

Chessia Consulting Services LLC



December 9, 2020

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

RE: Supplemental Engineering Review
213 Cushing Street
Definitive Subdivision Modification

Dear Ms. Savage Dunham:

In response to your request, Chessia Consulting Services, LLC has reviewed the above referenced project for Compliance with the Planning Board Rules and Regulations as amended through September 11, 2018. In addition, I reviewed the design and calculations for conformance to general engineering design standards. The data reviewed included the following information:

- Plans entitled “Corey’s Way Modified Definitive Subdivision Plan at 213 Cushing Street in Hingham, Massachusetts” dated February 25, 2020 last revised 9-21-20 prepared by Ross Engineering Company, Inc. consisting of nine sheets. (Plans)
- Application for Modification of Definitive Plan dated February 27, 2020. *Not resubmitted to this office*
- Report entitled “Stormwater Report Corey’s Way Modified Subdivision Hingham, MA” dated November 12, 2020 prepared by Ross Engineering Company, Inc. (Report)
- Report entitled “Stormsewer & Inlet Grate Bypass Analysis Corey’s Way Modified Subdivision Hingham, MA” dated November 12, 2020 prepared by Ross Engineering Company, Inc. (Inlet Report)
- Report entitled “BMP Standard 4 Corey’s Way Modified Subdivision Hingham, MA” dated November 12, 2020 prepared by Ross Engineering Company, Inc. (TSS Report)
- Report entitled “Operations & Maintenance Plan Corey’s Way Modified Subdivision Hingham, MA” dated November 12, 2020 prepared by Ross Engineering Company, Inc. (O&M)
- Report entitled “Stormwater Pollution Prevention Plan SWPPP for Corey’s Way Mod. Def. Subdivision Plan 213 Cushing Street in Hingham, MA 02043” SWPPP preparation date 10-22-2020. (SWPPP)

- Response letter dated November 16, 2020 prepared by Ross Engineering Company, Inc. including attachments for cut and fill calculations and existing water stub location,

I previously visited the site on behalf of the Hingham Board of Health to witness soil testing. I revisited the site to clarify some questions regarding existing conditions on March 18, 2020.

The site is located on the west side of Cushing Street south of LeClair Drive. The site is mostly wooded with variable steeply sloping topography in many areas. There is an existing access drive into the site over the existing right of way. Part of the access is paved and part is mostly grass with an area of ledge past the pavement. I recommend that the limits of gravel and any other surfaces be surveyed and indicated on the plans. There is some data on the watershed plans but it is not all consistent with observations in the field. The land slopes from various high areas in the central part of the property east to Cushing Street and to wetlands located south and west as well as to abutting property to the north. There is also an isolated wetland that is considered a Vernal Pool by the Town located in the northwestern part of the property.

A review of MassGIS data indicates that the site is not identified by Natural Heritage Endangered Species Program as a habitat for rare or endangered species. MassGIS does not identify any certified or potential vernal pools on the site but the local wetland by law considers the isolated wetland a vernal pool relative to setbacks, etc. The locus is almost entirely within the Zone II of public water supply wells, excepting a small area in the northern part of the site. There is an area of the property on the western side of the parcel that is within the FEMA flood hazard Zone A. This is associated with the Plymouth River which appears to be over 200 feet from the property limits based on MassGIS.

The subdivision was previously approved for one lot in 1965 based on data provided. It is proposed to construct the roadway and develop two lots on the parcel. No change to the existing right of way layout is proposed. The locus is in the Residence C Zoning District. The lot area is listed as 288,240 square feet (6.62 acres) exclusive of the right of way. It is not labeled on the Plan but is it assumed that the right of way is private. The Plan does not list the area of wetlands as required.

The wetlands comprise most of the northwest portion of the property. It is not known if a Notice of Intent has been filed with the Conservation Commission.

Some previous soil testing data and Natural Resource Conservation Service (NRCS) published data has been included in the Report. I witnessed some testing for the Board of Health and soils are predominantly glacial outwash sands with an area of less permeable soils with areas shallow to bedrock in the northern part of the lot.

Requested waivers are not listed on the plans but are included with the Application package. This section has been updated and only currently requested waivers are listed with my comments below in underlined type, previous comments are in *italic type* with

initial waivers in standard type. Waivers that were previously requested but no longer requested have been identified by using ~~strike through~~. The following waivers are requested:

- ~~Section 3 C. 2. To waive the requirement for a 2” border on the left side of the plan and to provide a 1 ½” border on the left side of the plan.
Typically, this requirement has to do with filing of the plans, I defer comment to the appropriate Town official.~~
- ~~Section 3 C. 2. (1) To waive the requirement to identify existing street trees over 12” in diameter. This section also requires identification of the location size and type of proposed street trees. The waiver requests relief from installing street trees along the roadway except at the cul de sac. This actually would be a waiver under Section 5. B4 (1).
The aspect of the waiver relative to installation of street trees is no longer requested. It is now requested to only identify large trees in the vicinity of proposed work and along Cushing Street.~~
- Section 3 C. 2. (n) To waive the requirement for plan and profiles scales to be 1” = 40’ and allow 1” = 20’ scale.
*Generally, a larger plan scale is easier to review, unless there is a specific filing issue for record plans this should not be a major issue.
This waiver is still requested.*
- Section 4 B. (3) (b) To waive the required sight distance for the 85th percentile speed. It is proposed to remove trees to improve sight lines.
*I defer this issue to the Town’s Traffic Consultant, but recommend an assessment of what is required versus what is provided and the public benefit of the waiver be discussed.
Based on discussion at the last public hearing, the plans are proposed to comply with the requirements of Vanasse & Associates assessment relative to sight distance. If approved it should be a condition to have Vanasse & Associates assess the plans or final construction prior to any lot releases. The sight distance assessment indicates that less than 500 feet (required for a Major Street) would be adequate based on measured speeds.*
- Section 4 B. (4) (b) To waive the requirements to construct a turnaround with planted island. It is proposed to provide a hammerhead type turnaround.
This waiver is still requested.
- Section 4 C. (3) (d) To waive the requirement to extend outfalls and to be compatible with a natural waterway or existing drainage system.
There is no drainage system or nearby wetland area in this part of Cushing Street.
- Section 4 J Protection of natural areas. It is requested to waive requirements to indicate large trees.
Based on discussions at the last public hearing there will be tree preservation areas recorded on the plans and deeds.
- Section 5 B4 Street Trees, it is proposed to plant street trees within the layout not 5 feet outside the right of way as required.
- ~~Section 5 J3 (1). To waive the requirement for 24 inches of gravel and allow 12 inches of gravel roadway base.~~

This waiver would not be required as described as a Private Local Street requires 12 inches of gravel not 24 inches.

- Section 5 X3 The waiver request is for 2:1 side slopes versus 3:1 side slopes required.

This should be a request from Section 5 A4 as well as 5 X3. Section 5 A4 requires construction to be consistent with the Typical Cross Section. The typical cross section requires an 8.5 foot shoulder pitching at 1/4" per foot to the roadway then grading would be a maximum of 2:1 but in accordance with X3 which has lesser slopes depending upon the height of the cut or fill. The plans propose a four foot shoulder then a 2:1 slope.

There are remain other waivers or plan modifications that would be needed to implement the plan as proposed.

Summary of Main Concerns:

Current comments are in underlined type following prior comment in *italic type* which follow my initial comment.

- Review of waivers relative to public benefit of granting the waivers.
The Board should review the waivers.
- The roadway is presented as a Private Local Street, but based on the length would not be allowed as a Private Local Street and would be a Limited Residential Street, which impacts several waivers.
It is proposed to transfer property with the abutter at 211 Cushing Street such that the overall roadway length can be reduced to meet Private Local Street requirements. I note changing the property limits and potentially adding another parties property to the project could require a new advertisement and modification to the Application. Town Counsel should review this issue.
It is my understanding that the project has been readvertised to include the new Applicant.
- Drainage design, there are several issues to be addressed relative to drainage.
There remain some issues to address, in particular:
 - *soil testing at proposed infiltration systems*
Additional unwitnessed testing was performed, however the plans do not identify test pit numbers for the new tests and it is not feasible to identify specific conditions at the test locations. Most all of the tests encountered sandy soils.
 - *locations of septic systems to confirm setbacks are met*
Potential locations for the septic systems on the proposed lots and existing lots north and south of the proposed roadway have been indicated. The design appears to result in the system at 211 Cushing Street being made non-compliant with the Board of Health Regulations. The septic system appears to be higher than the proposed drainage system. Lot 1 also appears to be potentially non-compliant as the systems are either within or very close to the required 50 foot setback for a system higher than the drains. Since the systems have not been designed on the new lots this may be feasible to redesign to comply.

