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May 11, 2020

Planning Board and Conservation Commission
Town Hall
40 Center Street
Fairhaven, MA 02719

RE: Lewis Landing, Fairhaven, MA.
Proposed Multi-Unit Residential Development
Huttleston Ave.

Dear Planning Board and Conservation Commission Members:

GCG Associates, Inc. has reviewed the following information for the Lewis Landing Multi-Unit Residential Development off Huttleston Avenue in Fairhaven, MA with respect to stormwater and Stormwater related requirements under 310 CMR 10.00 Wetlands Protection Act Regulations.

Plan References: "Lewis Landing, Fairhaven, MA. Proposed Multi-Unit Residential Development, Huttleston Ave., Fairhaven, MA prepared by Prime Engineering, Inc. dated September 9, 2019, last revised February 14, 2020.

Documents: Drainage Report prepared by Prime Engineering, Inc. dated February 18, 2020.

Based upon our review of the above information, we offer the following general comments and comments with respect to compliance with Town Bylaws: Chapters 192 – Wetlands; 194 - Stormwater Management, Illicit Discharge, Soil Erosion, Sediment Control By-Law; 198-31.1 – Zoning - Stormwater Management and 310 CMR 10.00 Wetlands Protection. The numerical section of the regulations is referenced at the beginning of each comment unless it is a general comment. Prime Engineering responses shown in *Italic* and GCG latest comments in **Red**.

GENERAL PLAN AND DEVELOPMENT COMMENTS

The following are general comments with respect to the plans and development of the project.

1. This is a vacant parcel located at the south side of Huttleston Avenue (U.S. Route 6) across street from New Boston Road as identified as Assessor's Map 31 Lots 115A & 117C. The parcel consists of 2.463+/- acres.

2. The applicant has filed a Notice of Intent for a Multi-Unit Residential Development consists of four 3-unit buildings, two storage buildings, one maintenance shed and associated pavement parking lot and utilities. The proposed work area is over 1 acre and requires filing an US EPA - NPDES permit and associated SWPPP. (NPDES NOI shall be filed 14 days prior to construction start.)
3. The proposed work limit also exceeds the Land Disturbance Permit (Chapter 194) threshold and requires filing a permit with the Fairhaven Board of Public Works.
4. The proposed multi-family site development in RC Zoning District requires a Planning Board Special Permit approval per Chapter 198-29. Which requires site design in compliance with Chapter 198-31.1 Stormwater management standards. Hence, stormwater management design is being reviewed to meet 198-31.1 requirements.
5. The project is located within Zone X, Area of Minimal Flood Hazard, (FIRM 25005C0413F, effective 7/7/2009), two series (A1- A-30 and B-1 to B-6) of wetland resource area were identified on the property and requires to file a Notice of Intent with the Fairhaven Conservation Commission and MassDEP.
6. There is no NHESP estimated habitats of rare wildlife or rare species identified in the site vicinity per MassGIS.

PLAN SET

Cover – No comment.

Drawing Sheet -1 – Existing Conditions Plan.

1. Wetland delineation line shown was based on a plan by Allen D. Quintin, dated January 11, 2017 and was not field located by Prime Engineering, Inc. Wetland delineation shown on the plan and Non-Jurisdictional Isolated Land Subject to Flooding status require Conservation Commission review and approval. *The Conservation Commission has approved the wetland line. Resolved.*
2. Plan shown three drain pipes (10"?, 15" and 18") connect to the on-site wetland south of wet flag #A-10, and a dilapidated drainage manhole. The 15" drainpipe appears to collect Huttleston Avenue surface runoff through a pair of catch basins located in front of development site and discharges to the wetland without a benefit of an easement. GCG recommends obtaining an easement to preserve the right of the existing drainpipes. *A drainage easement will be granted to MassDOT and the Town. Applicant to prepare easement. Once the project is approved, an easement will be granted. Applicant to prepare easement after approval. Easement should be provided as part of the approval conditions.*
3. Existing drainage inverts along Huttleston Avenue should be identified on the plan. Assuming the existing 15" and 18" drainpipes have three feet of cover over pipe and they will be exposed at the bottom of proposed constructed wetland basin. *The inverts have been surveyed and elevations have been added to the plans. The plan shown 12" RCP inlet at the Huttleston Ave. culvert and 18" RCP underneath Route 6 and at the downstream DMH. Assuming the pipe size at the bottom of proposed wetland basin is 18", the top of the concrete pipe (with 2.5" pipe thickness) is at elevation 59.9. and pipe bell will be exposed above the basin bottom at 60.0+/- . The side slopes at this location is 2H:1V. without an access drive. Pipe cover should be provided. There will be no vehicle traffic in the constructed wetland, so a localized protuberance of a pipe bell will be of no consequence. Pipe cover will not be provided. MSH requires cleanout sediment in basin/wetland system once every 10 years. GCG recommends mounting a foot of rip-rap stone cover over the*

