



**MILLENNIUM ENGINEERING, INC.**  
*Land Surveyors and Civil Engineers*

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June 10, 2021

Town of Salisbury  
Planning Department  
5 Beach Road  
Salisbury, MA 01952

Attn: Lisa Pearson, Planner

Re: 6 Forest Road  
Comprehensive Permit Application and Plan Review

Dear Ms. Pearson:

In response to design review comments provided by the Board's consulting engineer, Joseph Serwatka, dated January 18, 2021 we have prepared the following responses and revised Site Plans for the Board's consideration.

**Cover Sheet C-1**

1. A Zoning Table is provided with Existing and Proposed dimensions. It may be helpful to also have a table to compare the Subdivision Rules and Regulations requirements to what is being proposed, similar to what is presented in Exhibit O of the application. It should be noted that Exhibit O references sections 7A.4, 7A.10 and 7B.1 only. It may be necessary to include sections 7A.7, 7A.9, 7A.11, 7A.25.3, 7B.3 in the list of requested exceptions, or provide discussion on each.

*Response: Waivers have been added for sections 7A.7 and 7A.11. We don't believe a waiver is required for section 7A.9, 7A.25.3 or 7B.3. For 7A.9, where the proposed street varies more than 10 degrees from a right angle, we show a 15-foot radius on the north side and a 45-foot radius on the south side. For 7A.25.3, the Town's technical consultant has provided his review for sight distance and overall safety. With regards to 7B.3, the Salisbury Fire Chief has found the roadway layout acceptable. A waiver is no longer required for 7A.10.*

**Existing Conditions C-2**

1. The plan depicts several resource areas (e.g. wetlands, riverfront, floodplain) that would normally be reviewed and approved by the conservation commission prior to the submission of plans. The reason is obvious as any revisions brought about as part of the resource areas review could severely impact the layout of any potential development of the site. In this case, the plan depicts several hundred wetland flags spread over several wetland systems, riverfront setbacks, and a floodplain delineation which, to the best of my knowledge, have not yet been reviewed/approved by the commission. The guidelines for 40B reviews recommends that "if there is an indication of a wetland on the site... ask whether such a determination has been officially made and have it shown on the submitted plans with the date of determination". I would recommend that the plans be revised to depict resource areas (i.e. wetlands, riverfront, floodplain) that have been reviewed and approved by the conservation commission.

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*Response: Tom Hughes and Mary Rimmer walked the site and reviewed the entire length of the resource area delineation. The wetland lines were revised in some locations. The wetland lines shown on the revised plans are the updated lines as approved by the Conservation Commission.*

2. Existing topography should be depicted on abutting lots 88-90 to determine whether they contribute runoff to the site, and if this runoff may be blocked by the proposed site grading.

*Response: Additional topography has been added in this area. No runoff from these lots is being blocked by proposed site grading.*

3. The plan should show the extents of the remaining 6" AC watermain (200 feet +/-) in Forest Road. My recommendation, and perhaps DPWs as well, would be to replace this with a new section of 8" D.I. watermain.

*Response: The existing conditions plan shows the extents of the water main on Forest Road from Lafayette Road to Schoolhouse Lane and beyond (see sheet C-3).*

4. Existing cross culverts in Forest Road should be described completely, with pipe size and inverts to indicate flow direction. This will be important relative to the design for a sidewalk along Forest Road.

*Response: All cross culverts have been labeled accordingly (see sheet C-3).*

#### **Typical Sections/Legend/General Notes C-3**

1. The roadway cross-sections appear to depict sloped granite curbing, but a vertical granite curb and Cape Cod berm detail appear on the plan. Bituminous curb is not approved by DPW which looks for vertical granite curbing. A sloped granite curb detail should be added if such a waiver is proposed, but a grass/landscape strip must be provided between the curb and sidewalk.

*Response: The cross-sections have been revised to show vertical granite curbing wherever a sidewalk is proposed.*

2. The sewer forcemain depicted in the cross sections should contain a label with minimum/maximum amount of cover, typically 3-5 feet. The sewer detail sheet labels 4' of cover. The forcemain depicted in the profile sheets, up to 10 feet deep in a paved roadway, is not recommended by me, and likely not by the DPW/sewer department.

