

Chessia Consulting Services LLC



August 2, 2019

Ms. Mary Savage-Dunham
Community Planning Director
Town of Hingham
210 Central Street
Hingham, MA 02043

RE: Supplemental Engineering Review
85 Tower Road
Site Plan Review

Dear Ms. Savage-Dunham:

In response to your request, Chessia Consulting Services, LLC has reviewed the above referenced project under the Site Plan and Common Drive review procedures in the Zoning By-Law. The submittal was also reviewed for general engineering design standards, and DEP Stormwater Management Policy/drainage design. The data reviewed included the following information:

- Plans:
A set of Plans for 85 Tower Road Hingham MA. The following sheets were included:
 - Site Layout Plan
 - Grading Plan
 - Utility Plan
 - Driveway Plan and Profile
 - Septic Details Subsurface Disposal SystemAll plans are dated April 12, 2019, last revised 7-22-19 and were prepared by James Engineering, Inc. (Plans)
- Supporting Data:
“Drainage Calculations for 85 Tower Road” dated May 15, 2019 revised 7/19/19 prepared by James Engineering, Inc. (Report) Scalable watershed plans were submitted on July 8, 2019.
Response letter dated July 21, 2019 prepared by James Engineering, Inc. (Response)

The site is located on the easterly side of the loop at the end of Tower Road. The property was developed with a 3 bedroom single family dwelling that was destroyed by fire. The foundation remains on the lot. It is intended to divide the overall parcel to create a new lot on the southerly side of the property, which would include the existing foundation. The new lot is proposed for development of a new single family dwelling

consisting of six bedrooms that would be constructed as two buildings connected by a walk through area.

I visited the site on July 10, 2019. The property is mostly wooded with some cleared areas around the foundation. There are wetland resource areas on the site or adjacent property including a pond and bordering vegetated wetlands (BVW) together with Bordering Land Subject to Flooding (BLSF). Overall site runoff from the parcel would flow to the Crooked Meadow River to the east after flowing into wetlands located both to the north and south of the lot. I recommend that the Conservation Commission confirm the wetland resource areas and boundaries prior to action on this Application. Based on an email of June 18, 2019, and a discussion with Loni Fournier on 7-16-19 wetlands limits have not been approved at this time but an application has been submitted to the Conservation Commission.

Topographically the new lot has a ridge of higher elevation in the south center of the lot. Near Tower Road the land slopes to the east. The higher elevation area on the lot has visible ledge outcrops and likely extensive ledge throughout the area. Slopes from the ridge pitch to the north and south. The existing foundation is partially located in ledge. A foundation drainage system was observed within the foundation. It appears that some water intrusion was present near the ledge on the south side of the foundation and potentially on the west side facing Tower Road. There are several existing stone retaining walls.

Based on a review of MassGIS data, the property is within the Zone II of water supply wells, has a portion of the lot in the FEMA flood zone and has a potential vernal pool mapped by NHESP on the property. The property is not in an ACEC, or Zone A of public water supplies.

The property is located in the Residence B Zoning District. It is not located in the Accord Pond Watershed and Hingham Aquifer Protection District. A portion of the property is in the Town's Floodplain Protection Overlay District.

Some soil testing data is included on the plans. No tests are located at the proposed stormwater infiltration systems although one is near the proposed subsurface system. I have reviewed Natural Resource Conservation Service (NRCS) published data available on line. The site primarily consists of Canton-Chatfield Rock Outcrop complex soils with Scarboro muck soils in the northerly wetlands and Freetown muck in the southerly wetlands. Canton-Chatfield soils are classified as Hydrologic Soil Group (HSG) B, which are of moderate permeability. The presence of ledge outcrops or shallow depth to ledge impacts soil permeability. It is anticipated that groundwater elevations will vary with high groundwater conditions in wetlands and the presence of ledge in some areas. Testing that has been performed indicates moderately permeable loamy sands.

I also attended the first Public Hearing on the project on July 15, 2019.

GENERAL PLAN REVIEW:

The proposed project would develop a new residential house on a new ANR lot. The ANR was approved at the July 15, 2019 meeting.

