

CIVIL ENGINEERING

LAND SURVEYING

WETLAND CONSULTING

August 7, 2023  
6842

Groton Zoning Board of Appeals  
173 Main Street  
Groton, MA 01450

**Re: Additional Information relative to Stormwater Questions  
Groton Farms – 500 Main Street  
Groton, MA**

Dear Members of the Board,

On behalf of the Applicant, 500 MG LLC, Dillis & Roy Civil Design Group, Inc. has prepared this letter in response to an email from Mr. Rick Muehlke to the Zoning Board of Appeals dated July 30, 2023. We have provided the questions asked in the email in *Italic* with our response below each in **Bold**.

- 1. Please explain what "2-year", "10-year", etc terms mean in the tables. Does this mean the average single storm event in any 2-year period? Or the worst single storm event in any 2-year period? Or does it mean something else?*

**Dillis & Roy Response – The terms “2-year”, 10-year”, etc. are a way of expressing the probability of exceeding the given rainfall depth within any given 365-day period (1 year period). As such, the runoff depth for a 2-year storm, has a probability of 0.5 (50% chance) of occurring in any given year. Similarly, the runoff depth from a 10-year storm has a 10% chance of occurring in any given calendar year; 25-year = 4%; 50-year = 2%; 100-year = 1%. It is a common misconception that a 100-year storm only statistically occurs once in 100-years. Statistically speaking, each storm event is “mutually exclusive”. As such, if you have a statistical 100-year storm one year, you have the same probability of having one the next year....1%.**

- 2. What information are the table numbers based on, in terms of weather/climate forecasts? What is the source of this information? Is it based on more recent science, which projects added rainfall and more severe storms in future years, compared to the past 20-50 years?*

**Dillis & Roy Response – The Town of Groton (as well as the Commonwealth of Massachusetts) requires use of TR-20 or TR-55 (which are both developed by the Soil Conservation Service) to perform the required hydraulic calculations. TR-20 is a manual, hand calculation method and TR-55 is a computer based calculation**

**allowing for more iterations (and thus more accuracy)...both methods employ the same basic principles where runoff hydrographs are calculated based on tributary area, land cover and times of concentrations and added together as they converge downstream. TR-55 uses the rainfall atlas TP-40 to predict the 24-hour rainfall depths for each design storm return frequency. This rainfall atlas is now quite old and uses data from many decades ago. Our calculations used TR-55 and were based on the rainfall atlas publish by Cornell. This atlas is based on newer information and yields a more conservative (more rain depth) for each of the design storms. As such, the stormwater calculations performed for the development are based on more conservative values than what is required by the regulations.**

We trust this meets your needs at this time. If you have any questions or require any additional information, please do not hesitate to contact me.

Regards,

**DILLIS & ROY**  
**CIVIL DESIGN GROUP, INC.**



Gregory S. Roy, P.E.  
Vice President

cc: Mr. John Amaral – 500 MG LLC (via email)  
Ms. Leslie French – 500 MG LLC (via email)  
Mr. Robert Anctil – Perkins & Anctil PC (Applicant's Counsel)