- *some modeling assumptions need modification*
Comment remains.
 - *consistency between plans and calculations for infiltration trenches*
No longer applicable.
 - *use of the bioretention area for runoff rate control*
The bioretention system has been changed to a “grass depression”. The same comment applies, a grass depression is not a BMP listed in the DEP Handbook.
 - *connections between the lots and the roadway system*
Satisfied.
 - *bypass and the rational analysis data provided*
Partially addressed, insufficient back up data on the model and grate has been provided.
- Sight distance at the proposed intersection. Based on my observations in the field there is minimal sight distance and likely insufficient for safe egress from the site without removal of significant trees and likely some grading in the right of way. I recommend that the measurement points be marked in the field for review. The classification of Cushing Street should be determined by the Board if there is not an existing classification.
It is my understanding that the Board is planning to visit the site to observe existing conditions. The Applicant has indicated that due to existing grades within Cushing Street that it is not feasible to meet requirements without changing the grade of Cushing Street. I recommend that the Applicant prepare data on existing speeds and required sight distance based on AASHTO requirements for the 85th percentile speed, and if that is not available other means to develop a safe intersection should be proposed. This data should be prepared by and reviewed by a Transportation Engineer.
A study has been performed by Vanasse & Associates and implementation of these recommendations should be a condition if the project is approved.
 - Some of the required data is not included on the plans specifically trees that would be impacted by construction, existing septic systems, etc. as further discussed under specific sections of the Regulations.
The Board should comment on trees and proposed landscaping as applicable. The plans should include locations of existing and proposed septic systems as required.
Septic systems have been added, as noted above it appears that the design would render 211 Cushing Street non-compliant. The Board of Health should comment on the design.

Section 3

C Definitive Plan:

I have described my comments with reference to the specific section of the submittal requirements, current comments are in *italic type* following my initial comments. Comments have only been added where necessary.

(1) Application Procedure

- (a) It is assumed that the appropriate numbers of plans, etc. were filed with the Board.
- (b) Form C-1 was included in the Submittal.
Since the parcel would be changed with the revised design a new Form C-1 will likely be required. I note that property deeds, etc. are also required and would be different with the revised property configuration.
It is my understanding that this issue has been addressed.
- (c) It is assumed that the appropriate filing fees have been submitted.
- (d) There does not appear to be any other subdividable land adjacent to the parcel therefore the requirement for a sketch plan regarding potential future subdivision of other land is not necessary.
- (e) Data regarding storm sewer design has been submitted in the hydrologic calculations. The Report lists that Rational Method is included in Appendix C but it was not found in the Report. Refer to comments below on the storm sewer and drainage design.
Calculations have been included in the Report. Refer to comments below on the storm sewer and drainage design.
Revised data has been submitted. Refer to comments below on the storm sewer and drainage design.
- (f) Calculations for stormwater management have been included. Refer to comments below regarding drainage.
Refer to comments below on the stormwater management system design.
Revised data has been submitted. Refer to comments below on the storm sewer and drainage design.
- (g) A copy of the Order of Resource Area Determination extension to 2-5-2021 has been included as required.
- (h) It is assumed that the Application is sufficiently complete to authorize this review.

(2) Contents of the Definitive Plan

The plans are drawn at an appropriate scale for review and are on 24" by 36" sheets.

- (a) The Subdivision is called Corey's Way. The plans include a north arrow, no benchmarks could be found on the plans and the datum is not specified. The plans include the date and scale. The benchmarks and datum are required to comply with this regulation.
A benchmark and datum have been added to the plans. The datum is MSL (mean sea level) also typically NGVD 1929. I defer to the Board and DPW but current standards require NAVD 88.
The benchmark has been changed to say NAVD but since the elevation hasn't changed and MSL is not NAVD it is unclear what the actual survey datum was used to develop the plans and contour elevations. I note that the current Existing Conditions Plan does not label any of the existing contour elevations.

- (b) The name and address of the record owner and applicant is on the plans as required, the name and address of the Engineer and Surveyor is on the plans. The Cover Sheet has a Professional Engineers Certification that has been stamped but not the required Certification a Professional Land Surveyor. The plans are incomplete relative to this regulation.
It is my understanding that the Surveyors Certification should also include reference to the Subdivision Regulations.
Satisfied.
The subdivision boundary and all abutter's names are on the Plan as required. The zoning classification of the locus is indicated on the Plan as required.
As noted the boundary has been changed on the plans.
A copy of the ANR plan was included with the submittal.
- (d) The plans indicate the widths of the right of way for the Cushing Street right of way (public 50' width). The width of the traveled ways is indicated on the profile. The width of the proposed roadway is indicated on the Plan.
- (e) The location of nearby ways and their names are included on the Plans on the Locus Map, the plan does not list the scale, a scale of 1"=800' or larger is required.
The Locus Map is listed as 1"=800 feet but based on the locus of the site this is incorrect.
Satisfied.
- (f) Sufficient data to define the layout of the roadway has been provided. Only one existing monument has been identified. It is likely that there are monuments associated with Cushing Street that should be added to the plans.
According to the Response the closest monuments on Cushing Street are over 850 feet away.
No further comment required.
- (g) Complete boundary lines have been provided. Data on lot frontage, etc. has been provided on the proposed plan as required. The location of the Flood Plain and Watershed Protection District, the FEMA 100 year Flood Zone and Accord Pond Watershed and Hingham Aquifer Protection District are indicated on the plans.
- (h) The location of proposed monuments has been indicated as required. One existing monument is indicated.
- (i) The plan indicates wetlands; an Order of Resource Area Delineation (ORAD) was issued and has been extended to 2-5-2021. The project as revised on 3-24-20 moves all work outside of the 100 foot buffer and a Notice of Intent (NOI) would not be required. The locus is in the Accord Pond Watershed and Aquifer Protection District.
The revised plan limits work to just at the 100 foot buffer.
- (j) Drainage information is included with the submittal. Refer also to comments on Stormwater Management Regulations for specific comments.

The Plans include some of the required data. . The plans should indicate all proposed stormwater BMP's. As submitted many of the proposed stormwater features included in the calculations are not indicated on the Plans.

The revised plans indicate all of the proposed structures. Refer to comments under Stormwater Management Regulations.

Refer to comments under Stormwater Management Regulations.

It is not proposed connect to the Town drainage system, although runoff from the site would continue to flow into Cushing Street. No existing drainage was observed near the proposed roadway within Cushing Street.

The required Schematic has not been included in the set. The schematic should include the data indicated in Figure 3 of the Subdivision Regulations.

There is no direct discharge to a wetland, runoff would flow overland to wetlands at the south and west sides of the site and to the Isolated Vegetated Wetland (IVW).

It is proposed to install a subsurface infiltration system at the entrance to the site. Schematics were included as required.

This aspect of the design is conceptually the same.

There are also proposed infiltration trenches and leaching pits associated with lot drainage.

The revised design has a bio-retention system, subsurface roof infiltration system, infiltration trenches and a dry well on the lots.

The revised design has a drywell and a shallow grass depression on the lots. A shallow grass depression is not a BMP based on the DEP Handbook.

- (k) The plan indicates some proposed utility services. Water and electric, tel. etc. all exist in Cushing Street. The proposed water line diverges from the roadway and is very close to the lot line. It appears that ledge removal would be required for the water in some locations based on the plans. It is unclear how the depth of ledge was determined in the area of the water main and at the roadway centerline. The profile indicates the contour of the top of the ledge but no borings or probe locations have been indicated on the plans. It may not be feasible to locate the water as proposed if ledge is present in the area without impacting abutting property. I note that installation of the water line as proposed would require removal of several previously planted trees that provide a buffer to the southerly abutter, these trees are not indicated on the plan. Data on proposed water services to the houses should be provided. No existing storm sewers are indicated in Cushing Street. Existing utility poles are indicated and one would remain within the roadway as designed. No data on associated approval of proposed utilities has been provided as required. It is unclear that the water system is satisfactory to Aquarion or the Fire Department. It does not appear that street lights or fire alarms are proposed.