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two existing RCPs. The rip-rap stones allow water to flow through and protecting the pipes during sediment removal. Development footprint had been substantially reduced; pipe cover no longer an issue, resolved.

4. Additional soil testing should be performed at the proposed wetland basin area to identify ESHGW by mottling. Applicant needs to proof sufficient water table to support the constructed wetland vegetation. 198-31.1(B)(2)(A)(1)[h] requires soil logs signed by a DEP Certified Soil Elevator. *The test pits were recorded by an approved Soil Evaluator who has signed the existing conditions plan on which the logs are presented. There was no mottling in the 5 feet of fill. The presence of muck at 5 feet is indicative of the water table. Submit Soil Evaluator signed copy to Conservation Commission. The test pit logs are presented on Sheet 1, Existing Conditions, and the signator of that sheet is an approved Soil Evaluator, therefore, the requested signed soil log has been provided.* Resolved.

Drawing Sheet 2 – Site Layout and Landscaping Plan.

1. Proposed infiltration area vegetation should be cleared and replaced with loam and seed for maintenance. A cleared access path should be provided.
2. Relocate planting along edge of pocket wetland to provide maintenance access.

Drawing Sheet 3 – Grading and Utilities Plan

1. The proposed roof drain chamber infiltration practices are considered UIC Class V Well by US EPA and required to comply with the MassDEP setback requirements. The proposed 4-unit chamber between storage building #2 and south 3-unit building does not meet the 50' wetland setback and 10' building foundation setback; the 2-unit chamber west of storage building #1 does not meet the 10' foundation setback requirement; the single unit chamber northeast of maintenance shed does not meet the 10' foundation setback and 10' open, surface drain (rain garden) setback requirements. *The infiltration southeast of Storage Building 2 has been deleted. Since this is a re-development project consisting of Type C and D soils, the infiltration only needs to be to the extent practicable. The infiltrators west of Storage Building 1 have been shifted to be east of Building 1. Only the existing pavement area qualified for re-development project and requires maximum extent practicable treatments. (See MSH Vol. 2 Ch. 3 Checklist for Redevelopment Projects.) Project components within undeveloped areas must meet all the standards.* The expanded chamber units east of storage building #1 does not meet the 15 feet setback to Downhill slope (3:1) setback. (Applicant should consider rotate the chambers 90 degree and move it southward and provide 3:1 basin side slope at the chambers location.) The proposed system calculations should show compliance with the MSH 65% rule (Vol.3, Ch. 1, Pg. 27). Additional infiltration BMP may be required to meet the 65% rule and Fairhaven Zoning Bylaw 198-31.1-4 (C)(a)[2] - Water Quality Storm treatment requirements. *The infiltration units east of storage building # 1 has been relocated to achieve the 15-foot separation from a 3:1 slope. The increase in impervious area on the site is 32,883 SF proposed impervious, minus 5,475 SF existing impervious= 27,408 SF. 65% of 27,408 SF is 17,815 SF that must be infiltrated. The roof areas being infiltrated is 12,102 SF. A waiver is being requested. Based on the latest HydroCAD report, the proposed impervious area is 37,427 SF (including 5,475 SF pre-development pavement), the required recharge volume for 'C' soil is 779.7 CF. The current plan has provided 795 CF of recharge volume through roof drain chambers infiltration system. The proposed recharge volume meets the MSH requirements and roof drains are considered clean water per MDEP and does not require treatments. Nonetheless, MSH stated that "When less than 65% of impervious surface on a site are directed to infiltration BMPs, the system cannot capture sufficient runoff to infiltrate the*

