

Signalized Intersections (Group Assignment)

The intersection of 15th Ave NE and NE 45th St is shown in Figure 1 below.

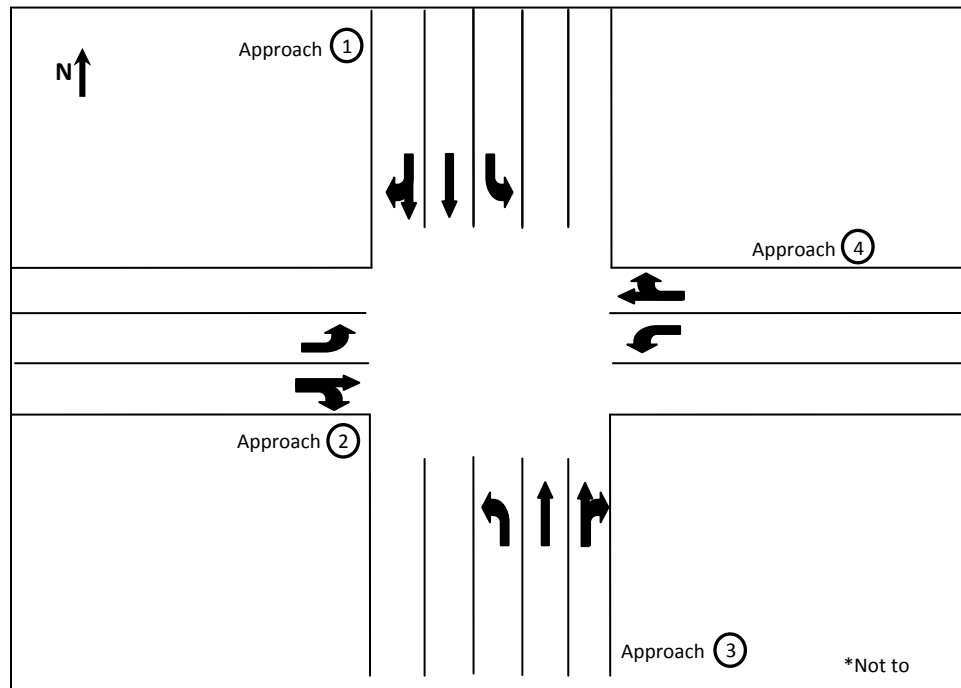


Figure 1: Intersection layout for 15th Ave NE and NE 45th St

The intersection consists of four approaches and a **four-phase** traffic signal plan has been recommended. The saturation flow rates and peak-hour traffic volumes for the intersection are given in Tables 1 and 2, respectively.

Phase 1	Phase 2	Phase 3	Phase 4
NB L: 1800 veh/hr	NB T/R: 3600 veh/hr	EB L: 1800 veh/hr	EB T/R: 1800 veh/hr
SB L: 1800 veh/hr	SB T/R: 3600 veh/hr	WB L: 1800 veh/hr	WB T/R: 1800 veh/hr

Table 1: Saturation Flow Rates for 15th Ave NE and NE 45th St Intersection

	Left-turn	Through	Right-turn
Eastbound	80 veh/hr	450 veh/hr	50 veh/hr
Westbound	60 veh/hr	360 veh/hr	70 veh/hr
Northbound	260 veh/hr	860 veh/hr	130 veh/hr
Southbound	300 veh/hr	840 veh/hr	140 veh/hr

Table 2: Peak-hour Traffic Volumes for 15th Ave NE and NE 45th St Intersection

Determine the minimum cycle length and effective green time for each phase. Use an initial $X_c = 0.9$.

Determine the Level of Service for each approach and then for the entire intersection. Assume no initial queues at the start of the analysis period. Use $T=1$, $k=0.5$, and $I=1.0$.

Complete these tasks by developing an excel spreadsheet that both calculates and communicates the results of your analysis. (Hint: it may be easier to start the calculations by hand and then begin to develop your spreadsheet as you start to feel more comfortable with the procedure).

You will be turning in a hardcopy of your excel spreadsheet. I will not see the actual excel file. See the attached example.

Extra credit: Determine the yellow and all red times for each phase. Determine the minimum amount of pedestrian green time required for the intersection. Assume a minimum of 20 pedestrians crossing either street during any one phase and a crosswalk width of 8 ft.

This is an example of what your assignment deliverable should look like.

Determine the cross-sectional area of a circular column.

Determine the volume of the column.

Given:

radius (r) = 3 ft

height (h) = 12 ft

Area = $\pi * r^2$

A = 28.26 ft ²

Volume = A*h

V = 339.12 ft ³

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- * State givens/inputs
 - * Show formulas used in calculations
 - * Include units
 - * "Highlight" answers (remember that your printout will be in black and white, so no colors)
 - * Use page breaks appropriately

I should be able to look at a hardcopy of your spreadsheet and understand the logic of your calculations even though I am unable to see the actual formulas you entered in excel.