The plans should identify the location of the existing water line stub as provided by the Weir River Water System as it appears that it could

impact the proposed galley system. The Response indicates that this stub was recently installed by the Weir River Water System. The water is now indicated on the south side of the road within the right of way. Overhead wires are proposed to remain approximately 1/3 of the length of the roadway, where currently installed. As noted the Fire Department should comment on the plans.

The location of the water main stub has been indicated on the plans. The Board should comment on maintaining overhead wires and the Fire Department should comment on the proposed hydrant location.

- (l) Some but not all existing trees are indicated on the plans. A woods line should be added to the existing conditions plans. No proposed street trees are indicated on the plan. The plans do not comply with this requirement, a waiver has been requested.

Some trees have been added and the waiver to provide street trees is no longer requested. It is requested not to indicate all trees on the property. The Board at the meeting on September 28, 2020, requested that a different color be added for trees to remain versus trees to be removed.

The Board should review the proposal regarding trees. It is my understanding that tree preservation areas were agreed to be provided at the last public meeting.

- (m) Suitable space has been provided for the Planning Board to sign the plans. A sign off block for the Board of Health should also be provided as required. The project would include on-lot wastewater disposal systems. The required statement regarding approval is on the Cover Sheet, the typo “TEH” should be corrected.

The plans now include signature lines for the Board of Health. There remains a typo “TEH” on the Cover Sheet.

Satisfied.

- (n) Since the roadway is less than 1,000 feet in length it is not required to have a separate plan and profile sheet. The data on Sheet 4 includes plan and profile information. The plan is at 1”=20’ versus the required 1”=40’ but is legible at this scale, typically the vertical and horizontal scales are different by a factor of 10 versus this case where vertical is a factor of 5.

A waiver has been requested from this requirement.

The Board should act on the waiver request.

Centerline data should include bearings and distances. Data on radii, length, etc. should be provided where lines differ from the centerline. The profile plan includes the location of proposed monuments. Lot frontages are not indicated, partial data on proposed buildings walks and drives are indicated for the new lots. Only partial drainage data is included on the plan.

Centerline bearing and length is listed. Data on radii, length, etc. should be provided where lines differ from the centerline has been partially indicated on the Profile sheet but is on other plans. Drainage data is indicated on the plans and profile.

No further comment required.

Cross section data for the new section of the roadway is included on Sheet 7. Only one cross section is indicated. The Board should determine if additional cross sections will be required.

No further comment.

The profile includes the required line data for centerlines and sidelines. The elevations are indicated at 25 foot stations. The subdrain is incorrect graphically as it is not drawn at a depth of four feet. Some data for storm drains is included but not all required data. The water main is indicated, no other utilities are indicated.

The subdrain has been corrected and data on storm drains has been added.

There is a sign off block on the Plan and Profile sheet for the Planning Board but not the Board of Health.

The Board of Health sign off has been added.

- (o) It is unclear if there are any historic objects on the site. Other existing features are generally indicated on the plans.

Reportedly the site was a gravel pit.

- (p) Contours are indicated on the Grading Plan at a one foot interval, which meets requirements. The contours do not extend 100 feet around the site at all locations. I recommend that more data be provided for the abutting lots to the south fronting on Cushing Street.

Comment remains.

Satisfied.

Earthwork calculations have not been provided as required.

Calculations have been provided. A net cut of 4,467 CY is proposed.

Wetlands are indicated.

- (q) It is unclear if the Board will require additional information.
- (r) I did not observe any roadway staking at my site visit on March 18, 2020. Some property line stakes were observed.

I have not revisited the site to observe if staking has been added. I note that the Board is scheduled to visit the site and staking could be useful to the Board.

No further comment.

- (s) The regulations require compliance with DEP Stormwater Management Policy as discussed below:

STORMWATER MANAGEMENT REGULATIONS/EROSION AND SEDIMENT CONTROL:

The DEP Stormwater Management Regulations consists of ten standards. 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. I have used the DEP Stormwater Handbook, including Volume 3 Documenting Compliance together with Volume 2 for specific details.

Standard 1 – Untreated Stormwater

This standard requires that the project not result in point sources of untreated runoff and that runoff not result in erosion or sedimentation to wetlands.

It is proposed to collect runoff from the roadway in two catch basins roughly at the midpoint of the roadway. These would discharge to a subsurface infiltration system. There is no proposed outlet for this system. Runoff from the first 150 feet of the roadway is proposed to discharge into Cushing Street, although the design would have a ponding area created on the northern side of the intersection as graded.

The revised design relocates the subsurface system to the west of the roadway at the lot line between the proposed lots. A subsurface system has been added to the roadway at the front. The only system that would have outflow is the bioretention basin on Lot 1. Other areas currently flow to the design points as currently exists, except that a swale along the proposed roadway shoulder would discharge into Cushing Street. This aspect is inconsistent with Subdivision Design requirements, refer to Sections 4 and 5. Refer also to other comments on this aspect of the design under Standard 2. The revised grading eliminates the low point at the intersection.

The design has been revised, in particular the on-lot systems. The swale within the roadway has been eliminated. There are now only a dry well and a “grass depression” on the lots. As noted a grass depression is not a BMP recognized by DEP. The only BMP with outflow is the grass depression on Lot 1.

There are also proposed drywells for lot runoff including the building roofs and lawn areas. These would primarily discharge to drywell/leaching pits at a low point in the lawn. Some of these have a 4” overflow pipe proposed although only DW2 has any outflow from the system, based on the calculations. Runoff from the lawn and flow off of the roof would flow to an infiltration trench, in some areas, and then connect to the drywell/leaching pit.

The revised design has several stormwater systems proposed for the lots including trench drains, subsurface infiltration systems and a sand filter. Some of these overflow or connect directly to the roadway system. I note that previous projects were not allowed to have lot drainage and roadway drainage to be piped to the same system.

Satisfied, the systems are separate.

This Standard would likely be met by the design. Refer to other Standards for additional comments.

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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. System designs should comply with the DEP Handbook for stormwater management systems.

There are some issues with contour data on the plans that in particular along the roadway where there are overlapping contours. This should be clarified, as well as the basis for the contours, i.e. source of data, datum, etc.

Existing Conditions:

I disagree with some of the cover conditions listed on the watershed plans. There were no “poor or fair” woods observed. Areas have been graded for access many years ago and all areas, excepting very few steep slopes that are sparsely vegetated, were covered with vegetation or forest duff. The plans do not consider that the woods would be altered to install the proposed drywells, which is not a realistic assumption.

Not addressed relative to woods condition assumptions. There may be some fair woods but the limits should be defined on the plans for review. Most of the area has cover and fair woods is described as burned or grazed, neither of which have occurred on this site recently.

Satisfied.

There are some isolated depressions within the site that would trap and infiltrate runoff that should be included in the calculations. In highly permeable soils as located in most of the southern part of the site there would likely be little or no runoff out of these areas even in a 100 year storm.

These areas have been included in the model for the existing conditions, but the overflow for “Depression B” is below the grade at the bottom. This should be corrected.

Satisfied.

Proposed Conditions:

All proposed infiltration systems should have soil testing to confirm suitability. I recommend that any testing be performed by a licensed soil evaluator and be witnessed by an agent of the Town.

Comment remains, although much of this site appears to consist of sandy soils some testing was not witnessed, some witnessed tests had shallow depth to ledge and or less permeable soils. The DEP Handbook requires tests at the location of all infiltration systems. I recommend that any additional testing be performed by a licensed soil evaluator and be witnessed by an agent of the Town.

Some additional testing has been performed but no additional tests were performed at the front galley system as requested. The Town was not informed of the testing and it was not witnessed by an agent of the Town. Test logs for the recent testing have been provided in the TSS Report, but the plans do not label the test pits such that the results can be evaluated at specific locations.

The calculations assume that there would remain a significant area of woods on the lots. This is not consistent with current development patterns and would require that there be a deed restricted area to guarantee that it would remain woods. Analysis should either assume full buildout or impose a restriction for wooded areas to remain.

Comment remains, the Board has frequently required deed restrictions where woods are proposed to remain on other projects.

It is my understanding that the Applicant has agreed to restrict future tree removal or lawn expansion on the lots.

The revised design proposed to have good brush condition on the perimeter slopes. This is something that takes several years to develop. The model should use good grass, which can be established with proper maintenance in a year. This will increase the runoff rate from these areas.

There appears to be an inconsistency in the divide associated with Design Point 4 as in the existing case not all runoff flows into the natural depression, but unaltered areas are proposed to flow into the depression under proposed conditions. This should be corrected.