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Required Recharge Volume” (Vol.3, Ch.1, Pg.27). The proposed design does not meet the 65% rule and the applicant is requesting a waiver. This is MSH requirement and part of the Wetland Protection Act (MGL Ch.131 Sect. 40), the Commission could grant a waiver for the requirements. However, MDEP could supersede the decision. GCG recommends the applicant to provide an adjusted recharge volume based on MSH Vol.3, Ch.1, Pg.28. to justify the waiver request. Alternately, the applicant may consider berm up down stream of the splash pool outlet and create an infiltration basin at the south side of proposed maintenance shed. Since the runoff has already treated through the constructed wetland. Zoning-Chapter 198-31.1 C.2(j) allows the basin to act as stormwater systems for both water quality and volume control. Furthermore, 198-31.1 C.2k[3] & [4] allow the bottom of the infiltration area at or above the maximum high ground water elevation, with calculations assumed the surface of the volume control structure to be impervious. Identify roof sections to be connected to Chambers system. The infiltration area proposed at downstream of pocket wetland outfall should be utilized to comply with the MSH recharge volume and the 65% rule. 198-31.1.C(2)k[2] allows “Infiltration for volume control shall be designed and constructed with the bottom of the infiltration area at or above the maximum high ground water elevation.” The proposed infiltration area bottom elevation and outline should be provided on the grading plan (to evaluate side slope). Infiltration area should be cleared and replace with loam and seed with an access path for maintenance.

2. 198-31.1(C)(2)(g)[6] – requires basins/ponds designed for stormwater runoff control shall have side slopes at a no steeper than a 4H to 1V grade. And a ten-foot wide bench surround any permanent pool. 2:1 and 3:1 side slopes proposed. *The eastern slope of the basin has been flattened to a 4:1 slope to provide access by foot. Applicant has requested a waiver, see comments below. A waiver is being requested. The applicant has provided an accessible 4H to 1V side slope on one side of the sediment forebay and the micropool, where sediment forebay requires annual maintenance/clean-out. The constructed pocket wetland requires clean out sediment at least once every ten year and MSH does not specify the minimum side slope of constructed wetland. Granting a waiver for the local requirement of 4H to 1V side slope should not have any impact to the function of the drainage system. This basin will be maintained by the private owner association. GCG does not see any adverse impact for granting the waiver. However, MDEP has the jurisdiction over the required 15 feet wide access path around the construction wetland. The proposed constructed pocket wetland BMP with sediment forebay pre-treatment meets the pollutant removal rate as required by 198-31.1.C(1). And 198-31.1.C(3)(d) allows the Board to approve other water quality BMPs which meets the pollutant removal requirements. The proposed forebay has 4:1 side slope on one side and 2:1 on the other sides. Forebay side slope does not meet MSH's maximum 3:1 side slope standard. However, the forebay is accessible on one side. Proposed pocket wetland has 2:1 slope on two sides and 4:1 slope at the ends. MSH does not specify a minimum side slope for constructed wetland. Waiver for 198-31.1©(2)(g)[6] has been requested.*
3. 198-31.1(C)(2)(k) - Forebays [1][b] requires forebays to be sized to contain 0.25 inches per impervious acre of contributing drainage and [d] requires forebay be four feet deep. *The forebay has been deepened to be 4 feet and contain .25 inches of runoff over the impervious area. Applicant has requested a waiver for the 4:1 side slope, see comments below. No response necessary. A waiver is being requested. See Comment #2 above. 0.25 inches per impervious acre volume has been provided.*
4. 198-31.1(C)(2)(l) - Fence enclosure for the stormwater basin may be required, depends on permanent pool depth. *The Planning Board will decide whether a fence will be required. Planning Board approval is required. Fence and planting location should be incorporated with the basin maintenance access. A waiver is being requested. Planting has been proposed on the north side of the constructed pocket wetland. The applicant should be responsible for replacing any damaged planting and vegetation during the once every ten years pocket wetland maintenance. GCG does not see any adverse impact for granting*

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this waiver. This comment was to alert that fence enclosure was not proposed, and the Board may require fence enclosure as deems necessary under Section 198-31.1(C)(2)(I). There is no waiver required unless the Board ask for fence.

