

**Table 1a**  
**Delineation Calculations For Zone 1 Radius**  
**Benner Water Authority**  
**Hampton Hills & Grove Park**  
**PWSID 4140131 & 4140133**  
**Centre County, PA**  
**Small Systems Source Water Protection Program**

Q=Pumping rate of the source

t=Time of pumping (days)

n=Porosity of the well (dimensionless; percentage expressed as a decimal)

H=Saturated thickness of the aquifer (feet; typically open interval or length of well screen)

r=Calculated radius of the zone

$$r=(Qt/\pi nH)^{1/2}$$

Source Type/ID	well-001	well-002	well-001
Source Name	Hampton Well #1	Opequon Well	Grove Well #1
Q (GPD)=	28800	83640	60480
Total Depth (ft)	397	382	300
Casing Depth (ft)	214	158	197.5
St Water Level (ft)	77	54	0
H (ft)=	183	224	102.5
Q (ft <sup>3</sup> /day)=	3850	11180	8090
porosity=	0.3	0.3	0.3
t (days)=	90	90	90
r calculated (ft)=	44.8	69	86.8
r actual* (ft)=	100	100	100

\*Any source with a calculated Zone 1 radius less than 100 feet will automatically be assigned a radius of 100 feet.

**Table 1b**  
**Delineation Calculations For Zone 2 Radius**  
**Benner Water Authority**  
**Hampton Hills & Grove Park**  
**PWSID 4140131 & 4140133**  
**Centre County, PA**  
**Small Systems Source Water Protection Program**

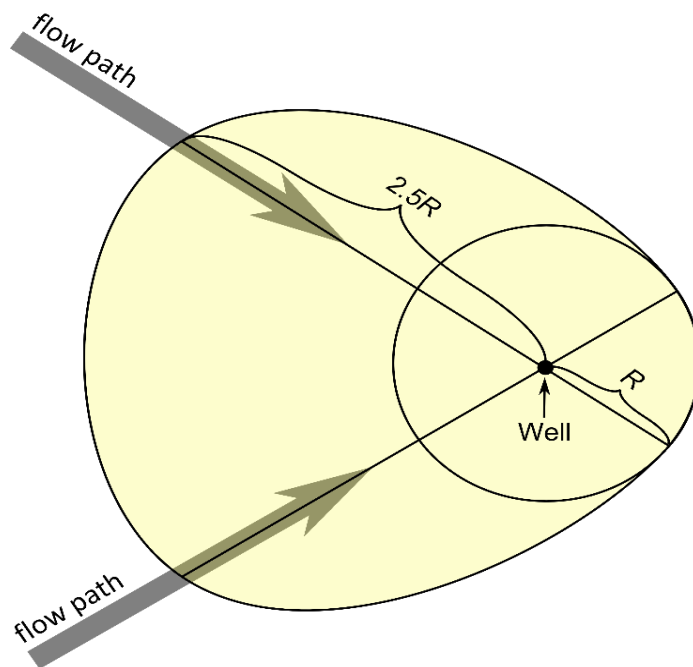
Q=Pumping rate of the source

N=Areal recharge to the water table due to precipitation

R=Calculated radius of the zone

$$R=(Q/n\pi)^{1/2}$$

Source Type/ID	well-001	well-002	well-001
Source Name	Hampton Well #1	Opequon Well	Grove Well #1
Q (GPD)=	28800	83640	60480
N (in/yr)=	17	17	17
Q (ft <sup>3</sup> /day)=	3850	11180	8090
N (ft/day)=	0.00388	0.00388	0.00388
R (ft)=	562	958	814
2.5R (ft)=	1410	2400	2040
Zone II Area (acres)=	50.2	156	129



The above illustration is an example Zone II area, and shows how each variable is used to determine the size and shape of the area.