■ Use of Alternative Volume-Time Functions (cont.)

Adapting the BPR Formula for Consistency with the HCM

The original BPR formula is derived from the 1965 Highway Capacity Manual (HCM). Since 1965, there have been revisions to the HCM which more accurately reflect conditions in urban areas today. Some researchers have found that the BPR formula can fit the data from more recent versions of the HCM well with the appropriate choice of model parameters.

Horowitz developed volume-time equations using the BPR formulation which fit well the 1985 HCM data for both freeways and multi-lane highways. These parameters are shown below. If software limitations require the user to use a single equation for all roadway types, Horowitz recommended parameters of 0.83 for a and 5.5 for b.

Facility Type	Free Flow Speed	a	b
6-Lane Freeways	70 mph	0.88	9.8
	60 mph	0.83	5.5
	50 mph	0.56	3.6
Multi-Lane Highways	70 mph	1.00	5.4
	60 mph	0.83	2.7
	50 mph	0.71	2.1

A recent NCHRP project fit the BPR curve to the 1994 HCM data. This work is notable in that a curve was fit specifically for signalized arterials. The parameters are shown below.

Source	a	b
Signalized Arterials	0.05	10.0
All other facilities	0.20	10.0

It should be noted that the equations estimated in both of the research efforts cited above assume that *actual* capacity, as computed by the methods in the HCM, be used.