Calculating Racial/Ethnic Diversity using the Shannon-Wiener Index with Census Table QTP4

Step 1: Select
Column B (Id2)
Column H (Total - Number; Total population - One race)
Column J (Not Hispanic or Latino-Number; Total Population – One Race)
Column N (Not Hispanic or Latino-Number; Total Population – One Race – White)
Column R (Not Hispanic or Latino-Number; Total Population – One Race – Black or African American)
Column V (Not Hispanic or Latino-Number; Total Population – One Race – American Indian and Alaska Native)
Column Z (Not Hispanic or Latino-Number; Total Population – One Race – Asian)
Column AD (Not Hispanic or Latino-Number; Total Population – One Race – Native Hawaiian and Other Pacific Islander)
Column AH (Not Hispanic or Latino-Number; Total Population – One Race – Some Other Race)
Column AJ (Total - Number; Total Population – Two or More Races)

Step 2: Subtracting Column J from Column H to determine Total Hispanic Population

Step 3: Using the neighborhood definition file columns for Block and Neighborhood, assign Neighborhoods to the Census Blocks

Step 4: Using the Excel Pivot Table function, sum the number of residents for each race/ethnic group for every neighborhood.

Step 5: Create the diversity Spreadsheet using the following steps (see model on next page):

a) Divide the population of each race/ethnic group by the total population (at both the city level and for each neighborhood).
b) If the resulting number is zero for a race/ethnic group, the value is zero; otherwise find the natural logarithm of the value (i.e., IMLN in excel) using the following if/then excel function:
=IF (COLUMN/ROW=0, 0, IMLN(COLUMN/ROW [e.g., =IF(L2=0,0,IMLN(L2)]
c) Multiple the results found in Step b) by the results of Step a) [e.g., =L2 X T2]
d) The inverse sum of the races/ethnicities represents the diversity index [e.g., =-SUM(AB2:AI2)

The following calculations determine the Index (repeat column/equation for each race/ethnic group within the city/neighborhood):

A	B	C	D	E	F	G
City/ Neighborhood	**TOTAL POPULATION**	**TOTAL POPULATION RACE/ETHNICITY** (One column for each Race/Ethnic Group)	**PERCENT of OVERALL POPULATION** (One column for each Race/ Ethnic Group)	**ALGORITHYM for RACE/ETHNICITY** (Excel Function: One column for each Race/ Ethnic Group)	**RACIAL/ETHNIC DIVERSIFICATION** (Excel Function: One column for each Race/ Ethnic Group)	**DIVERSITY INDEX** (Inverse Sum of Columns "F")
City XX	XXXX	XXX	= C/B	=IF(D=0,0,IMLN(D))	=C*E	=-Sum(F:X)
Neighborhood A	XXXX	XXX	= C/B	=IF(D=0,0,IMLN(D))	=C*E	=-Sum(F:X)
Neighborhood B	XXXX	XXX	= C/B	=IF(D=0,0,IMLN(D))	=C*E	=-Sum(F:X)

Excel Sample:

City / Neighborhood	Total Population	DIVERSITY INDEX	White	Black/ African American	Hispanic or Latino (any race)	American Indian/ Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	Two or More Races
ANY CITY, ANY STATE	**3095313**	**=D22**	**1500047**	**146600**	**927866**	**14098**	**328058**	**13504**	**6715**	**158425**
NEIGHBORHOOD A	6530	**=D23**	3495	1155	973	60	449	40	26	332
NEIGHBORHOOD B	15035	**=D24**	11811	159	2014	185	303	36	8	519

Step 1: Calculate what percent of overall population is each race/ethnicity			White	Black/ African American	Hispanic or Latino (any race)	American Indian/ Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	Two or More Races
		ANY CITY, ANY STATE	=D2/$B2	=E2/$B2	=F2/$B2	=G2/$B2	=H2/$B2	=I2/$B2	=J2/$B2	=K2/$B2
		NEIGHBORHOOD A	=D3/$B3	=E3/$B3	=F3/$B3	=G3/$B3	=H3/$B3	=I3/$B3	=J3/$B3	=K3/$B3
		NEIGHBORHOOD B	=D4/$B4	=E4/$B4	=F4/$B4	=G4/$B4	=H4/$B4	=I4/$B4	=J4/$B4	=K4/$B4

Step 2: a) Divide the population of each race/ethnic group by the total population (at both the city level and for each neighborhood).			White	Black/ African American	Hispanic or Latino (any race)	American Indian/ Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	Two or More Races
b) If the resulting number is zero for a race/ethnic group, the value is zero;		**ANY CITY, ANY STATE**	=IF(D7=0,0,IMLN(D7))	=IF(E7=0,0,IMLN(E7))	=IF(F7=0,0,IMLN(F7))	=IF(G7=0,0,IMLN(G7))	=IF(H7=0,0,IMLN(H7))	=IF(I7=0,0,IMLN(I7))	=IF(J7=0,0,IMLN(J7))	=IF(K7=0,0,IMLN(K7))
		NEIGHBORHOOD A	=IF(D8=0,0,IMLN(D8))	=IF(E8=0,0,IMLN(E8))	=IF(F8=0,0,IMLN(F8))	=IF(G8=0,0,IMLN(G8))	=IF(H8=0,0,IMLN(H8))	=IF(I8=0,0,IMLN(I8))	=IF(J8=0,0,IMLN(J8))	=IF(K8=0,0,IMLN(K8))
		NEIGHBORHOOD B	=IF(D9=0,0,IMLN(D9))	=IF(E9=0,0,IMLN(E9))	=IF(F9=0,0,IMLN(F9))	=IF(G9=0,0,IMLN(G9))	=IF(H9=0,0,IMLN(H9))	=IF(I9=0,0,IMLN(I9))	=IF(J9=0,0,IMLN(J9))	=IF(K9=0,0,IMLN(K9))

Step 3: Multiple the results found in Step 1 by the results of Step 2			White	Black/ African American	Hispanic or Latino (any race)	American Indian/ Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	Two or More Races
			=D7*D12	=E7*E12	=F7*F12	=G7*G12	=H7*H12	=I7*I12	=J7*J12	=K7*K12
			=D8*D13	=E8*E13	=F8*F13	=G8*G13	=H8*H13	=I8*I13	=J8*J13	=K8*K13
			=D9*D14	=E9*E14	=F9*F14	=G9*G14	=H9*H14	=I9*I14	=J9*J14	=K9*K14

Step 4: The inverse sum of the races/ethnicities	DIVERSITY INDEX
	=-SUM(D17:K17)
	=-SUM(D18:K18)
	=-SUM(D19:K19)