5. 198-31.1(C)(2)(n)[6] – CB-1 pipe (all pipes) should have a minimum 24" cover, proposed HDPE pipe requires a waiver. *Pipes are required to have 2 feet of cover where they are subjected to vehicle loads. A waiver is being requested since no pipe with less than 2 feet of cover will be subjected to vehicle loads. A request to allow HDPE pipe is being made. The proposed CB-1 frame and grate to 12 pipe invert has 2.18 feet separation. The pipe wall is approximately 2" thick, that left 12" between the top of the pipe to rim grade. The proposed CB frame has a thickness of 3.5" and the concrete structure top slab thickness is 8". There is no room to physically fit a CB hood. GCG recommends raising the driveway grade to provide additional pipe cover at CB-1. Trees has been proposed at the west side of the micropool and the only access to the wetland basin is over the CB-1 outlet pipe. GCG recommends applicant to provide sufficient pipe cover to support maintenance equipment/vehicle loads. The elevations have been adjusted so the hood can fit. Resolved.* Please verify the inverts at the 18" HDPE & existing 18" RCP crossing. The 18" RCP invert appears to be 125'+/- from upstream headwall. The proposed 18" HDPE pipe slope should label 0.0143 ft/ft (per HydroCAD report and pipe inverts) instead of 0.02 ft/ft. The two pipes have 0.68' separation. Pipes with less than 18" separation should be encased in concrete. The proposed 18" HDPE pipe is used to handle a 3" orifice flow with 0.37 cfs during the 100-year storm event. Applicant may consider reducing the pipe size to gain addition separation between the two pipes.
6. 198-31.1(C)(4)(a)[2] – requires 48-hour detention time for the water quality (198-31.1(A)(1)(b) - First Flush = (1.25"), see 198-33 Definitions) storm. *The 48-hour detention time requirement only applies to extended detention basins (that are in the Nasketucket Basin zone). The subject site is not in the Nasketucket Basin zone and the proposed basin is not an. This section is required for 80% total suspended solids, 30% total phosphorus, and 15% total nitrogen removal only. (For development within the Nasketucket Basin would require additional treatment to removal 30% nitrogen and 50% phosphorous per 198-31.1 (A)(b)[2], which would require a wet extended detention pond/basin (WP).) Please provide the 1.25" storage volume below the outlet orifice or request a local regulation waiver. A constructed pocket wetland has been selected due to its superior performance compared to extended detention basins. Infiltration units were rejected due to the poor soils, high water table and their inherent propensity to failure. In accordance with the MassDEP Stormwater Manual, the following are projected removal rates:*

Removal Efficiency	Nitrogen	Phosphorous	Total Suspended Solids
Constructed Wetlands	20-55%	40-60%	80%
Extended Detention	10-30%	15-50%	50% Basins

It is clear the proposed treatment system meets the performance standards of Fairhaven Stormwater Management regulations. GCG concurs with the % removal efficiency listed above per MSH. The applicant should request a waiver for 198-31.1(C)(4)(a)[2]. Alternately, the applicant may request Board approval of other water quality (constructed pocket wetland) MBPs which provided the pollutant removal requirements, per 198-31.1(C)(3)(d).