The revised plans has the small existing area of pavement discharging to Cushing Street broken out as a separate subarea, but the same design criteria was not used in the proposed case. If the area is combined in the existing case there would be an increase in runoff to Cushing Street in the 2 year storm. The 10 and 100 year storms would not have an increase. If I break out the pavement in the proposed case consistent with the existing condition model, there would be a decrease in this subarea. The calculations should be consistent.

The plans indicate the flow paths used to determine the time of concentration (Tc) in some but not all areas. I note that it is unlikely that there would be a longer Tc in subarea PST 4 than in Pre 4. In the case of subarea PST 2 there would not be any grass as listed in the Tc as the entire area is woods for a cover condition. As noted above this could change unless otherwise restricted.

This issue has been addressed in the revised submittal.

There are new issues in the revised Report. The flow paths in some cases exceed 50 feet for sheet flow. A maximum of 50 feet of sheet flow is standard practice in Massachusetts. In one case Bermuda grass, not dense grass as would be found in this area was used for the flow condition. These result in

much longer flow times in the proposed case. In another instance the flow time is the same although the alteration of the site would make it shorter.

The proposed galley system for CB 3 & 4 has not had any soil testing data provided to demonstrate the suitability of the location. This system would most closely resemble an infiltration trench. The system should be located at least 10 feet from the property line. This system should be at least 50 feet from a septic system soil absorption area. The location of septic systems on the proposed and abutting lots has not been indicated and will be required to confirm separation distances. The plans indicate abutting wells, my files indicate that these houses are also connected to Aquarion water. The Board of Health Regulations require a 100 foot setback from irrigation wells. This appears to be met. I note that this system may not be feasible to install without impacting adjacent property. The proposed system would require a 12 foot excavation within 6 feet of the lot line.

The plans should include the location of proposed and existing septic systems to confirm that all setback requirements have been met. The proposed galley system (#2) has been relocated to avoid impacts to the abutting lot. Setback issues also apply to the galley system at the front of the site as well as other proposed infiltration structures. The proposed system is close to a constructed 3:1 slope although the 100 year storm elevation appears to be approximately at the elevation of the base of the slope. The plans also indicate an infiltration trench beyond the galley system that is not included in the hydrology model.

Septic system locations have been added, as noted there appear to be issues that could affect the location of some systems due to required setbacks between septic systems and stormwater infiltration systems. Galley 2 is close to a steep slope, the submittal should document that there will not be a breakout issue at the toe of the proposed fill slope.

Based on a review of the HydroCAD model and making some corrections as noted under other comments, the model has significant error messages that should be corrected. This is beyond the level of effort of checks that this office was making as part of this review. HydroCAD is not designed to model every pipe and catch basin in a storm sewer network although it is possible to create such a model. Eliminating many of these structures from the model would eliminate many of the error messages and would simplify the model.

I recommend that the easement be of sufficient size to allow excavation including an area for both an excavator and soil storage. The easement may be adequately sized, but the easement should be indicated on the grading plans to confirm the limits of the easement are sufficient.

Satisfied.

There are five proposed drywell/leaching pits proposed based on the calculations. One is located in the area mapped as HSG B soils and would

likely not have the infiltration rate used in the calculations unless soil conditions differ from mapped data. As noted soil testing at proposed locations will be required. Subject to other requirements, leaching pits can be used for rate control but at this time there is insufficient data to determine their suitability for this site.

The revised plans have one drywell/leaching pit at the location of an existing low area on site. The plans also indicate infiltration trenches connecting to the drywell but they are not included in the hydrology model. This issue should be addressed. As noted, no testing at the proposed drywell/leaching pit has been performed and is required to comply with DEP regulations.

Leaching trenches are no longer proposed. As noted it is unclear what the test number is at the drywell to confirm suitable soil conditions.

The calculations also include an infiltration trench. Infiltration trenches can be used for rate control subject to appropriate design, etc. At this time there is insufficient data to determine the suitability for this site.

Two infiltration trenches are proposed to collect runoff from Lot 2. Both of these trenches, as indicated on the plans, are inconsistent with the calculations. Infiltration trenches should have a level bottom, which may be proposed but is not detailed properly on the plans and details. The lengths are different than indicated by scaling the plans. There should be some soil testing at the proposed trench locations. The trenches are both located on steep slopes in some portions of the trench and the DEP Handbook has specific setbacks from steep slopes. In one case the trench is within 150 feet of a wetlands where a 150 foot setback is listed in the Handbook. As noted, septic systems are not indicated but should be a minimum of 50 feet from an infiltration trench.

Infiltration trenches are no longer proposed.

A bioretention area has been added to the rear of Lot 1. Bioretention areas are not credited with runoff rate control according to the DEP Handbook. They are allowed and encouraged for treatment and are suitable for infiltration under Standard 3 if suitable soils are present. The design should include the location of the overflow spillway, which is utilized in the 10 and 100 year storm. It may be desirable to use a different BMP for this location as treatment of the lawn area is not required and bioretention areas are not for rate control but are acceptable for treatment systems and recharge of small volumes. If used the design should have a greater depth of planting soils. The detail references a landscape plan that is not included in the set.

The bioretention area has been converted to a grass depression, which is not a BMP in the DEP Handbook. It should be changed to a system in the Handbook that is suitable for use as both a rate control and infiltration structure.

A sand filter has been added to the design in the front yard of Lot 2. These BMP's are not credited with rate control and should be designed for

treatment only. This system should be modeled with a flow through the sand of 2 in./hr. over the infiltration surface relative to TSS removal sizing.
No longer proposed.

There are three subsurface plastic chamber infiltration systems. One each for half of the roof on Lot 1 and Lot 2 and another that infiltrates runoff from the front of Lot 2 including the driveway, after treatment through the proposed sand filter. As noted testing at proposed locations should be performed. The system that collects the front yard of Lot 2 is proposed to connect into the roadway drainage system. Typically, this has not been allowed on past projects. Ultimately the design of the roof collection system should be provided as these systems are proposed to collect the 100 year storm.
Direct infiltration of roof runoff is no longer proposed.

The Rational Method calculations are not included in the Report and will be required to be performed for the 100 year storm for CB 3 & 4 as they would convey the 100 year storm to the infiltration galleys. Alternatively, the bypass could be accounted for in the calculations. Grate capacity should be part of the analysis.

The rational method calculations were modeled in HydroCAD for the 10 year storm. The analysis did not include the 10 year storm or the inlet capacity analysis at the grates which is required to confirm that the model accurately addresses flow to the catch basins and bypass. There is a calculation for a curb inlet, but it is not consistent with the plans, or standard designs in this area as the opening is in excess of the grate width.

A separate Inlet Report has been submitted. I note the following that should be clarified or addressed in this Report:

- The C value for new pavement should be 0.9 not 0.85 as used.
- The Tc values appear longer than typical and no supporting documentation has been provided. Mass DOT recommends a Tc of 5 minutes for the first inlets with the time extended based on pipe length within the system. A chart is provided but the flow paths and cover are different than used in the hydrology analysis.
- The specific model used should be identified.
- The runoff coefficients in the model are inconsistent with other analysis provided.
- The inlet capacity uses a “FHWA HEC-22 Generic” grate. No data on this grate has been provided to determine if it is consistent with the proposed grate.
- The results indicate bypass at all inlets, which has not been accounted for in the hydrology calculations.

I recommend a simpler analysis of the width of flow in the gutter based on the rational method calculations and adding structures as required to capture the flow similar to what was done at Patterson Pond.

Additional information is required to demonstrate compliance with this Standard.

Additional information is required to demonstrate compliance with this Standard.

Additional information is required to demonstrate compliance with this Standard.

Standard 3 – Recharge to Groundwater

The design would result in an increase in impervious area. The difference in impervious area over the existing conditions should be infiltrated in accordance with the standard.

It is proposed to infiltrate some of the proposed impervious area in the galley system and individual drywell/leaching pits. As noted soil testing is required for both groundwater depth and soil suitability. The Report should include all of the data required in the DEP Handbook including an adjustment for the percentage of impervious area captured, time to drain, etc.

Comment remains relative to testing as required in the DEP Handbook. Only data for Galley system 2 has been provided in the Report.

Some unwitnessed testing has been performed but as noted it is not feasible to compare the soil logs with the plan data to identify the locations of the tests. A “shallow grass depression” is not a stormwater BMP in the DEP Handbook. An alternative system listed in the Handbook should be used at this location.

