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February 9, 2023

**C-22-14
109R & 131 CLARK LANE
PUBLIC HEARING
EXHIBIT # 48**

Maureen Fitzgerald, Environmental Planner
Town of Waterford
15 Rope Ferry Road
Waterford, CT 06385

**RE: Kingstown Properties, LLC – Affordable Housing Development – Clark Lane
P&R Job No. 213009**

Dear Ms. Fitzgerald:

We are in receipt of the February 7, 2023 secondary report prepared by Sigrun Gadwa of Carya Ecological Services, LLC. We understand that this report as well as the previous January 26, 2023 were commissioned by one or more abutting property owners who have expressed opposition to the proposed project. In spite of the questionable prejudicial position that Ms. Gadwa has taken in her review of this project based on Section 10 of her report, we feel it is important to clarify several of the salient technical issues discussed in the report. The following is offered in response to these particular issues:

1. Section 1 of the Carya report addresses the Clark Lane drainage system discharge that is currently proposed to be collected and treated through the project's stormwater system. Because of the lengthy discussion by Ms. Gadwa at the January public hearing about this proposal, we prepared a schematic alternative plan showing a potential extension of the Clark Lane system to the easterly limits of the project. Ms. Gadwa indicates that this plan includes "no mention of a spreader of any sort" in spite of clearly and obviously showing a potential level spreader. We maintain our position that our collection and treatment of this stormwater is prudent and is a direct result of: (a) following the protocols of the Jordan Brook Watershed Management Plan; (b) requests by Town staff during the preapplication review process that we do so and; (c) generally accepted good engineering practice. Despite this, if the Commission would prefer this alternative approach, it is a technically feasible alternative and can be incorporated into the final design in the manner shown on the alternate site plan.
2. Section 4 of the Carya report suggests a design alternative whereby every other house is eliminated and replaced with a small biofiltration basin or rain garden. Assuming that we would continue to collect and treat the Clark Lane discharge because we were requested to do so, if the applicant redesigned the project as suggested by Ms. Gadwa, the net effect would be a reduction of impervious coverage of approximately 22% draining to the stormwater basins. While this may result in a small decrease of the size of both the bioretention basin and detention basin, it is important to understand that the design flow to these basins is generated by both the impervious coverage and pervious coverage in the contributing watershed. There is not a linear relationship between impervious coverage and size of these basins. In general terms, a 22% reduction in impervious coverage might

result in a 10% reduction in the footprint of each basin. (The exact size reduction would require a complete and detailed stormwater analysis and iterative basin design.) We also note that given the sensitive nature of the receiving watercourse (Fenger Brook) it would generally be desirable to maintain the size of the basins to provide additional treatment volume and enhanced stormwater quality. We further note that the use of rain gardens to serve each individual unit was discussed during preapplication reviews. Because individual unit rain gardens are typically small landscape features, there is a higher likelihood that they will be modified or removed in the future or that their function will unknowingly be impaired. While they would provide an appropriate level of stormwater treatment initially, any loss of function that occurred over time and without notice would negate their benefit. Because the entire project will be owned and managed by a single entity, the current proposal with a single larger basin was chosen because it will not slowly disappear and it can be maintained in perpetuity to ensure future stormwater quality as intended.

3. Ms. Gadwa suggests that the proposed design does not meet the Stream Channel Protection criteria in Section 7.6.1 of the *2004 Connecticut Stormwater Quality Manual* in spite of the fact that the information necessary to establish this has not been submitted to date. The proposed design not only meets the Stream Channel Protection criteria, it far exceeds the criteria. Per the 2004 Manual, the typical criteria is to "control the 2-year, 24 hour post-development peak flow rate to the 1 year, 24 hour predevelopment level."

The 1 year, 24 hour predevelopment peak flow from just the Clark Lane discharge is 2.87 cfs.

The 2 year, 24 hour post-development peak flow from our *entire developed site*, including Clark Lane is 1.98 cfs.

Clearly, the Stream Channel Protection criteria have been met and exceeded based on this simple analysis alone.

Related to this point is the assertion by Ms. Gadwa that in spite of the proposed level spreader design, the presence of an existing stone wall immediately down gradient thereof and the stable existing soil conditions between the detention basin discharge and Fenger Brook there will be significant erosion of channels caused by this discharge. Expanding on the above analysis:

The 25 year predevelopment peak flow from just the Clark Lane discharge is 8.34 cfs.

The 25 year post-development peak flow from our entire developed site, including Clark Lane is 7.60 cfs.

Considering that the existing Clark Lane discharge has no scour protection at all and the proposed detention basin discharge has a large level spreader and more gentle slopes immediately down gradient, we reiterate our confidence that there will not be persistent erosion problems associated with the detention basin outlet and level spreader.