*Response: The sewer forcemain has been revised to maintain approximately 4 feet of cover the entire length.*

3. Note 7 leaves tree removal up to the discretion of the "owner". All trees greater than 20" should be tagged and any designated for removal must be shown on the plan. Typically a proposed tree cutting line is staked in the field based on the approved plans, and reviewed/approved by the planning board/conservation commission. The board may want the note revised to require town, rather than owner, approval.

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*Response: The note has been revised to require Town approval instead of owner approval.*

4. Note 13 makes individual building (condo) owners responsible for the maintenance of their sewer service from the building to the sewer main (in this case the forcemain). It is not advisable, and likely economically infeasible, for condo owners to be responsible for the service under the paved roadway. The condo owner could be responsible for the sewer service from the building to the lateral assembly (shutoff) at the edge of pavement, while the association would be responsible for the remainder as well as the forcemain.

*Response: We agree with the reviewer's comment. The note has been revised accordingly.*

**Grading Plan C-4 through C-6**

1. The plan should be revised to show the proximity of Schoolhouse Lane. The subdivision regulations, section 7A.7, require street intersections to be offset a minimum of 200 feet from centerline to centerline. The separation to Schoolhouse Lane appears to be only about 150 feet. At a minimum, this should be added to the list of requested waivers.

*Response: Schoolhouse Lane has been added to the plan.*

2. As mentioned previously, additional topography should be provided on abutting lot 88 to determine the direction of runoff. Also, additional contours and/or spot grades should be provided in Forest Road, as would be typical. Finally, the cross culverts under Forest Road should be fully described with pipe size(s) and inverts.

*Response: Additional topography has been added in this area. No runoff from these lots is being blocked by proposed site grading. All cross culverts have been labeled accordingly (see sheet C-3).*

3. The flow of runoff from the existing catchbasin and pipe in front of lot 88 will likely be blocked by the construction of the proposed roadway and sidewalk over the existing roadside swale. The engineer should present a plan to allow for the continued conveyance of this runoff.

*Response: We disagree with the reviewer's comment. There is nothing in the proposed grading that would indicate that the flow from the existing drain pipe will be impeded.*

4. The subdivision regulations require streets to be laid out to intersect as nearly as possible at right angles, and not less than 60 degrees. The proposed roadway appears to intersect Forest Road at about 65 degrees. There would appear to be ample space and opportunity to align the proposed roadway at a right angle, or much closer to it.

*Response: In order to align the proposed roadway close to or at 90 degrees, that would require the road to shift closer to the intersection with Schoolhouse Lane as well as reduce the sight distance in that direction.*

5. A walking path is proposed from Forest Road, through the site, to town-owned land at the rear. The path appears to be an integral part of the expressed benefits of the project. The plans show 250 s.f. of

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wetland filling associated with the path, but this is likely based on wetland delineations that have not yet been reviewed/approved by the conservation commission. Should the wetland delineations be revised during the conservation review process, the wetland impact could easily be ten-fold, and make the path unfeasible. This is another reason why I would recommend that the wetland delineations be reviewed and approved prior to the submission of plans.

*Response: As mentioned above, the wetland lines have been updated per Mary Rimmer's review and approved by the Conservation Commission.*

6. Two proposed community gardens are depicted within the project, but proposed water services and meter locations are not shown to the gardens. It would appear that water service would be required to make these gardens feasible. The engineer should address this.

*Response: The plan has been revised to show one community garden at the rear of the site and a water service has been added to the plan.*

7. The plans depict double-wide (20') driveways in front of each unit to park two cars side-by-side. The schematic floor plans, however, depict a single-width (10') driveway in front of each unit, due to proposed porches at the front of each unit, which are not depicted on the grading plans. The engineer should depict the proposed porches on the plans, and adjust the driveways accordingly.