It is likely that this Standard could be met based on my observations of soil conditions; however, additional documentation is required to demonstrate that the submittal complies with this requirement.

As noted, soil testing is required, subject to successful soil testing it is likely that this Standard would be met, although as noted under other sections some design data is required for some aspects of the design as well as clarification between plans and calculations.

This Standard likely could be met but as noted soil testing locations should be clarified and an alternative to the shallow grass depression should be proposed.

Standard 4 – 80% TSS Removal

This standard requires that runoff be treated to remove 80% of total suspended solids (TSS) prior to discharge.

Since it is assumed that highly permeable soils exist pretreatment prior to infiltration of 44% TSS removal is required. The site is also in a Zone II, which requires 44% pretreatment. Specific treatment measures should comply with the DEP Handbook.

No data on TSS removal has been provided. There are catch basins, and infiltration systems proposed. It is required to improve conditions over existing conditions so the area tributary to Cushing Street would need improvement although there is currently an area of impervious pavement at the roadway the extent of impervious roadway is increased at this location.

The revised design lists the following treatment trains for various areas based on the TSS forms in the Report. I note that the Report is not consistent with the TSS forms in some areas but the TSS forms are required and provide an easy basis for assessment. I have noted discrepancies between the Forms and Report in my comments.

Revised TSS removal forms have been provided. Refer to comments under specific systems below.

DP 1 Cushing Street

Existing impervious areas associated with abutting lots are not required to be treated and the plans would direct runoff from the northerly abutter along a proposed roadside swale and a small area of untreated roadway into Cushing Street directly. I note that there would be an increase in untreated impervious area tributary to Cushing Street although the areas is small, the submittal should document compliance with the Regulations.

The following treatment train is proposed for the roadway portion:

Deep Sump Hooded Catch Basin – There are two catch basins which receive less than ¼ acre of impervious area and are properly designed to receive 25% TSS removal credit as listed in the Form.

Stormceptor 450i Proprietary Units – The TSS form lists “Organic Filter” with 80% TSS removal, which is not accurate. Stormceptors have been typically credited with 30% TSS removal on other projects as is recommended in this case as well. I note that the TSS removal credit for a proprietary system is discretionary based on the Board’s review of data provided.

The removal rate has been changed to 30% as recommended. The systems are likely the appropriate size but the submittal should include the DEP conversion calculations and supporting flow data from the manufacturer.

Subsurface Infiltration Galley (Galley 1) – The TSS form lists this as a “Dry Well” but it is larger than a typical dry well. Subject to adequate pretreatment, which has not been provided based on previously accepted criteria, and adequate soil testing, this system could provide 80% TSS removal.

Satisfied subject to justification of the Stormceptor sizing.

DP 2 North

This area would only have a portion (1/2) of the Lot 1 roof, which is to be collected in a subsurface infiltration chamber system, as the only impervious area requiring treatment. Roofs are considered clean relative to pretreatment but do require 80% TSS removal. This would be achieved in the proposed chamber system subject to adequate test results. No TSS form submitted but

in this case only one system, which would provide adequate treatment, is proposed.

Roof infiltration through a subsurface system is no longer proposed. A “shallow grass depression” is proposed but is not a DEP recognized BMP. An alternative system should be proposed for this area. The only impervious area tributary is the roof and pretreatment of roofs is not required.

DP 3 South

This area would only have a portion (1/2) of the Lot 2 roof, which is to be collected in a subsurface infiltration chamber system, as the only impervious area requiring treatment. Roofs are considered clean relative to pretreatment but do require 80% TSS removal. This would be achieved in the proposed chamber system subject to adequate test results. No TSS form submitted but in this case only one system, which would provide adequate treatment, is proposed.

Roof infiltration through a subsurface system is no longer proposed. It is proposed to have driveway runoff flow over a grass filter strip over 50 feet long to a swale on the northerly side of the house and then to the drywell/leaching pit. The filter strip would provide 45% TSS removal after establishment of the grass. The drywell should be sized for the Water Quality Volume (WQV), based on my calculations it is large enough to hold the WQV.

DP 4 Westerly Wetlands

The following treatment train is proposed for the roadway portion:

Deep Sump Hooded Catch Basin – There are two catch basins which receive less than ¼ acre of impervious area and are properly designed to receive 25% TSS removal credit as listed in the Form.

Stormceptor 450i Proprietary Units – The TSS form lists “Organic Filter” with 80% TSS removal, which is not accurate. Stormceptors have been typically credited with 30% TSS removal on other projects as is recommended in this case as well. I note that the TSS removal credit for a proprietary system is discretionary based on the Board’s review of data provided.

The removal rate has been changed to 30% as recommended. The systems are likely the appropriate size but the submittal should include the DEP conversion calculations and supporting flow data from the manufacturer.

Subsurface Infiltration Galley (Galley 2) – The TSS form lists this as a “Dry Well” but it is larger than a typical dry well. In this case the roadway would have 44% pretreatment and this system would provide 80% TSS removal.

The Galley system would still comply.

The following treatment train is proposed for a portion of the Lot 1 and Lot 2 driveways. No TSS form has been included for this aspect of the design:

Sand Filter – A sand filter properly sized with adequate pretreatment can provide 80% TSS removal. I recommend that the data listed for design criteria in the DEP Handbook be reviewed as sand filters should be off line units and sized in accordance with various listed references. In this case no supporting documentation has been provided but the design is consistent with the detail in the Handbook. More supporting documentation and an off-line configuration should part of the design. It is possible that there is a sufficient length of grass between the driveways and the sand filter to achieve pretreatment but this should also be documented.

Subsurface Infiltration Chamber – The proposed sand filter would flow into a subsurface infiltration chamber. This system would receive 80% TSS credit as designed subject to any modifications to the sand filter maintaining 44% pretreatment credit.

I note that ½ of the Lot 1 and Lot 2 roofs are directly piped to the Galley 2 roadway system. This has not been the practice of the Board and the Applicant may need to consider alternative systems for these areas.

No longer proposed.

The submittal should include all supporting data for proposed BMP's to justify the design and sizing, etc.

Comment remains relative to Stormceptor units.

This Standard would not be met based on the minimal data provided.

Additional data is required to demonstrate compliance with this Standard.

Subject to providing the water quality volume to flow conversion data and confirmation of the acceptable flow in the Stormceptors this Standard would be met.

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

The site is located in a Zone II and would be considered a critical area.

Insufficient data has been provided to demonstrate compliance with this Standard.

Some of the design would meet requirements for a critical area but there needs to be some supporting documents, additional testing and the Galley 1 system would not meet pretreatment requirements for a Zone II area based on allowances for TSS removal previously accepted for Stormceptor units.

Refer to comments under other Standards. The “grass depression” is not a listed BMP and some support data for the Stormceptors is required.

Standard 7 – Redevelopment Projects

The site could be considered a partial redevelopment. Only the portion of the site that would have relaxed standards is the small existing impervious area in the roadway. For areas with existing impervious coverage it is necessary to demonstrate that it is not feasible to comply with the regulations. As noted there would be an increase in impervious pavement tributary to Cushing Street.

Insufficient data has been provided to demonstrate compliance with this Standard.

The submittal does not consider the project a redevelopment project.

Standard 8 – Erosion/Sediment Control

This Standard requires development of plans and narrative data to control erosion and sedimentation resulting from the removal of vegetation, etc. as a result of construction. In this case the work area would exceed the one acre of disturbance threshold and an EPA NPDES Permit and SWPPP would be required.

No data has been provided, an Erosion and Sedimentation control plan should be provided consistent with DEP requirements.

No data has been provided.

This Standard has not been met.

This site will require a SWPPP as over an acre of disturbance is proposed. I recommend that a draft SWPPP be submitted prior to the close of the public hearing and that no work commence on the site until the SWPPP is approved by the Town.

A draft SWPPP has been provided and will be reviewed under separate cover.

Standard 9 – Operation and Maintenance Plan

An Operation and Maintenance Plan (O&M) was not provided.

The revised submittal includes an O&M plan.

I note that this is a complex system with many elements and will likely have a high maintenance cost, in particular if a BMP needs to be repaired or replaced.

Catch basins – Catch basins should be inspected four times per year according to the DEP Handbook.

The design has been simplified significantly from the prior submittal.