198-31.1(C)(4)(a)[1 & 6] – requires establishment of, and the methodology with which to maintain, wetland vegetation on the bottom of the basin. *This also only applies to extended detention basins. Extended detention basins contain water most of the time since on average it rains every three days. The proposed pocket wetland basin will not have that problem. As stated in comment #6 above, these two requirements apply to this development. However, item (4)(a)[1] requires a minimum contributing watershed area of 10 acres is not feasible to enforce, since the development site is only 2.463 acres. GCG recommends applicant to*

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request a waiver. Item (4)(a)(6) has been proven that the proposed basin bottom at 59.00 is below the estimate seasonal high ground water at 59.3. In addition, the basin may require modification to provide the 1.25" storage volume. The Fairhaven regulations require that, if an extended basin is being designed, it needs a 10-acre plus contributing drainage area. The proposed constructed pocket wetlands are suitable for drainage areas of 1 to 10 acres. (The Site is an area of 2.46 acres). No below the outlet storage volume is required in a constructed pocket wetland. The applicant should request a waiver for 198-31.1(C)(4)(a)[1]. The subject site is less than 10 acres, and the applicant has limited control of the offsite drainage. The proposed pocket wetland bottom is below seasonal high ground water and suitable for wetland vegetation growth. Applicant should request Board approval of other water quality (constructed pocket wetland) MBPs which provided the pollutant removal requirements, per 198-31.1(C)(3)(d).

7. MSH Vol.2, Ch.2, Pg. 45 - requires constructed stormwater wetland to have an emergency spillway capable of bypassing runoff from large storms without damage to the impounding structure. The proposed basin has an emergency spillway at the top of the basin control structure. The spillway can handle the 100-year storm without damage to the impounding structure. The 23" diameter inlet grate and 15" HDPE at 0.5% slope, both do not have the capacity to handle the 7.83 cfs inflow during the 100-year storm event. The emergency spillway should be sized with brimful conditions, without any outlets. (Considering the orifice and open grate are both clog during the extreme storm.) The armored spillway should be located near the outlet structure southwestward and allow overtop the private driveway and flows to the onsite wetland. Spillway should be sized to eliminate overflow onto Huttleston Ave. Attachment B demonstrates that the emergency spill water (inlet grate) has the capacity to pass the 100-year storm. If that failed, the excess flow would go over the drive to the wetlands. Resolved. New proposed emergency spillways (pocket wetland and infiltration area) dimensions should be shown on the plan,
8. MSH Vol.2, Ch.2, Pg. 45 – requires an access for maintenance. A waiver of the 15% slope access drive is being requested. This is MSH requirement and under MassDEP's jurisdiction and subject to potential Superseded Order of Conditions. The Conservation Commission approval should not be responsible for future MassDEP actions. The applicant is also requested waiver for the 4:1 side slope requirement under 198-31.1 (c)(2)(g)[6]. GCG recommends a minimum of 3H:1V side slopes along the sediment forebay area, (as also required by MSH), and provide a minimum of 10' wide access path along the basin area with steeper than 3H:1V side slope. The proposed sewer line at the northeasterly corner of sediment forebay should be relocated, the sewer pipe as shown is above the forebay finish grade. The applicant should show a reasonable maintenance access to support the waiver request. A 4: 1 slope has been provided on the east and west ends. The sewer line has been shifted in order to provide more cover. The sediment forebay and pocket wetland layout provided a reasonable maintenance. Granting a waiver should not have any adverse impact to the system. In addition, the system will be maintenance by private contractor with appropriate equipment. The proposed forebay side slopes do not meet MSH requirements but is accessible with the one side 4:1 slope. A 10 feet wide access path has been provided along the top of pocket wetland. (landscape planting is proposed along the access path, may consider relocating planting to clear the maintenance access.
9. Forebay inlet pipe slope should be labeled. The slope of the pipe has been labeled. Resolved.
10. DMH to Forebay rim should be specified. The rim of the manhole has been added. Resolved.
11. Verify there will be enough cover on top of the two existing 15" and 18" drainpipes. There is adequate cover over the 15" and 18" diameter pipes since they will not be subjected to vehicle loads. The top of existing 18" RCP is at the wetland basin surface. The construction wetland requires clean out sediment in basin/wetland system once very 10-year per MSH. Pipe cover or similar protection should be provided. We certify that the basin as designed

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will be easily maintained. GCG recommends mounting a foot of rip-rap stone cover over the two existing RCPs. Resolved.