*Response: The patios/porches have been added to the front of the units and the driveways have been revised accordingly.*

8. Typical residential parking space size requirements are 10' wide by 20' long. The bylaws do allow for spaces that are 9' by 18' in some overlay districts. The plans appear to use a variety of sizes. For instance, the driveways are 20' wide, allowing for 2 ten foot spaces, but the visitor parking spaces appear to be only 9' wide by 18' long. The parking spaces on the first unit, however, at station 1+50 are only about 15' long, which does not meet either standard. Other spaces, such as at the unit at station 13+00, measure only 12 feet long to the back of the sidewalk. The engineer should provide the required parking space lengths without infringing upon the sidewalk, as such would force pedestrians to walk in the roadway. All these parking issues should be addressed by the engineer.

*Response: The parking spaces have been revised accordingly. All visitor spaces are now 10' x 20'. The driveways have all been revised to allow for the required lengths so as to not encroach on the sidewalk or traveled lane.*

9. The proposed visitor parking spaces at stations 15+00 and 19+00 are located on tight curves that do not meet subdivision standards. Combine that with snow storage and landscaping, and the potential exists for a hazardous situation. The engineer should relocate these spaces to safer locations.

*Response: After the redesign of the roadway, no visitor parking spaces are located on substandard curves.*

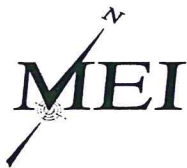
10. The two proposed constructed wetlands are required to have access for maintenance, with a minimum width of 15 feet and a maximum slope of 15% through public or private rights-of-way. Neither

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constructed wetland appears to satisfy this requirement. The engineer should revise the designs accordingly.

*Response: Constructed wetland #1 can be accessed through the visitor parking spaces adjacent to Building Z. Constructed wetland #2 can be accessed through the driveways at the end of the cul-de-sac and in between Buildings T and U.*

11. The layout/geometry of the proposed roadway does not come close to meeting subdivision requirements, and I would be inclined to recommend that it not be approved in its current form. Subdivision regulations require minimum 150-200 foot centerline radius and a 150 foot tangent between reverse curves. The plans appear to have centerline radii (they are not labelled) as small as 75 feet, and reverse curves with no tangents, resulting in likely unsafe travel at design speeds. The guidelines for reviewing 40B projects state that “parking and circulation should be designed to provide for the maximum pedestrian safety, ease in traffic flow, and access/egress on the property, while minimizing the need for impervious surfaces which increases stormwater runoff”. The project, as designed, does none of that in my professional opinion.

There is a relationship between design speed and geometric design criteria. AASHTO (American Association of State Highway and Transportation Officials) 2011 has a radius of curvature equation which is:

$$R_{min} = V^2 / (15(0.01e_{max} + f_{max}))$$

where:  $R_{min}$  = minimum radius of curvature (ft)

$V$  = design speed (mph)

$e_{max}$  = maximum rate of roadway superelevation (percent)

$f_{max}$  = maximum side friction factor

The town's 150-200 foot minimum centerline radius requirement corresponds to a design speed of about 25 mph. The radii provided on the plans would correspond to a design speed below 20 mph which, in my professional opinion, is impractical and unenforceable. At the very least, I would recommend that this issue be reviewed by the applicant's traffic engineer and the town's traffic consultant.

*Response: The roadway has been redesigned accordingly with 175' minimum roadway curves and a design speed of 25 MPH.*

12. As mentioned above, the guidelines recommend “minimizing the need for impervious surfaces”. I believe that the roadway geometry issue could be addressed while also substantially reducing impervious surfaces by essentially straightening the roadway alignment between stations 6+00 and 17+00. This would eliminate approximately 500 feet of the proposed roadway, six horizontal curves that do not meet subdivision regulations, and two reverse curves without adequate tangents. The southern portion of the development, now occupied by the roadway between stations 8+00 and 13+00, could be redesigned with a small cul-de-sac, or a series of common driveways serving 4 units as is currently employed on the plan. The Board may want the engineer to present a plan showing this option for discussion.

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*Response: See above response.*

13. Headlight intrusion could be an issue for the existing homes on Forest Road from vehicles on the proposed roadway. The engineer should consider whether there may be an issue, and how it may be addressed.