This lot would be served by an on-site septic system that is under review by the Board of Health. Runoff would be collected from the roof of the house via gutters downspouts and collection pipes, the new driveway would flow to a proposed catch basin and discharge to a subsurface system on the lot. Runoff from the front yard near Tower Road would be directed to a new surface depression (infiltration basin) created by fill associated with the driveway. The open basin is designed to capture all runoff up to the 100 year storm and infiltrate it into the ground.

The existing water service is proposed to be extended to the new house. There is no data on gas, electric or cable utilities. The project is subject to site plan review since there would be alteration of 20,000 square feet of land.

Current comments are in *italic type* following my initial comment. The following issues are considered the most significant for the Board to consider in review of the project:

- Identification of existing trees and protection of wooded areas to remain.
The plans indicate existing trees, there is no indication that any would remain. The existing woods line is indicated but the proposed woods line is not indicated on the plans. The Board should review this issue.
- Soil testing for the proposed stormwater systems.
Comment remains, the Board could include a condition requiring testing at the Applicant's risk if unsuitable soils are encountered.
- Compliance with stormwater standards.
There remain some issues to address.
- Comments other Town agencies including the Board of Health and Conservation Commission regarding the project.
The status of other reviews is not known.
- Clarification of some areas relative to grading and retaining walls.
Satisfied.

Section I-I Site Plan Review:

1. Purpose:
No comment required.
2. Procedures:
It is assumed that the appropriate information has been submitted to initiate the review process. The Board should review the project relative to the specific subsections of this section.

3. Pre-Application Submittal.
It is unknown if a pre-application submittal has been submitted or commented on by the Board. It is my understanding that there have been other submissions regarding this property.
4. Submittal Requirements:
Plans are stamped by a Professional Engineer.
 - a. The submittal includes a locus plan. The Owner/Applicant is listed as Gerry Rankin on the Plan. The lot area and boundary dimensions are indicated on the plans. The plans include setbacks from Tower Road. I recommend that the plans include the Zoning District where the lot is located, together with required zoning setbacks, area, etc. The plans include the required zoning square. It appears that the proposed building would meet setbacks as shown on the plan. The plans indicate existing and proposed contour elevations in the vicinity of the proposed work. Structures within 100 feet of the property line appear to be indicated on the plans as required.
Satisfied Zoning data is on Sheet 1 of 5.
 - b. The plans are drawn to scale (1" = 40' and 1" = 20') and indicate the proposed building footprint. The building dimensions are not listed on the plans as required. Building elevations and floor plans were not provided. I note that the Board requested floor plan data at the Public Hearing and it was agreed that they would be submitted.
Building dimensions are indicated on the Utility Plan. The Response indicates that the Building Plans will be submitted under separate cover. I defer this issue to the Board. I have not received the building plans. The Board should confirm that the building design is allowed, as the Building Commissioner previously indicated that the proposal did not comply with Zoning requirements.
 - c. No data on traffic circulation has been provided. As a single family lot, it is not typically required to perform a traffic analysis. A detail of the driveway cross section has been provided. I note that it is inconsistent with the plan at the proposed retaining wall section across from the garage area.
Two cross sections have been provided and the wall removed. The cross sections only include the westerly side of the driveway.
 - d. The Application does not request any relief from zoning requirements. Since the site includes over 20,000 square feet of land disturbance a site plan review is required under Section IV-B 6 b. Refer to comments on lot area calculations above.
 - e. The plans indicate a proposed on-site septic system. The Board of Health should comment on the status of their review. Water would be brought to the site from Tower Road, the existing street tap would be utilized and a new on-site service line installed to the new dwelling. Electric/cable services are not indicated, it is unclear if these would be brought to the house via overhead wires or in underground conduits. I note that existing utility poles should be indicated on the plans together with the proposed services to the dwelling. No

gas mains or gas service connection is indicated on the plans. Utility purveyors should comment on the plans. I recommend that data on the existing catch basin in Tower Road at the front of the property be added to the plan including where it flows. A stormwater system consisting of a subsurface infiltration system for the roof and driveway is proposed. There is also a small open infiltration basin system proposed between the proposed driveway and Tower Road. Refer to comments on the stormwater systems under h. below. There are no existing or proposed trees or plantings indicated. No trees were observed in the Tower Road right of way but there are several large trees within the site along the roadway frontage that may be feasible to retain. The site is heavily wooded excepting a portion of the wetlands and the formerly developed house and adjacent area. The plans should identify existing trees to be removed or retained.