Infiltration trenches – Infiltration trenches should be inspected every six months at a minimum. The trenches should include a monitoring well that should be inspected as part of the normal inspection to identify if the capacity of the soil to infiltrate has diminished. The O&M discusses swales leading to the infiltration trenches that are not clearly identified on the plans.

No longer proposed.

Subsurface Galley Systems – These systems should be inspected a minimum of twice a year.

Satisfied.

Drywell (Leaching Pit) - This system should be inspected a minimum of twice a year.

Satisfied.

Subsurface Chamber Systems – These systems should be inspected a minimum of twice a year.

No longer proposed.

Sand Filter – These systems should be inspected a minimum of twice a year. The O&M should include requirements to remove a section of the sand layer as listed in the DEP Handbook.

No longer proposed.

Bioretention system – I recommend that the Bioretention Maintenance Schedule included in the DEP Handbook be included in the O&M.

No longer proposed.

A Shallow Grass Depression is now proposed. This is not a stormwater BMP in the DEP Handbook. As noted an approved system should be proposed at this location.

Stormceptor – I recommend that the Manufacturer's maintenance manual be included in the O&M.

Satisfied.

I recommend that the O&M plan be included in the deeds as a requirement.

I recommend that the O&M plan be included in the deeds as a requirement.

This could be a condition if the project is approved.

This Standard has not been met.

Additional modifications to the O&M as discussed above should be included in the Report. I recommend that a standalone O&M with a plan identifying the location of the various BMPs be provided prior to any occupancy permits if the project is implemented.

The requirements have generally been met, except that a shallow grass depression is not a BMP.

Standard 10 Illicit Discharge

There does not appear to be an illicit discharge connection. The signed certification should be provided.

A Certification has been provided for a project on Whitehead Road in Cohasset.

Reportedly this has been corrected but it was not found in the Reports.

This Standard has not been met.

This Standard has not been met.

The required data should be provided in accordance with this Standard.

- (3) Review by the Board of Health as to Suitability of the Land
Chessia Consulting Services will be reviewing the project for the Board of Health. It is unclear when the Board of Health will act on the submission.

The Board of Health will need to act on the project prior to approval by the Planning Board.

The Board of Health will need to act on the project prior to approval by the Planning Board. Based on my prior review for the Board of Health, additional witnessed testing is required on Lot 1.

- (4) Review by Other Officials

It is unclear the status of review by other Town agencies and other utilities. Since work is proposed in the existing public way and drainage from the proposed roadway would discharge to the existing public way, the DPW should comment on the proposed design. I also recommend public safety officials review the plan for both access and sight distance issues.

I defer this issue to the Board.

I defer this issue to the Board.

Section 4 Design Standards

A. General

No comment required this section addresses general approval requirements.

B. Streets (or Ways)

- (1) Types of Streets

The proposed Street is being submitted as a Private Local Street although based on the Regulations it would need to be submitted as a Limited Residential Street. Although there are only two lots the overall length of the street exceed the maximum allowed length of 300 feet and there is no provision for the waiver requested in the Regulations. It may be feasible

to modify the existing right of way to have a 300 foot long roadway to have a Private Local Street. I have reviewed the remainder of this section assuming that the Applicant intends to comply with the requirements for a Limited Residential Street.

The revised plans propose a shorter roadway that would comply with the length for a Private Local Street.

(2) Location of Streets

(a) General: I recommend that public safety officials comment on the roadway relative to safety and access. The plan include sight distance data assuming that only 150 feet of sight distance is required. I note that this is for vertical curves within the subdivision not at intersections.

Comment remains, the plans and supporting documents should include what would be required to comply with the requirements, what is or can be provided with removal of trees, etc. and what mitigation to address the inability to meet sight distance requirements is proposed.

Vanasse & Associates have reviewed sight distance requirements and the Applicant has agreed to comply with their recommendations.

(b) It is unclear if the proposed roadway conforms to the Master Plan.

(c) Based on the topography and wetlands as indicated on the plans it does not appear desirable to have the street project to another property.

(d) The Board should comment on the attractiveness of the layout.

(e) The plans do not include a reserve strip. Although there is a long strip along the southerly side of the roadway, the adjacent property has frontage on Cushing Street.

(f) The property does not cross into another municipality, this requirement is not applicable.

(g) As this is a modification to an existing layout it is unclear if any changes to the layout at Cushing Street should be required. Cushing Street would likely be considered a Major or Secondary Street based on the definitions and the standards of this intersection could be greater than for a less traveled roadway. This section requires that the existing roadway meet the design standards for intersections.

The revised plans would modify the layout as well as create an additional lot as initially proposed. A plan of the intersection has been provided on sheet 9. The grades along Cushing Street should be listed on the plan. Some but not all are listed. It does not appear that Cushing Street as it exists meets grade requirements at the intersection. A waiver would likely be required from this requirements.

The Response indicates that a waiver may be required but one has not been requested. The plans should specify whether the grades

meet requirements and if not request the waiver or modify the grade in Cushing Street.

(3) Width, Alignment and Grades of Streets

As noted I have reviewed this section assuming a Limited Residential Street.

Current comments in this section are for a Private Local Street.

(a) Sight distance data has been provided for the intersection with Cushing Street but it does not comply with requirements. Stopping sight distance would comply for vertical curves within the site.

Comment remains a waiver would likely be required from this section.

A waiver has not been requested and would be required. The design would meet AASHTO standards based on the 85 percentile speed subject to implementation of Vanasse & Associates recommendations.

Table 1:

The proposed right of way is 40 feet wide as required for a Limited Residential Street.

This also meets requirements for a Private Local Street as proposed.

The proposed pavement is 20 feet wide as required for a Limited Residential Street.

This also meets requirements for a Private Local Street as proposed.

Cape cod berms are proposed and comply with the requirements.

This also meets requirements for a Private Local Street as proposed.

No sidewalk is required or proposed.

This also meets requirements for a Private Local Street as proposed.

There is no curve to the street and therefore no centerline radius requirement.

This also meets requirements for a Private Local Street as proposed.

The centerline grade is proposed to be 5.4% maximum which meets the maximum allowable grade of 8% for a Limited Residential Street.

The revised plans have a maximum grade of 5%. This meets requirements for a Private Local Street.

The centerline grade is proposed to be 2.4% minimum which meets the minimum allowable grade.

The centerline grade is proposed to be 3% minimum which meets the minimum allowable grade.

The curb radius for the pavement is 30 feet as required at the intersection with Cushing Street.

This also meets requirements for a Private Local Street as proposed.

The pavement depths comply with the requirements.

This also meets requirements for a Private Local Street as proposed.

The gravel subbase is proposed as the 12 versus 24 inches required.

A waiver has been requested to install 12 inches of gravel. This is not required as 12 inches is the requirement for a Private Local Street.

This waiver is no longer requested.

- (b) Cushing Street would likely be a Major Street with a 500 foot sight distance requirement or a Secondary Street with a 250 foot sight distance requirement. It is unclear if a speed study has been performed to determine required sight distance based on 85th percentile speed. The Board should make a determination on the type of Street and requirements for a speed study.

A waiver from this section has been requested. To support the waiver, I recommend that the plans and supporting documents include what would be required to comply with the requirements, what is or can be provided with removal of trees, etc. and what mitigation to address the inability to meet sight distance requirements is proposed.

A waiver has been requested from this section but subject to the implementation of the recommendations to provide adequate sight distance based on the 85 percentile speed, this regulation would be met. The waiver should be from subsection (a) above.

- (c) (listed as (d) in the Regulations) The Plan includes a sight distance evaluation (Sheet 8). The starting point should be in the exit lane not the centerline and other points should also be where the vehicle would be in the lane. The plan requires removal or trees or trimming, this should be clarified as to the extent. Based on observations there is minimal sight distance available. I recommend that the points required for sight distance be marked in the field for observation. It is not known if Cushing Street is a scenic way. As noted I disagree that sufficient data to use a sight distance on Cushing Street of 150 feet has been provided.

A sight distance plan has been provided. As noted I recommend that the Board review the data and consider having their transportation engineer review the data.

As noted this issue has been discussed and the recommendations of Vanasse & Associates should be considered as a condition if the project is approved.

- (b) No slope easements are proposed. I note that there is a wall within a portion of the right of way.

No further comment, the Board should determine if a slope easement will be required for the existing retaining wall.

No further comment, the Board should determine if a slope easement will be required for the existing retaining wall.

