July 21, 2025

Ms. Mary Grover
MADEP-Western Regional Office
463 Dwight Street
Springfield, MA 01103

RE: MADEP File Number 246-0785
8 View Ave, Northampton
BDG response to MADEP dated July 11, 2025

Dear Ms. Grover:

I have reviewed the above-referenced submittal and response letter from the Berkshire Design Group, and offer the following comments:

General Comment

Only PDF's of the plans were provided; neither full size, scalable plans, or CAD files, which can be plotted to scale, were provided. This makes it impossible to verify pipe lengths, slopes, and critical distances. Full scale plan availability is particularly critical in reviewing the proposed roof drain collection and conveyance piping, given the number of junctions, angle points and minimum cover. A complete review of the system cannot be conducted without a full scale plan, and it is disappointing that I even need to point this out after multiple reviews of this project.

Groundwater Mounding Analysis

The applicant's engineer continues to rely on the Hantush methodology, a spreadsheet that adopts several simplifying assumptions to resolve the Laplace differential equations that define groundwater flow. I point out the disclaimer in the Hantush Analysis provided, which states that application of the model may result in erroneous output and numerical instabilities if the underlying assumptions that are inherent in the model are violated. For those unfamiliar with the Hantush approach, the methodology makes the following assumptions:

1. The infiltration system lies within an isotropic, homogeneous aquifer of infinite extent.
2. The infiltration system is rectangular with dimensions defined by x and y axis dimensions, with the mound height calculated only along the x-axis
3. The natural water table is horizontal, with no gradient or slope

4. No boundary conditions exist that can influence mound development along either the x or y-axis.
5. The rise in mound height is small relative to the saturated thickness of the aquifer.

Several of these conditions are violated in the applicant's Hantush presentation, as noted below:

1. The natural water table on this site is decidedly sloped, following the surface contours in a parallel manner, approximately 16-inches below the surface.
2. Two building foundations are located within 10-feet of the infiltration systems, along the y-axis applied on the model. These foundations will limit mound development along the y-axis, forcing elongation and possible mound height increase along the x-axis, as the model is based on basic continuity of mass (flow).
3. The infiltration system is not a basic rectangle, as it has an oblong shape. This further renders the model results as inaccurate based on the dimensions input into the model.
4. The model results produce a mound height of 1.4-feet, which is 18 percent of the saturated thickness, which is a significant fraction of the saturated depth, violating another of the simplifying assumptions made in the Hantush approach.

Beyond these concerns, I had previously outlined, in my January 21, 2025, letter several concerns related to the data input into the spreadsheet. These concerns, which I will not repeat here, remain unresolved.

I remain concerned that the modeler lacks the qualifications and experience necessary to evaluate groundwater conditions that will influence stormwater system performance for this project.

Roof Drain Collection and Conveyance System

Sheet LC-132, provided to detail the roof drainage collection and conveyance system, is completely inadequate and a drawing that fails to meet basic engineering standards. As I noted in my earlier review, the hydrologic analysis for this project, and compliance with Stormwater Standard 2, is predicated on the collection and conveyance of roof water runoff to the stormwater infiltration and detention basins for all storm events up to and including the 100-year event. If the roof drainage system cannot collect and convey this stormwater, the project will not comply with Standard 2. Among the numerous deficiencies are the following:

1. Downspout locations on the buildings are not provided.
2. Roof plans with pitches, ridges and valleys locations are not provided. If the roofs are flat, drain locations and exit points should be provided.

3. The plan has numerous pipe runs which total several hundred feet, but does not provide pipe inverts or slopes along each run, which is standard engineering practice. The network is unbuildable as shown.
4. The plans fail to detail how junctions will be constructed when pipe size changes occur. Will crowns be matched as is good engineering practice? Invert elevations are necessary to provide guidance as to construction.
5. Insufficient cleanouts are provided to maintain the system. Cleanouts should be provided at every angle point and anywhere multiple pipes are joined. As presently designed, the system has too few cleanouts available for inspection and maintenance, and will be prone to debris blockage.
6. Given the few inverts and ground elevations provided, the system is proposed to have as little as 8-inches of cover over the top of the pipes. Standard engineering practice is to provide a minimum of two-feet of cover over the tops of pipes. There are several locations where these conveyance pipes cross driveways. The standard specifications for the HDPE pipe proposed require at least 18-inches of cover from the crown of the pipe to pavement sub-grade where vehicular loading is proposed. As designed, these HDPE pipes will fail.
7. Even without the vehicle loading problem, setting the pipes with so little cover in landscaped areas will lead to differential settlement and frost-heave issues. This turn will impact the pipe slopes and joints over the long term and will lead to conveyance system failure.
8. A node by node analysis should be provided to document anticipated flows in each pipe segment, consistent with the hydrologic analysis, along with pipe conveyance capacity based on Manning's Equation or typical flow nomographs based on standard pipe friction coefficients.

I again emphasize that the roof drainage collection and conveyance system plan provided in the most recent submittal fails to meet the standards of good, accepted engineering practice.

Operation and Maintenance Plan (OMP)

The OMP should include the following components:

1. Roadway and driveway vacuum sweeping on a quarterly basis
2. Annual inspection and compliance documentation by a Professional Engineer
3. Compliance documentation and record-keeping

Other Considerations

While it is my opinion that the project still has failed to demonstrate compliance with the MA Stormwater Standards, should the Department issue a SOC allowing the project to move forward, I recommend that the following Special Condition be included:

The applicant shall engage an environmental monitor, independent of the general contractor, the site contractor, or the design engineer/landscape architect, to monitor the project through construction. The monitor shall demonstrate experience and competency in stormwater management, wetland resource protection, erosion and sedimentation control, and general site construction. The monitor shall perform weekly inspections during construction, and inspections after any storm event that exceeds one-half inch of precipitation in a 24-hour period. Weekly inspection reports, with a summary of site conditions and recommendations, shall be filed with the applicant and the Department.

Thank you for your consideration and please feel free to contact me with any questions.

Sincerely yours,

Robert A. Gemma, PE, PLS
President

CC : Caroline Smith for abutters group