It is unclear if the Board of Health has approved the project at this time. The Response indicates that electric/cable services would be brought in via overhead wires and likely additional poles. No data on the existing catch basin has been provided as recommended, I defer this issue to the Board. The same drainage concept is proposed although the infiltration basin has been moved. The Response indicated that the basin between Tower Road and the driveway is a detention basin but the design is consistent with an infiltration basin refer to comments under h. below. Large trees within the limit of work have been indicated on the plans. The Response states that all trees within the limit of grading are to be removed. I recommend that any trees to be retained be identified and protected. This could be a condition if the plan is approved.

- f. The submittal includes a grading plan and stormwater runoff analysis. Traffic volume is unlikely to be a concern. Refer to comments under Stormwater Management Regulations below for drainage design. There are several existing stone retaining walls on the site. In particular there is a larger wall along Tower Road. I recommend that the top and toe elevation(s) be indicated along both sides of this wall as it is indicated to remain and the existing contours are not consistent with observations. There are spot grades at the base of the wall. The grading plan proposes to site the house on the higher level area of the lot. Some cut would be required on the west side with some fill to the north, east and south sides. I note that grading is incomplete in the vicinity of the northeast corner of the house. As noted, existing contours are inaccurate at the existing wall along Tower Road. I note that the top of the wall is above grade. Contours are incomplete and or inconsistent around the proposed retaining walls and parts of the house. Fill is proposed for the driveway and infiltration system and a smaller amount of fill is indicated for the septic leaching area. Grading extends over the new lot line and an easement to maintain the grades would be required, in particular since the grading is required for the septic leaching area and stormwater infiltration system. Stone retaining walls are proposed for both cut and fill areas. The wall detail is only for fill areas. One section of retaining wall in cut would be over 5 feet high based on the grading and is located in the building setback. The walls are proposed to be constructed of material from on-site blasting

according to the plan. It is unclear how much ledge removal is required as only a small area of ledge is indicated on the plans and no testing at the foundation has been performed. Based on the Public Hearing, it is assumed that much of the house site would require ledge removal. Overall earthwork calculations have been provided. I recommend that the Building Commissioner comment on the wall located in the setback. I note that the Proposed Watershed Plan and the Grading Plans have some different grades indicated on the plan.

The plans include some existing spot grades along both sides of the wall and the height (24") has been listed on the plans. The existing contours have not been corrected and would not go through the wall as indicated. Other grading issues have been addressed and all but one proposed wall has been eliminated. The remaining wall appears to be decorative. Watershed plan grading is consistent with the design grading plan.

The site appears to be mostly ledge from the south side of the existing foundation to the steep slope above wetland series B flags. The plans show some exposed ledge areas but it appears to be predominantly ledge in this area. How ledge removal will be achieved should be discussed by the Board and Applicant as this is a developed area and blasting could impact nearby houses if not performed properly.

The Board should address this issue.

- g. This item requires information to assess the impact of the development on soil, water supply, ways and services. There are some test pit logs included in the Application for this lot but none at the location of the proposed stormwater systems. Tests performed indicate refusal due to boulders at the septic primary and reserve leaching areas between 81 and 99 inches below grade. Soils below the top layers are reported as loamy sand with percolation rates of between 2 and 5 min/in where tested. I recommend that the Board of Health comment on the plan. Groundwater appears to be proximate to the elevation of the wetland areas where evidence was encountered in drainage test pit 1. I noted that the existing house foundation has a drainage system and it appears that water was collected from the ledge area on the south side of the foundation, in addition to a collection system along the front near Tower Road. As a single family dwelling it is unlikely to impact water supply, ways or other services. In particular as there was a dwelling on the lot.