- (c) The angle of the right of way complies with the 60° angle requirement.
 - (d) The proposed roadway does not appear to be within 200 feet of another roadway.
 - (e) The proposed intersection angle of the pavement is close to 90° not applicable.
 - (f) The plan does not comply with leveling area requirements. A waiver has been requested.
The revised plans comply and this waiver is no longer requested.
 - (g) The proposed vertical curve meets stopping sight requirements.
 - (h) It is not proposed to connect to the Town Sewer system, this section is not applicable.
- (4) Dead End Streets
- (a) The proposed roadway is a dead end street. It is proposed to obtain a waiver to construct a Private Local Street but a waiver for a longer roadway is not allowed so it is assumed that the roadway would be a Limited Residential Street.
The revised plans conform to length requirements for a Private Local Street.
 - (b) A waiver has been requested to construct a hammerhead type turn around. The Fire Department should comment on this design.
This waiver is still requested.
This waiver is still requested.

C. Subsurface and Storm Drains

- (1) Compatibility and General Design
- The existing site currently drains mainly to the wetlands to the south and west side of the site, with the roadway pitching toward Cushing Street. Some runoff flows to on-site depressions. It is unclear how roadway runoff near Cushing Street will be addressed as there is no proposed system at the intersection as required.
A subsurface infiltration galley system is now proposed at the intersection. Refer to comments under Section 3 (2) s. above.
Refer to comments under Section 3 (2) s. above.

The calculations indicate that there would not be an increase in runoff but other factors are also required to be addressed.

There are some issues with the design that will need to be addressed as identified in other sections.

There are some issues with the design that will need to be addressed as identified in other sections.

(2) Groundwater Interception

The roadway would be installed in part within exposed and underground ledge areas. It is assumed that groundwater would be present above the ledge and a subdrain is proposed. The subdrain is proposed to discharge into Cushing Street or be buried according to the plans. More data is required regarding this design.

It is proposed to connect the subdrain into the infiltration system. This is not recommended as it will reduce the available capacity of this system. Although there is ledge in the roadway, if soils are suitable and there is no groundwater it may be better to waive the requirement for subdrains, or over excavate the ledge to provide greater depth to groundwater.

As designed a waiver would be required or the Board would have to determine the that capped end is a suitable discharge location.

(3) Storm Drains

A storm sewer system is proposed for part of the roadway. Storm drain calculations should be provided. It is not recommended to use HydroCAD for storm sewer design. In this case the storm sewer network would be required to be sized for the 100 year storm.

Comment remains. There were some Rational formula HydroCAD calculations provided but not for the 100 year storm. Although the 100 year storm is not typically used for storm sewer design the model depends on the flow being collected and conveyed by the storm sewers in a 100 year storm.

Rational analysis has been provided refer to comments in Section 3 C (2) s. under Standard 2.

(a) There are two catch basins proposed. The proposed spacing of the catch basins complies with the requirements, except that there are no catch basins at the intersection with Cushing Street as required. Based on the plans there would be a low point on the northern corner of the intersection. The design does not comply with the Regulations.

The revised plans have added two Stormceptor inlet basins near the intersection.

The revised plans have two catch basins draining to the rear system and four to the front galley system.

(b) Two manholes are proposed. Manholes meet the requirements.

No further comment required.

(c) There are no culverts proposed, this section is not applicable.

(d) Insufficient data has been provided regarding the storm sewer system to determine compliance with velocity requirements. Pipes are all 12" diameter or greater and have sufficient slope to meet requirements. The galley system inlet would be above the 10 year storm as required. There is no outlet or connection to a natural

waterway or existing system. All systems should have an emergency overflow even if the 100 year storm is contained.

Data on velocity has been provided but it is based on a routing methodology not the peak flow under the Rational Method required. A waiver has been requested relative to connection to an existing system.

The Inlet Report includes velocity data. As noted there are some issues with this analysis. It is likely that velocity would be acceptable except that catch basin laterals may be below minimum velocity. This is commonly the case as there is minimal flow in the catch basin laterals.

The waiver is still requested relative to connection to existing systems.

- (e) The only outlets are associated with the drywell/leaching pits on the lots and these may not require a headwall. A four inch overflow outlet is proposed.

A pipe outlet from Galley 2 is proposed but based on the calculations there would be no flow out of the system even in the 100 year storm.

This aspect of the design has not changed.

- (f) Not applicable, the site is not subject to tidal action.
- (g) Not applicable there is no connection to the public drainage system nor is there any likely extension through the property for a future municipal drainage system.

D. Open Drainage Systems

This calculations include infiltration trenches, these could be considered an open drainage system. A portion of the system on Lot 2 is located in a very steep slope.

The plans are unclear regarding the design of any swales as they are not identified on the plans but there are swales discussed in the Report.

Swales are no longer proposed, the grass depression could be considered an open drainage system but it is proposed to function as an infiltration basin not a swale or channel.

E. Stormwater Management Structures.

A subsurface system is proposed for the roadway drainage, and all of the drywell/leaching pits for roof and yard runoff are subsurface systems. A waiver will be required to allow construction of the subsurface systems. There are systems on both Lots 1 & 2. The galley system is located in an easement, not on a separate lot, and the drywell/leaching pits are not in either an easement or on a separate Lot. A waiver from this section is required as the roadway would be a Limited Residential Street based on length.

There are several different stormwater management structures proposed. There are roadway drainage systems, lot specific drainage systems and connections between systems. I note that past projects did not include private lot drainage connections to the roadway systems.

The stormwater management system has been simplified. The Galley 2 system is located in an easement. Lot drainage does not directly connect into the roadway drainage system. Refer to other comments.

F. Easements

(1) The plans include an easements for the galley system only. The easement is listed as to the benefit of the Town. Town Counsel should review this aspect of the proposal.

I defer this issue to Town Counsel. I recommend that the Site Plan include the easement as it also indicates the proposed galley system.

Satisfied.

(2) It is unclear if there is any municipal drainage from other roadways that discharges to the wetland area and if the Town would require any additional easements. The river is not located on the property but part of the site is in the FEMA flood plain associated with the river.

I defer this issue to the Board.

I defer this issue to the Board.

G. Sidewalks

A sidewalk is not required for a Limited Residential Street.

A sidewalk is not required for a Private Local Street.

H. Lots

The lots appear to comply with the applicable zoning requirements of the district.

I have witnessed some prior soil testing but test data has not been provided. More data will be required to demonstrate conformance with the Board of Health, including locations of existing system and potential locations of proposed systems. Soils are generally suitable but the northern part of the site has shallow to ledge areas. Additional soil testing will be necessary for the septic systems and drainage.

Test data has been provided but more testing is required to comply with Board of Health requirements. The Response acknowledges that additional testing will be required.

More testing will be required to meet Board of Health requirements. I recommend that the Board obtain Board of Health comments on the plans.

M. Open Space

No open space is proposed. This is a small subdivision; the Board should determine whether requiring open space is reasonable in this case.

J. Protection of Natural Features

The plans specify some of the trees which are to be removed as a result of this project. As noted there is a row of trees on Lot 2 that provide a buffer to the abutter. These would be removed to install the water main. The Board should review this aspect of the design.

More data on existing trees has been provided. The Board should review this aspect of the design.

The Board should review this aspect of the design.

K. Cases In Which Ways Are Not Adequate

Cushing Street would be considered adequate for access subject to safe sight distance at the location of the proposed intersection.

The Board should address the sight distance issue.

This issue would be addressed by implementation of the recommendations in the Vanasse & Associates review.

L. Municipal Services

(1) The plan does not indicate the size of municipal utility services in Cushing Street as required.

An 8 inch water main stub has been installed according to the Response. The location of the stub should be added to the plans. The existing water main is listed as a 12 inch pipe.

Satisfied.

(2) No information on sleeves for utilities is included on the plans.

Not addressed, it is unclear if any sleeves will be required.

The Response states that they do not believe any sleeves will be required.

(3) Municipal sewer is not available, this section is not applicable.

(4) I recommend that the applicant obtain a letter from Aquarion regarding water service. It is proposed to install a hydrant near the end of the roadway.

The Response indicates that the Weir River Water System is reviewing the plans.

(M) I recommend that the Fire Chief comment on the water system relative to fire protection. A new hydrant is proposed near the end of the roadway.

It is unclear if the Fire Chief has commented on the plans.

The Board should request comment from the Fire Chief, if not received.

(6) It is unclear if a fire alarm box will be required for this short roadway. It is my understanding that alarm boxes may be phased out.

