FIRE FLOW AND PRESSURE CALCULATIONS
Southbound Express
2721 US 301 South
July 2022

Flow and pressure requirements:

	Fire flow required per Appendix B (Q_{design})	500	gpm *
	Pressure required for fire flow (P_{design})	20	psi
1) At data point 1 (flow hydrant)			
(101 Emmett Road)	Fire flow reading from test (Q_{test})	2080	gpm
2) At data point 2 (residual hydrant)	Static presssure (P_{static})	72	psi
(Intersection Alphin Road & US 301)	Residual pressure ($P_{residual}$)	46	psi

Total flow noted from flow test results 7-27-22 (Q_{test}) 865 gpm

$Q_{20} = Q_{test} \times ((P_{static} - P_{design})^{0.54})/(P_{static} - P_{residual})^{0.54})$

Solve for flow at 20 psi (Q_{20}) $Q_{20} = Q_{test} \times ((P_{static} - P_{design})^{0.54})/(P_{static} - P_{residual})^{0.54})$

$(P_{static}-P_{design})^{0.54}$	8.45
$(P_{static}-P_{residual})^{0.54}$	5.81

Flow at 20 psi at data point 2 Q_{20} 1258 gpm

Solve for pressure P at required fire flow of 500 gpm (P_{500})

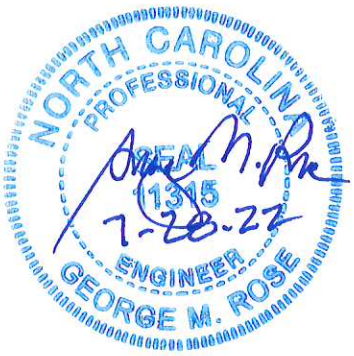
$P_{design} = P_{static} - ((Q20/Q_{test})(P_{static}-P_{test})^{0.54}))1/_{0.54}$

$(Q_{design}/Q_{test})^{1.85}$	0.363
$(P_{static}-P_{residual})$	26.00
$(P_{static}-P_{residual}) \times (Q_{design}/Q_{test})^{1.85}$	9.432

Calculated pressure at data point 2 at required fire flow of 500 gpm (P_{500}) 62.6 psi

Observed pressure at residual hydrant at 500 gpm was 57 psi

* Harnett County requirement for minimum flow at 20 psi



4D SITE SOLUTIONS, INC
ENGINEERING SURVEYING GPS CONSTRUCTION LAYOUT

FIRE HYDRANT FLOW TEST

TEST DATE	MAIN SIZE	PROJECT
07/27/2022	12"	1928-Southbound

PURPOSE OF TEST	PERSONS PERFORMING TEST
Fire flow	Scott Brown & Caleb Kernan

HYDRANT FLOW DATA

FH ID	FH LOCATION
	residual hydrant - intersection of Alphin Rd & US 301

STATIC	RESID	PITOT	TIME	OR SIZE	FLOW
72 psi	46 psi		11:00am		865 gpm

ADDITIONAL OBERSERVATIONS

flow hydrant is common property lines between 101 Emmet Rd & 2445 US 301
57 psi at 500 gpm

CONDITION OF FLOW HYDRANT

NUMBER OF OUTLETS	OUTLET SIZES	BODY APPEARANCE
3		GOOD

FH SHUT OFF COMPLETELY?

YES

OTHER OBSERVATIONS ON THE HYDRANT

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