4. Ms. Gadwa provides a detailed critique of the bioretention basin design in Appendix 1 of her report. It appears that this critique is based primarily on outdated information from 2009 and 2012 from the UNH SWC and a lack of understanding of how the system will function. The proposed design is based on 2020 criteria provided by the UNH SWC which differ from the older criteria. A typical detail for the enhanced bioretention basin prepared by the UNH SWC is attached and annotated to specifically address the concerns raised by Ms. Gadwa. The following corresponds to each specific comment:

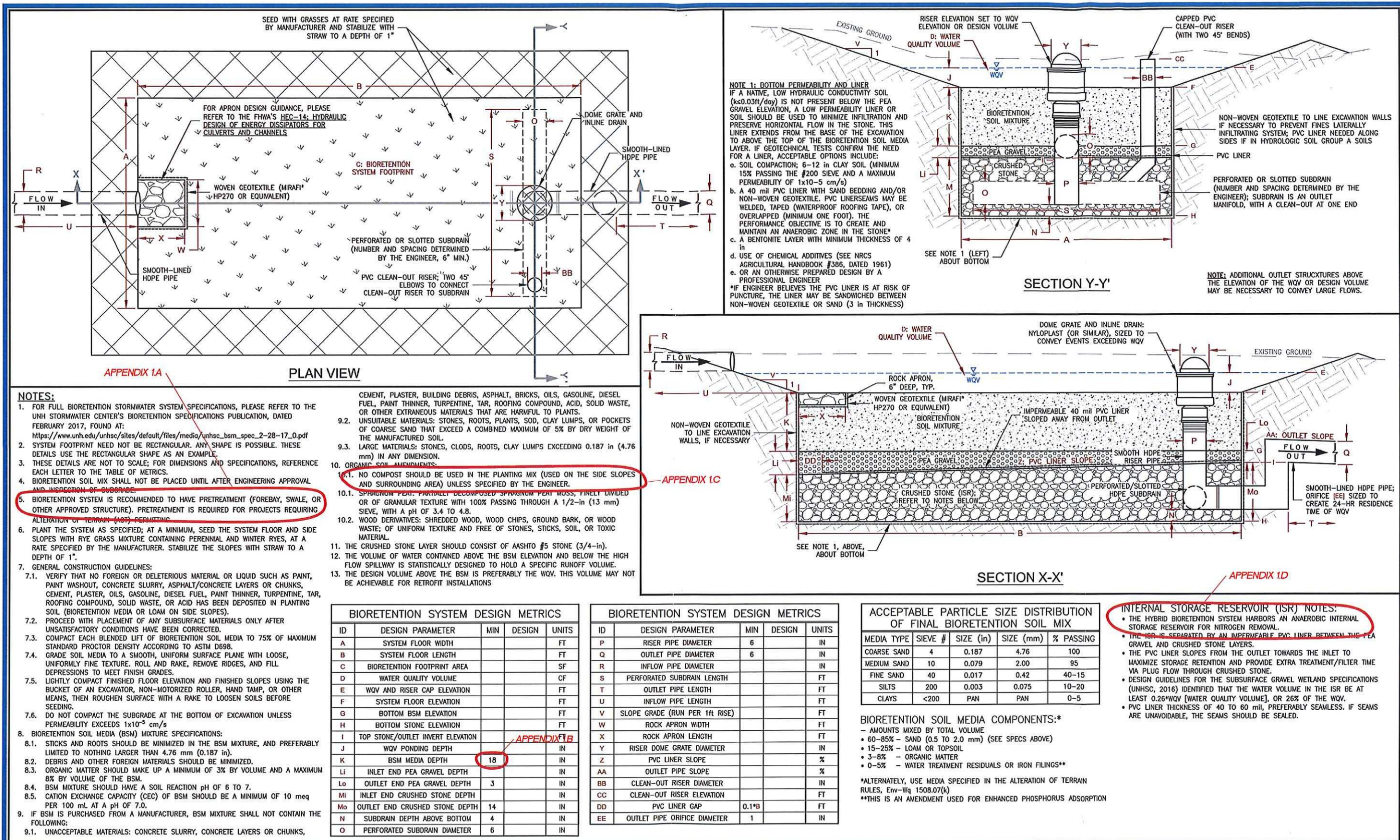
- A. Pretreatment is provided by the Stormceptor unit, however we take no exception to the addition of a forebay to capture additional sediment.
- B. The 18" thick media layer conforms with the 2020 UNH SWC standard detail. The basin is designed to provide a minimum residence time of 24 hours in the subsurface ISR system.
- C. The media mix proposed conforms with the 2020 UNH SWC requirements which specifically state that compost should *not* be used in the filter media.
- D. The ISR system below the basin filter media specifically requires anaerobic (saturated) conditions to function properly. The ISR is essentially a subsurface gravel wetland which offers a second stage of treatment below the biofiltration bed.
- E. Given that Ms. Gadwa is not an engineer, there may be a lack of understanding of the hydrologic analysis calculations and the design and function of the water quality diversion weir manhole. This structure has been designed specifically to avoid excessive flows through the bioretention basin even during large storm events by limiting headwater depths on the 12" CPP pipe to the bioretention basin by maximizing the length of the overflow weir. The weir elevation corresponds to the headwater elevation at which the water quality flow (WQF) is reached and because of the weir length, the headwater does not increase significantly during large storm events.
- F. The bioretention basin underdrain will not have an adverse impact on the hydrologic regime of down gradient wetlands.

If you have any questions or need additional information, please do not hesitate to contact us at your convenience.

Sincerely,



David J. Held, P.E., L.S.
Provost & Rovero, Inc.



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02	10 Sept 2019	DES Revisions
01	12 Mar 2019	Initial design
No.	Date	Revision
Designed:	Checked:	Approved:
JCB	TPB/JJH	TPB/JJH

GRAPHIC SCALE
N/A - DRAWING NOT TO SIZE
Original Drawing Size = 34 x 22 in.

Project:
**STANDARD DETAIL
BIORETENTION ISR**
STORMWATER SYSTEM

Date:
21 FEB 2020
Sheet No.
01 of 01