Refer to comments under h. below.

- h. The regulations require compliance with DEP Stormwater Management Policy as discussed below:

STORMWATER MANAGEMENT REGULATIONS - EROSION AND SEDIMENT CONTROL:

The DEP Stormwater Management Regulations consist of ten standards. The standards were reviewed using the Massachusetts Stormwater Handbook Documenting Compliance (MSHDC) together with other sections of the

Handbook as appropriate. This section of the correspondence lists the standards and identifies whether the submittal complies, does not comply or if additional information is required to demonstrate compliance.

This project could be considered a partial redevelopment as the lot has a foundation on it. As no portion of the existing impervious will remain except the two parking spaces directly off of Tower Road, it is unclear that there would be any justification for lesser compliance. In any case no request for a relaxation of the Standards has been requested.

Standard 1 – Untreated Stormwater

This standard requires that no new untreated point source discharges are created and that point source or sheet flow discharges do not result in erosion into or scour of wetlands. This standard is required to be met for redevelopment projects.

The design includes one new surface discharge point. Runoff would be collected in a new catch basin for the driveway and a roof collection system for the dwelling. There is also a small infiltration basin area without an outlet proposed between the driveway and Tower Road. It is proposed to treat runoff from all of the proposed new impervious areas through the subsurface infiltration system.

The design concept has not changed.

The submittal includes a detail for outlet protection but sizing calculations for scour protection are required. Since the outlet would discharge to the abutting property through uplands there should be an easement provided through the abutting property to the wetlands.

An easement to the end of the outlet protection has been added. I recommend that the easement extend to the wetland as the property owner could impact flow from the outlet in areas outside of the wetland. Outlet protection sizing has been provided.

To demonstrate compliance outlet protection calculations should be provided. Also refer to comments under other Standards.

Refer to above recommendation. If approved the Board could include a condition to expand the easement.

Standard 2 – Post Development Peak Discharge Rates

This standard requires that the peak rate of discharge does not exceed pre-development conditions and that the design would not result in off-site flooding during the 100 year storm. I note that it is not permitted to increase runoff or flooding to abutting properties without appropriate easements, etc.

The watershed plans use an arbitrary line at the limit of work but extend the flow path beyond the area. Typically, the limit would be to the wetland or a control point such as a culvert or other concentrated point. In this case the limit is in uplands that could be altered by clearing trees and constructing lawns, etc. It is unclear how this would be prevented in the future as no restrictions are proposed. The plans should indicate existing and proposed limits of woods and lawn areas for pre and post conditions. The areas are partially indicated relative to cover conditions.

As noted above there is no way to prevent further clearing and alteration of the woods, which would increase runoff. The proposed limit of woods is not indicated on the plans and the new owner could clear more than is included in the calculations. The Board could include a condition requiring tree preservation or no-disturb areas that conform to the proposed limit of clearing on the plans.

The size of several sub areas has changed, including the roof of the building although the building is indicated as slightly bigger than the initial submission the area is reduced. The Applicant should clarify this issue. It is unlikely that the small changes would alter the results.

The calculations should expand the time span to collect full volumes.

The time has been extended. The calculations include an error message that initial flow is not all captured. This will have a slight impact on the total runoff volume.

The proposed subsurface system may be impacted by the presence of ledge. Based on field observations the southern side of the foundation has exposed ledge within the former building footprint and the infiltration system is proposed to extend south of the existing footprint into the ledge. The one test pit outside the system indicates sufficient depth to groundwater (over 10 feet) but testing on the south and west sides may not be consistent with this groundwater elevation due to ledge in the area. This system has a top elevation of 56 and the 56 contour is partially over the easterly chambers. It is unclear that there is sufficient cover at this point. In addition, the proposed grading includes a slope of 4:1, which starts at the 56 contour. Infiltration systems are required to be set back from steep slopes. Refer to Volume 2 of the DEP Handbook.

