From:

FHWA Geotechnical Aspects of Pavements Reference Manual

Chapter 5.0 Geotechnical Inputs For Pavement Design (continued)

5.4 Mechanical Properties

Correlations[1] between resilient modulus (Mr) and various material strength and index properties (NCHRP 1-37A, 2004).

Strength or Index Property	Correlation	Comments	Test Standard
California Bearing Ratio[2]	Mr (psi) = 2555 $(CBR)^{0.64}$ Mr (MPa) = 17.6 $(CBR)^{0.64}$	CBR = California Bearing Ratio (%)	ASTM D1883, AASHTO T193:The California Bearing Ratio
Stabilometer R-value	Mr (psi) = 1155 + 555 R Mr (MPa) = 8.0 + 3.8 R	R = R-value	AASHTO T190-Resistance R-Value and Expansion Pressure of Compacted Soils
AASHTO layer coefficient	Mr (psi) = 30,000 $(a_i / 0.14)^3$ Mr (MPa) = 207 $(a_i / 0.14)^3$	a_i = AASHTO layer coefficient	AASHTO Guide for the Design of Pavement Structures (1993)
Plasticity index and gradation	$CBR = \frac{75}{1 + 0.728 (w\ PI)}$	w PI = P200 * PI P200 = % passing No. 200 sieve size PI = plasticity index (%)	AASHTO T27-Sieve Analysis of Coarse and Fine Aggregates AASHTO T90-Determining the Plastic Limit and Plasticity Index of Soils
Dynamic Cone Penetration[3]	CBR = 292 / $(DCP^{1.12})$	CBR = California Bearing Ratio (%) DCP = Penetration index, in./blow	ASTM D6951-Standard Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications

1 Correlations should be applied to similar conditions - i.e., CBR measured at optimum moisture and density vs. soaked conditions correlates to Mr at corresponding moisture and density conditions.

2 NCHRP 1-37A strongly recommends against use of the older Heukelom and Klomp (1962) correlation Eq. (5.13) between Mr and CBR specified in the 1993 AASHTO Design Guide.

3 Estimates of CBR are used to estimate Mr.

http://www.fhwa.dot.gov/engineering/geotech/pubs/05037/05b.cfm