section. This is illustrated below for a pavement section with a traffic index of 7.0:

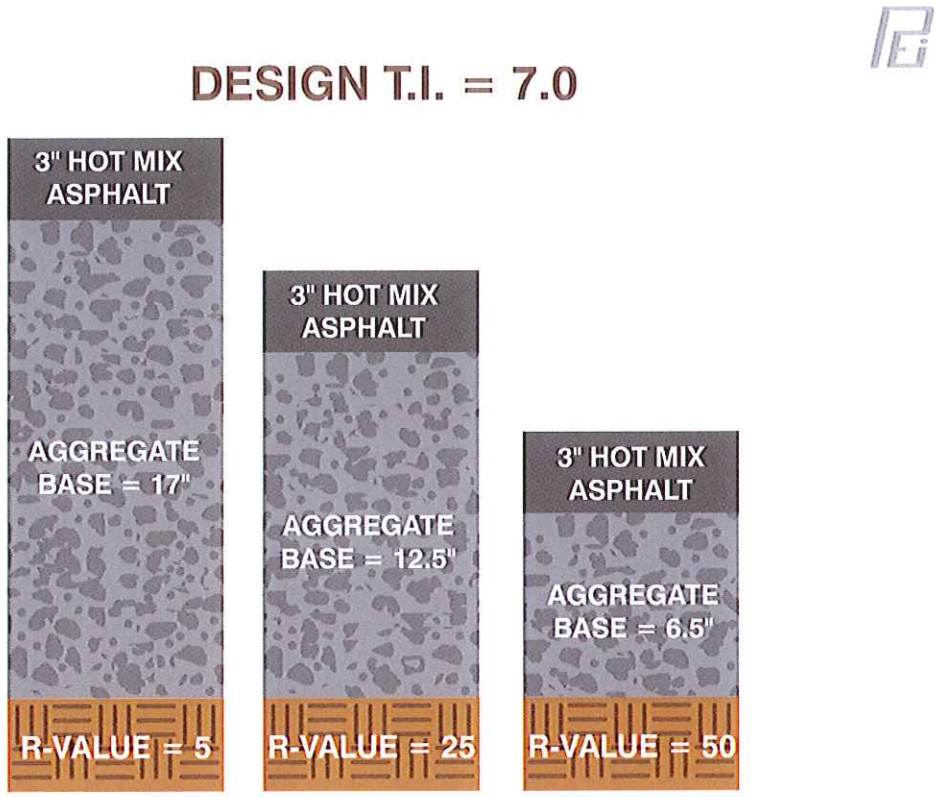


image provided courtesy of Pavement Engineering Inc.

R-Value test results are provided in the evaluation summary section of this report.

DEFLECTION TESTING

Non-destructive deflection testing of the pavement was performed on the major campus roads. The deflection testing, in conjunction with the anticipated traffic index and existing pavement thickness, determines the structural adequacy of a pavement. Deflection measurements of pavements are an important aid to proper design, maintenance and performance.

PEI utilizes the Dynaflect pavement testing device. The Dynaflect comprises a dynamic force generator together with a motion sensing device, mounted on a small trailer, and a motion measuring system, which is normally carried in the towing vehicle. Deflections are measured while the trailer is halted for a brief time at the desired location. The motion sensing device is lowered into contact with the surface and the result is read by the operator in the towing vehicle.

The force generator produces a vertical force which varies sinusoidally at the rate of 8 cycles per second. The total force applied to the material beneath the trailer consists of the static weight of the apparatus, 2,000 pounds, plus the dynamic force which alternately adds to and subtracts from this weight. The peak to peak excursion of the dynamic force is 1,000 pounds. This force is applied to the ground through a pair of rigid wheels.

PEI performed the deflection testing in general conformance with California Test Method 356.

For this analysis, PEI combined the deflection testing results with the visual observations of the current cracking conditions to develop the recommended treatments. A summary of the structural analysis is included in the evaluation summary section of this report.