The location of the proposed infiltration system has been revised to be further east and parallel to the lot line. It is now over the one test pit excavated. Additional testing should be performed at the southwest corner of the system. the slope has been adjusted for cover but requires grading into the abutting property without an easement to maintain these grades. Part of the infiltration system would be over the septic leaching area. The plans should specify removal and replacement of unsuitable soils within the limits of the proposed infiltration system. The above issues could be conditioned if the project is approved.

The calculations for the depression to be created next to the driveway include overflow pipes that are not proposed. The elevation of the water in the depression does not reach the elevation of the outlets but they should be eliminated from the calculations. This basin is not credited with recharge but is used for runoff mitigation. The proposed open basin would be an infiltration basin by design, although the calculations do not credit exfiltration during a storm it is assumed to infiltrate between storms to have all of the volume available for the next storm. Soil testing should be performed at the location of the proposed basin to ascertain that it will drain between storms as designed.

Outlet pipes have been eliminated from this system and the overflow would be the catch basin grate in the driveway. Based on a review of the DEP Handbook this is an infiltration basin and should be designed consistent with requirements or an alternative system proposed. A detention basin has an outlet at the bottom to drain an infiltration system drains through the soil.

The Board should require soil testing to confirm conditions are suitable for infiltration.

Recommendation remains. The Board could include a condition requiring that there be soil testing performed as noted above prior to construction.

Additional data is required under this Standard to demonstrate compliance.
Additional data is required under this Standard to demonstrate compliance.

Standard 3 – Recharge to Groundwater

This standard requires that designs provide on-site recharge to mimic pre-development conditions. Calculations to demonstrate compliance are based on soil conditions, and certain methodology as outlined in the MSHDC.

Additional testing should be performed at the proposed infiltration system locations. There is only one test and it is near but not at the location proposed subsurface system. The proposed system may be impacted by the presence of ledge. Based on field observations the southern side of the foundation has exposed ledge within the former building footprint and the infiltration system is proposed to extend south of the existing footprint into the ledge.

The location of the system has been adjusted but additional testing should be performed at the southwest corner of the system. The Board could include a condition requiring testing prior to construction.

The subsurface system would retain the required volume to comply with this Standard.

Additional testing data is required under this Standard to demonstrate compliance. Refer to design comments under other Standards.

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Standard 4 – 80% TSS Removal

This standard requires runoff be treated to remove suspended solids (TSS) to at least 80% removal. For areas with rapidly draining soil pretreatment of 44% prior to an infiltration system is required.

It is proposed to direct runoff from the driveway to a catch basin then into a subsurface infiltration system. Roof runoff would be collected in a pipe system and discharge directly to the infiltration system.

The roof piping is designed to pass through part of the house. I recommend that this aspect be revised. This could be a condition but may require more design to implement.

The catch basin would meet requirements for 25% TSS removal as it is sized appropriately and would receive less than ¼ acre of impervious surface flow.

The final BMP in the treatment train is the subsurface infiltration system. As noted, additional soil testing should be performed. Supporting calculations for water quality volume should be provided. The site is in a Critical Area (Zone II of water supply wells) and pretreatment of 44% TSS removal is required and the water quality volume should be based on 1” of runoff. Based on my calculations the infiltration system would retain the water quality volume for 1” of runoff as currently designed.

Not addressed, the Response states that the filter fabric is the treatment but this is inconsistent with the Handbook. If it is intended to include an isolator row section as done with Cultec systems, then the area of that section would not be credited with infiltration. Supporting calculations should be provided. This could be a condition but may require redesign depending of the final proposal.

This Standard could be met subject to satisfactory soil testing and additional pretreatment. As designed the project does not meet this Standard. Refer also to Standard 6.

This Standard could be met subject to satisfactory soil testing and additional pretreatment. As designed the project does not meet this Standard. Refer also to Standard 6.

Standard 5 – Higher Potential Pollutant Loads

The project is not considered a source of higher pollutant loads, this Standard is not applicable.

Standard 6 – Protection of Critical Areas

Based on a review of Mass GIS mapping the site is located in a critical area as it is in the Zone II of a water supply. Infiltration systems in a Critical Area should be sized for 1” for water quality volume and provide 44% pretreatment.