- (7) It is typical for the electric system to be designed after approval of the plans. I recommend that the Board obtain comments from the Municipal Light Board. It does not appear that street lights are proposed.
The Board should obtain comments from the Hingham Municipal Lighting Plant if they have not been received.
The Board should obtain comments from the Hingham Municipal Lighting Plant if they have not been received.
- (8) It is typical for the telephone system to be designed after approval of the plans and in coordination with the electrical system.
No further comment required.
- (9) Underground cable utilities are partially proposed for the project. It is proposed to leave an existing pole and overhead wires a distance of approximately 100 feet from Cushing Street.
The Board should review the location of the existing pole to remain.
The Board should review the location of the existing pole to remain.

L. Soil Surveys

Test pit locations and logs have not been provided. Soil testing will be required at the proposed locations of stormwater and wastewater disposal systems.
Existing test data has been provided and the locations of tests are also indicated. As noted, additional testing will be required.
Refer to other comments, additions test logs have been provided, but they are not labeled on the plans.

M. Foot Paths, Bridle and Bicycle Paths

Not applicable there are no paths indicated on the plans and a Limited Residential Street does not require paths.

Section 5

Most of these sections are applicable to the construction phase. I have listed those sections that would require Board approval as part of the Application.

A1. General

I recommend that a note be added to the plan referencing the requirement that construction comply with all aspects of this Section of the Regulations, unless waived.
Satisfied.

B1. Subdivision Layout

No Comment required.

C1. Clearing, Grubbing and Excavation

I recommend that a note be added to the plans specifying these requirements. The limit of work should be indicated relative to excavation of slopes in fill sections. *A note has been added discussing clearing limits. I recommend that the note be revised to include other aspects of this section.*
Satisfied.

D1. Excavation/Backfill

I recommend that a note be added to the plan referencing this section of the Regulations. On site soils may be suitable as backfill material subject to testing to confirm the gradation.
Satisfied regarding fill, the plans indicate required removal limits.

E1. Disposal of Surplus and Unsuitable Material

It is unclear if this site has excess material that will need to be removed from the site. No earthwork calculations have been performed. The Board may request the location that material will be taken and the amount of trucks required, etc. if there is excess material. The Board may want to restrict trucking to avoid conflicts with school buses.
Based on the revised plans there is an excess of cut. The Board may request the location that material will be taken and the amount of trucks required, etc. if there is excess material. The Board may want to restrict trucking to avoid conflicts with school buses.
I defer this issue to the Board.

F1. Test Pits

As noted testing for drainage structures will be required. In addition, this section requires exploratory testing to determine pipe elevations in the roadway where conflicts may exist. The Plans should reference this requirement.
Some testing in the roadway has been performed. I recommend that the water main stub be added to the plans as that may conflict with the proposed drainage system.
Satisfied.

G1. Excavation for Structures

No comment required the Contractor should be aware of these requirements.

H1. Trench Excavation

No comment required the Contractor should be aware of these requirements.

I1. Miscellaneous Trench Excavation

No comment required the Contractor should be aware of these requirements.

J1. Below Grade Excavation

No comment required the Contractor should be aware of these requirements.

K1. Rock Excavation

No comment required the Contractor should be aware of these requirements. It is anticipated that rock excavation will be required.

L1. Drainage and Stormwater Management

- (1) Refer to comments under Section 3 C (2) s. and Sections 4 C, D, E &F.
Refer to comments under Section 3 C (2) s. and Sections 4 C, D, E &F.
Refer to comments under Section 3 C (2) s. and Sections 4 C, D, E &F.
- (2) No catch basin to catch basin connections are proposed, the plans comply with this requirement.
- (3) A note requiring compliance with MassDOT specifications should be added to the plans.
The Response indicates that Note 4 on Sheet 5 is responsive to this requirement but it discusses trucking, not materials and methods as required under this section.
Satisfied.
- (4) The design does not provide a minimum of 2.5' of pipe cover as required. It is likely that the design could be revised to comply.
Satisfied.
- (5) Catch basin details comply with the requirements. Granite curb inlets are not proposed, a waiver would be required.
The waiver is no longer requested, although the plans indicate a cape cod berm not a granite throat inlet. The Report includes calculations for a throat inlet.
No longer an issue, throat inlets are not required if cape cod berm is approved for the roadway. The detail for setting catch basin grates complies with requirements.
- (6) The catch basin detail complies with requirements.
- (7) The manhole detail complies with requirements.
- (8) A subdrain is required due to ledge on-site. The plans indicate a subdrain but no detail or outlet has been provided.
A detail has been provided but does not comply with the Regulations for pipe material or the depth of stone over the pipe based on MassDOT details.
Generally addressed, the trench should be lined with filter fabric and the depth is confusing as the depth to the top of stone should be 4 feet and the variable depth would be to the surface.
- (9) No outlet pipes excepting from drywell/leaching pits are proposed. The Board should determine if headwalls are required.
No further comment based on the revised design.
- (10) A tide gate would not be required for this subdivision.
- (11) No comment required the Contractor should be aware of these requirements.
- (12) No comment required the Contractor should be aware of these requirements.

M1. Culvert Piping

(1) RCP pipe is proposed, the trench detail should include the requirements listed in this section.

The detail should specify M 1.03.0 type c or screened gravel for pipe bedding, although suitable material is likely available on-site the Regulations reference the above listed materials in subsequent sections. Backfill is required to be gravel within the roadway.

Satisfied.

(2) No drain outlet is proposed.

N1. Stormwater Management Structures

The DPW should review the plans under this section.

O1. Fine Grading and Compaction Subgrade Area

No comment required the Contractor should be aware of these requirements.

P1. Lot Grading/Drainage

An easement to drain roadway runoff into DW2 would be required.

No longer applicable, although the Town has typically not allowed lot drainage systems to connect to the roadway system.

Satisfied.

Q1. Catch Basin and Drain Manholes

The design meets requirements relative to number of pipes in a manhole and pipe angles. The Contractor should be aware of the other construction requirements.

R1. Pre-Cast Manhole and Catch Basin Materials

No comment required the Contractor should be aware of these requirements.

S1. Catch Basins (built)

Not applicable, precast catch basins are proposed.

T1. Manhole Construction Methods

Not applicable, precast catch basins are proposed.

U1. Drop Inlets

Not applicable, no drop inlets are proposed.

V1. Dry Wells/Leaching

Dry Wells/Leaching Pits are proposed on the individual lots. It is unclear if the proposed units are required to comply with this section as they would not ever be the responsibility of the Town.

There is one leaching pit proposed the other on-lot systems are chamber type systems.

I defer this issue to the Board, the drywell proposed is for lot drainage only.

W1. Raising Casting Construction

No comment required the Contractor should be aware of these requirements.

X1. Construction Method for Frame and Cover Construction

No comment required the Contractor should be aware of these requirements.

V1. Concrete Materials for Adjusting Sewer or Drain Castings Collars.

No comment required the Contractor should be aware of these requirements.

Z1 Construction Methods for Concrete Placement

No comment required the Contractor should be aware of these requirements.

Based on the revised plans the following specific sections would require redesign or waivers.

It is unclear if a waiver will be requested from section J3 as it has been difficult to obtain the required gravel on other recent projects.

A waiver from J3 has not been requested.

X3 Side Slopes

It is proposed to have a four foot shoulder sloping away from the roadway and then a 2:1 slope up to existing grade. The Regulations would require a flatter slope as the adjacent grade is less than 10 feet above the roadway except near Sta. 2+00. Also refer to A4 below. A waiver would be required.

The plans now propose a four foot shoulder then a 2:1 slope to existing grade within the right of way. A waiver has been requested from this Section.

A4 Landscaping (Grass Plot, Side Slopes, Street Trees)

This section references the typical cross section together with other requirements for loam and seed. The submittal does not comply with the Typical Cross Section in the Regulations and a waiver would be required.

This Section requires construction to be consistent with the Typical Cross Section. The typical cross section requires an 8.5 foot shoulder pitching at 1/4" per foot to the roadway then grading would be a maximum of 2:1 but in accordance with X3 above which has lesser slopes depending upon the height of the cut or fill. A waiver from this section would be required.

B4. Street Trees

Street trees are located in the right of way not on private lots within a 10 foot offset as required.

A waiver has been requested from this Section.

The remaining sections have specific construction material and installation requirements. I recommend that the Plans include notes requiring that the materials and methods conform to the Planning Board Specifications as described in Section 5.

Satisfied.

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