MEMORANDUM

December 21, 2015
15465

Project: Town of Cape Elizabeth Technical Amendments

To: Maureen O'Meara, Town Planner

From: Steve Harding, Town Engineer

Subject: Storm water Modeling Limitations

In review of recent technical amendments being made to the Site Plan submissions section and Chapter 16 of the Town Ordinances dealing with storm water, concerns have been raised regarding the appropriateness of using industry standard software modeling techniques for projects that have small increases of impervious surface and/or small overall project areas. The following discussion addresses the difficulties in applying the industry standard software packages, such as HydroCAD, to small projects given the limitations of the software program and its technical basis, as well as the various parameters of a site's characteristics which would influence the predication of stormwater runoff.

The Town of Cape Elizabeth, like many Maine municipalities, contain provisions within their ordinances to control the future estimated peak rate of runoff to levels that exist prior to the development of the proposed project. For larger projects, this provision is readily addressed by using software modeling programs to estimate pre- and post-development runoff hydrographs and then predict the function of attenuation features, such as a storm water detention basin or bioretention basin, to demonstrate a reduction in estimated peak rate of runoff from the site. The Maine Department of Environmental Protection (DEP) regulates stormwater flow from projects typically in the range of greater than an acre of impervious area. The industry standard software models, which in Maine is most often HydroCAD program, are very well adapted for projects with drainage areas well over an acre so in these situations the software modeling provides a a effective means to measure runoff changes from the pre- to the post-development conditions and a mathematical step in which to evaluate various storm water attenuation features.

As the project area becomes small and with lesser areas of added impact, these software modeling programs become much less reliable and the calculated deviations between pre-and post-development conditions much less dependable in relation to actual storm water changes. Intuitively, any increase in

net impervious area would likely result in some increase in storm water runoff as less runoff is infiltrated into the soil and more runoff is discharged off-site. The actual measurement of this runoff, however, tests the limits of the software modeling programs and the results are often meaningless or at best an insignificant increase that would not be easily measured in the field.

For these small projects or small impervious area increases, engineers often cite the limitations of the storm water programs and negligible realistic effects to request that formal storm water calculations be waived. We have supported such requests in the past, however, we have encouraged designers to implement some means of storm water treatment, such as a rain garden or under-drained swale, so that the intuitive increase could be attenuated even if the minimal increase could not be accurately measured. In doing so, we believe that the intent of the Town's ordinances have been met while allowing for a more effective design approach in respect to the minimal value of a formal stormwater calculations analysis.