This Standard has not been met.
This Standard has not been met.

Standard 7 – Redevelopment Projects

The project would not be considered a redevelopment, but could be considered a partial redevelopment.

Standard 8 – Erosion/Sediment Control

This standard requires construction phase erosion controls. Although the work area is less than one acre and a SWPPP under EPA requirements would not be required, the data should include all of the information required in the DEP Handbook.

This Standard requires the following data. I reference the Stormwater Report Checklist. Some of this information could be provided prior to construction:

- o Narrative – There is Construction Sequencing section on the Plan that describes general construction phases, procedures, etc.*
- o Construction Period Operation and Maintenance Plan – A Construction Period O&M has not been provided.*
- o Names of Persons or Entity Responsible for Plan Compliance – Not provided. It could be a condition that this data be provided prior to the start of construction.*
- o Construction Period Pollution Prevention Measures – Some data is provided on the plans, primarily a mulch sock to be installed in phases and a tracking pad. I do not recommend use of an infiltration basin for sediment storage as proposed. Although the submittal claims the basin as a detention basin all water leaving the basin has to discharge through the soil as designed. I note that work is proposed in the 50 foot wetland buffer zone. The Wetland Bylaw limits work within this area, it is unclear if the Commission has approved work in the no disturb buffer.*
- o Erosion and Sediment Control Drawings – A drawing has been provided refer to other comments.*
- o Detail Drawings and specifications for erosion control BMPs, including sizing calculations. – No details or calculations have been provided.*

- *Vegetation Planning – Typically planting periods for successful growth should be included. There is no discussion of planting or landscaping.*
- *Site Development Plan – This requirement would be satisfied with the Plans.*
- *Construction Sequencing Plan – There is a construction sequence on the Erosion Control Plan.*
- *Sequencing of Erosion and Sediment Controls – The Plan should specify the timing of sediment and erosion controls as required.*
- *Operation and Maintenance of Erosion and Sediment Controls – The submittal includes requirements for maintenance and repair of erosion and sediment controls in the Construction O&M.*
- *Inspection Schedule – A schedule for inspection of various erosion and sediment controls should be included.*
- *Maintenance Schedule - A schedule for maintenance of the erosion and sediment controls should be included.*
- *Inspection and Maintenance Log Form – A construction phase log form was not included with the submittal.*

Additional data is required to demonstrate compliance with this Standard.
Additional data is required to demonstrate compliance with this Standard. The Board could include a condition that the above issues be addressed on the Erosion Control Plan and that a separate construction phase O&M be provided.

Standard 9 – Operation and Maintenance Plan

This standard requires long term maintenance of non-structural and structural BMP's and requires a specific inspection schedule, etc.

The catch basin maintenance complies with DEP Handbook requirements.

The subsurface infiltration system is a non-proprietary precast chamber system. proposed O&M provides description of the maintenance. Maintenance is consistent with the DEP Handbook.

The infiltration basin maintenance should identify what to do if the system does not drain in 72 hours after a storm. Otherwise it is generally consistent with the DEP Handbook and would likely be maintained at a more frequent level.

Comment remains.

Additional data is required to demonstrate compliance with this Standard.
Additional data is required to demonstrate compliance with this Standard. This is a small change that could be a condition if the project is approved.

Standard 10 – Illicit Discharge

A signed Certification Statement has been provided.

- i. It does not appear that any lighting is proposed.
- j. It is unclear if the Board requires or requests and other materials not identified above regarding the project.

The Board should review the comments and determine if all of the information required under Section 7. Review Standards and Approval have been addressed by the Applicant prior to arriving at a decision.

I appreciate the opportunity to assist the Planning Board on this project and hope that this information is sufficient for your needs. This report is for the Hingham Planning Board and associated Hingham land use agencies only and provides no engineering, planning or other advice that may be relied upon by any party or agency other than the Town of Hingham. I would be pleased to meet with the Board or the design engineer to discuss this project at your convenience. If you have any questions please do not hesitate to contact me.

Very truly yours,
Chessia Consulting Services, LLC

John C. Chessia, P.E.
JCC/jcc