*Response: The only house on Forest Road that could be affected is #9, across from the proposed roadway entrance. The owner hasn't raised any issues but the applicant has shown in the past that he is always open to listening to neighbors' concerns and acting accordingly.*

**Utility Plan & Profile C-7 through C-10**

1. The plan shows the proposed 8" watermain connecting to an existing 6" section of watermain in Forest Road, which is not advisable. As noted previously, there is about a 200 foot section of 6" A.C. watermain left in Forest Road that was never replaced. The watermain that was replaced is 8" D.I. as is typical. I would recommend, and I believe that the DPW would concur, that the 200 foot section of remaining 6" A.C. watermain should be replaced with 8" D.I. watermain as part of the project. The engineer should show this work on the plan if required.

*Response: The section of 6" watermain will be replaced with 8" D.I. as recommended.*

2. The sewer system design has the first four units being serviced by a gravity 8" sewer main, but the remaining 72 units are each served by individual E-one sewer pump pits, each connecting to a common 2/3" sewer forcemain under the roadway. Based on discussions with the DPW and sewer department, it is my/our opinion that the 72 sewer pump pits and forcemain are the least desirable option for the development. The most viable design would include extending the 8" gravity sewer as far as possible into the site at minimum slope (0.004ft/ft) to serve as many homes as possible via gravity sewer. If the engineer were to redesign the roadway as mentioned above to eliminate tight horizontal curves, it would appear that gravity sewer could extend some 1000 feet into the site. The remainder of the site would typically be serviced by a gravity sewer system to a low point at the rear of the site where a single pump station would pump sewage to the front sewer system. This single pump station could also have a backup generator in the event of a power outage. A single, shallow forcemain would be installed, rather than a forcemain at depths approaching 10 feet as shown on the current plans.

*Response: We appreciate the Town's concerns and feedback, but this will be a privately maintained sewer system and the E-one pumps will remain. There is no way the sewer can be extended 1,000 feet into the site. The sewer is designed at the minimum slope and can only make it far enough into the site to service the first building.*

3. Based on discussions with the DPW, it is preferable to have a hydrant at the end of the watermain for flushing, rather than the blowoff as shown.

*Response: The watermain has been updated to show a hydrant at the end for flushing.*

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**Erosion Control Details C-14**

1. The General Erosion Control Notes appear to be generic and likely will not work with such a large site. Note 13 states “no more than 3 acres shall be disturbed at one time”, and “all area shall be stabilized within 45 days of initial disturbance”. With an upland area of almost 18 acres, this would appear to limit the site contractor to clearing, grubbing and stripping topsoil from no more than 3 acres at one time, meaning the site would have to be constructed in phases. Also, stabilizing areas within 45 days is impractical in my professional opinion, especially considering that it appears some 20,000 cubic yards of fill are need to raise site grades. The engineer should address these issues.

*Response: This note has been removed from the plans. It is a note typically associated with plans that get reviewed by the NHDES and was left on inadvertently.*

2. The Construction Sequence appears to imply that the entire site will be worked at one time, rather than 3 acres at a time as noted above. It also does not address the thousands of yards of fill that will be required to accomplish site grading, and whether this will be phased.

*Response: The project will not be phased. While it is difficult to specify exact locations where stockpile areas may occur, note #4 in the construction sequence specifies that any stockpile areas shall be surrounded by erosion control.*

**Schematic Floor Plans A1**

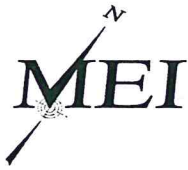
1. It would be helpful if the plan could depict a mechanical room or other area in each unit where the water meter would be located. Otherwise, the engineer should address whether outside meter pits will be used.

*Response: The final architectural drawings will show an area for mechanical equipment or a closet where the water meter can be installed.*

**Comprehensive Permit Application**

1. Page 9 states that the applicant is proposing to construct a new public sidewalk from the entrance to the site, along the length of Forest Road and to connect it to the new sidewalk being built by the State of Massachusetts along Lafayette Road. The task would be much more involved than simply the installation of a sidewalk. Forest Road currently has “country drainage” meaning that roadway runoff sheds off the pavement into roadside ditches. Installing a curb and sidewalk would block this flow of runoff, likely making it necessary to install a series of catchbasins, manholes and piping to collect the runoff. Substantial excavation would be required for the work and, when done, the length of Forest Road from the project to Lafayette Road may have to be repaved. The Board may want the applicant to address whether they are committing to additional work necessary to install a new sidewalk.

