

MEMORANDUM



To: Ryan Rimmele, Zebulon Campground
From: Dave McCallops, Director; Stefanie Smith, Technical Director
Date: 03/07/2024
Subject: Stormwater Management Recommendation

Introduction

There are two primary objectives and considerations for this discussion on stormwater management:

1. This will be a privately owned and operated campground and not a residential subdivision. There will be no public right-of-way and only paying customers and possibly their guests will be permitted on the property. The ownership intends for access to the site to be controlled and monitored for the safety and security of their customers.
2. The owner of the property wants to provide environmentally sustainable development as possible given the opportunities, constraints, and topography of the land. That includes managing stormwater on the site in a sustainable way to protect their customers and their downstream neighbors.

The following represents our thought process on how best to achieve both objectives stated above.

Stormwater Methodology

The proposed Zebulon Campground is located on approximately 36 acres about ½ mile north of Proctor Street with frontage along Shepard School Road. As a privately owned and operated campground, the current design includes approximately 50 RV Campsites, eight Yurt Campsites, 11 Glamping Campsites, and 12 Platform Tent Sites for a total of approximately 81 Campsites. The variety of campsite types is intentional to be “light on the land”, address the shape and character of the property, and attract various clientele from individuals to couples, to families.

While campgrounds vary in size throughout North Carolina and the nation, the proposed 81 Campsites is fairly low when compared to typical campgrounds. Most of the campgrounds in our experience start with a minimum of 100 Campsites with 200 to 250 Campsites being the typical target from a Return-on-Investment scenario. The proposed smaller size of this campground will limit traffic and provide for a better guest experience for those staying at the campground as well as reducing negative impacts to the existing neighborhoods south and east of the campground.

There are a number of methods to collect, convey, and address stormwater quantity from a private development during and following a rainfall event. The methods to manage stormwater normally depend on the type of development, the rules and regulations of the community, plus the environmental conscientiousness of the owner and the community where the development occurs.

For collection and conveyance, the use of curb with catch basins, cross culverts, and storm sewer pipe is one method to manage stormwater. Another is the use of drainage ditches and sheet flow for most of the collection and conveyance with assistance from cross culverts and possibly small sections of storm sewer pipe and accompanying catch basins. For managing water quantity, the use of existing lakes or ponds or the inclusion of new detention or retention ponds have proven effective throughout the nation.

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Considerations

A major consideration for the method used to collect, convey, and address stormwater quantity is the environmental consciousness of the community. The use of drainage ditches and sheet flow provides for lower velocities of the stormwater, the ability to convey more stormwater compared to a pipe, and most importantly improved water quality. The ditches and sheet flow across open space captures pollutants such as suspended solids as well as chemicals, oils, etc. that help improve the water quality of the stream, river, pond, lake, etc. where the stormwater discharges.

The primary purpose of using catch basins and underground storm sewer pipes is to move stormwater as quickly as possible without consideration of the negative environmental impacts. By design, roadside curbs with catch basins and underground pipes provide accelerated velocities which increase erosion. In addition, catch basins and sewer pipes do not allow the rainwater to be filtered and captured through ditch vegetation or allow for the infiltration of rainwater into the ground.

For campgrounds specifically, our experience nationally is for a more environmentally friendly and natural setting for the campsites and the stormwater collection and management system. This leads to drainage ditches and sheet flow across the site versus a traditional subdivision setting of curbs, catch basins, and an underground pipe network.

In addition, campgrounds as privately owned entities and for the safety of their customers do not allow direct and open access to the public. This includes connections to subdivisions and other public or private developments. Safety and security are critical to the success of a campground and the comfort of their customers.

To discourage high speeds, campgrounds typically have tighter radii where possible with speed limits ranging from 5 to 10 MPH. The lower speeds, uncurbed roadways and to encourage a sense of community, the roadways within a campground also serve as pedestrian walkways and bikeways. The use of the roadway in lieu of off-roadway sidewalks also encourages guests to adhere to the lower speed limits. Sidewalks increase impervious area requiring additional stormwater management to control velocities and downstream impacts, plus the need for additional cleansing of the rainwater.

It is imperative that speeds are controlled and only customers who are within the campground have access to the roadway system. Allowing the privately owned campground to be used as a possible cut-through by neighboring residential subdivisions increases the likelihood of negative safety and security impacts to the campground. Conversely, Recreational Vehicles (Class A RVs to Trailer Trailers pulled by large pickup trucks and SUVs) driving through the adjoining neighborhoods could increase safety concerns by the neighbors. Therefore, eliminating access from the campground to the residential subdivisions also reduces negative safety and security impacts to the residential areas.

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Recommendation & Conclusion

In our professional opinion, the use of drainage ditches along the campground roadways without sidewalks is the best option for your privately owned campground development. The suggested arrangement provides the most environmentally friendly solution for stormwater management while still maintaining safe surroundings for pedestrians and bike riders within the campground.

Please let us know if you have any questions or would like to discuss the findings within this memorandum in more detail.

Sincerely,

David M. McCallops, P.E.
Director of Water Resources

Stefanie S. Smith, AIA, LEED AP BD+C
Technical Director