*Response: The applicant has committed to any additional work necessary to install this new sidewalk.*



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2. Section D on page 10 addresses wetland impacts. As noted above, the wetland delineation has not yet been reviewed/approved by the conservation commission, making any discussion on wetland impacts premature.

*Response: As mentioned above, the wetland lines have been updated and approved.*

3. Exhibit L, Traffic Report, appears to show that the stopping sight distance for vehicles travelling on Forest Road at 30 mph have 235 feet and 245 feet of sight distance, where 200 feet is required at the site driveway. It goes on to show that the available intersection sight distance for vehicles exiting the site driveway is 235 feet looking south, and 245 feet looking north, where the required minimum is 287-331 feet for right and left turn, respectively. The report appears to conclude that this apparent insufficiency is allowable as long as the vehicle on the major road (i.e. Forest Road) has adequate stopping sight distance to stop or slow to accommodate the maneuver by a minor road (i.e. Meadowview Lane) vehicle. The Board may want to have their third party traffic consultant review these conclusions, and the entire report.

*Response: The updated plans have been reviewed and accepted by Vanasse & Associates.*

4. The plans should contain adequate information to comply with section 7A.25.3 of the regulations "to allow sight distance evaluation" by the board's technical consultant.

*Response: As mentioned above, the updated plans have been reviewed and accepted by Vanasse & Associates.*

#### **Stormwater Management Report**

1. Page 2 of the maintenance plan states that the party responsible for operations and maintenance of the stormwater system is Steve Paquette, but page 5 lists the homeowner's association as the responsible party "post-construction". The term post-construction" should be more well-defined since, as we have seen, it can take many years between project completion (i.e 100% occupancy) and the resolution of outstanding construction items, as-built submittal, and certificates of compliance/completion.

*Response: The O&M manual has been updated to indicate Mr. Paquette will be responsible for maintenance during construction and the Homeowner's Association will be responsible post construction.*

2. The report should contain the calculations demonstrating the proper sizing (i.e surface area and volume) of the sediment forebays, as required.

*Response: The forebay detail on sheet C-13 shows the calculations for proper sizing.*

3. The engineer is not proposing any runoff recharge as required by standard #3 stating that "the test pits indicated silt loam and silty clay loam soils, which will prevent any underground infiltration system from being properly designed". The Policy requires that for sites comprised solely of C and D soils, proponents are required to infiltrate the required recharge volume only to the maximum extent practicable. For the purposes of standard 3, "to the maximum extent possible" means that:



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- (1) The applicant has made all reasonable efforts to meet the Standard;
- (2) The applicant has made a complete evaluation of all possible applicable infiltration measures, including environmentally site design that minimizes land disturbance and impervious surfaces, low impact development techniques, and structural stormwater best management practices; and
- (3) If the post-development recharge does not at least approximate the annual recharge from pre-development conditions, the applicant has demonstrated that s/he is implementing the highest practicable method for infiltrating stormwater.  
The required minimum infiltration rate is 0.17 inches per hour. The majority of site soils indicated in the test pits are silt loam, which has a Rawls infiltration rate of 0.27 inches per hour. This would appear to allow the engineer to design some amount of recharge volume. The board may want the engineer to address this.

*Response: Infiltration trenches have been added to the plan where feasible. Due to the poor soils and high groundwater tables, the only suitable location is the area behind buildings L & M.*

4. Additional topography and spot grades should be provided on abutting lot 88 to verify that it does not, in fact, contribute runoff to the site, as delineated in the pre-development watershed map.

*Response: Additional topography has been added in this area. No runoff from these lots is being blocked by proposed site grading.*

5. The rear of the site appears to shed runoff onto abutting lot 73 in the pre-developed condition. The engineer should account for this and verify that runoff does not increase in the post-development condition.

*Response: Areas 100S & 300S incorporate any runoff flowing offsite to the east. The post-development flows show that runoff is being decreased in this direction.*

We trust the above information provides the necessary details required for the Board's review and ultimate approval. If you have any questions or comments on the above information, please feel free to contact our office.

Sincerely,

Millennium Engineering, Inc.

Christopher M. York, P.E.  
Project Manager