12. Provide pre-treatment in front of rain garden per SMH Vol. 2, Ch.2, Pg. 25. *A grass filler strip has been added in front of the rain garden. Please clarify the proposed curb location, there is no curb or cape cod berm specified on the plan, a cape cod berm detail was included in the plan sheet 5 of 7, but not called out on the plan. (GCG recommends cape cod berm be installed in the binder course surface instead of top course) and the contour at this location did not indicate any grade changes along the pavement. MSH requires a vegetated filter strip with a stone diaphragm, to promote sheet flow, for rain garden pre-treatment (See MSH Vol.2, Ch.2, Pg.26 for design requirements.) As in standard protocol the curbing is called out on the Site Layout Plan (showing curbing on the Grading and Utilities Plan would make that plan cluttered and difficult to read). The Cape Cod berm detail has been revised. The grass strip filter has been modified. Resolved.*
13. *Show forebay bottom contours 57, 58, 59 and 60.*
14. *Show infiltration area bottom elevation and contour and outline bottom area, Infiltration area should be cleared with loam and seed suitable for maintenance per infiltration basin standard and provide maintenance access path. Since the stormwater has been treated through sediment forebay and pocket wetland, the water met the pollutant removal requirements and the bottom of the infiltration area are allowed to be at or above the maximum high ground water elevation per 198-31.1(C)(2)(k)[3].*
15. *Infiltration basin side slope should not exceed 3:1. And should be equipped with 1 foot freeboard.*

Drawing Sheet 4 – Erosion Control Plan

1. The Construction entrance (exit) should have a minimum length of 50 feet. *The construction entrance has been lengthened to be 50 feet. Resolved.*
2. Silt sack should be installed at the east entrance catch basin on Huttleston Avenue. *Silt sacks have been added to the Huttleston Avenue catch basins. Resolved.*

Drawing Sheet 5 – Detail Sheet-1

1. No comment
2. *Rename Detention Basin Outlet structure to Pocket Wetland Outlet Structure. Verify 15" diameter opening, plan shown 18' pipe outlet pipe. Detail labeled Cross Section A-A but no plan view. Specify the top of structure with frame and cover.*
3. *Orifice Plate Detail labeled outlet control structure (see detail). Add outlet control structure detail to plan. Clarify structure type, this detail shown flat wall surface, and plan shows round structure. Orifice plate material should be called out.*
4. *Verify drainage pipe trench detail called for 5' minimum cover.*

Drawing Sheet 6 – Detail Sheet-2

1. *Splash pool surface dimension should be called out (or show on the utilities plan). The splash pool has been dimensioned. Resolved.*
2. *Rain Garden should consist of 2" – 3" mulch on top of 2.5' to 4' thick Planting Soil (Engineered soil mix for bioretention systems designed to exfiltrate, MSH Vol.2. Ch.2 Pg. 26). The mulch and underlying soil has been dimensioned and detailed. The soil layer depth dimension should match with the label. The soil as specified is suitable for MassDOT planting soil, but not for exfiltration. Please refers to 30" minimum depth of Engineered Soil Mix with 40% sand, 20-30% topsoil, and 30-40% compost as specified on MSH Vol.2. Ch.2 Pg. 26. The detail has been revised as requested. Resolved.*

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3. Show constructed wetland detail to indicate required volume for deep marsh and shallow marsh. *The percentages of the deep and shallow marsh areas has been specified. Please include the detention basin calculations % area table in the plan set. The pocket wetland ratios are presented on Detail Sheet 2 and Attachment A. Resolved.*
4. Pocket wetland bottom elevation of 60.0 is above the estimate seasonal high ground water. (ESHGW at 59.3 per TP #1). Pocket wetland should be excavated to the groundwater table to maintain adequate water levels. (MSH Vol.2, Ch.2, Pg.41)
5. Micro pool bottom elevation is at the 3" orifice invert at 60.0. Micro pool should have sufficient depth before the outlet to prevent clogging. Provide a micro pool capacity of at least 10% treatment volume. (MSH Vol.2, Ch.2, Pg.45).
6. Water quality volume should be provided below the outlet orifice invert.
7. Crushed Stone Filtration Berm detail called out on pocket wetland cross section; detail should be provided.
8. Provide emergency spillway detail.

Drawing Sheet 7 – Architectural

1. No comment

STORMWATER REPORT COMMENTS

1. 198-31.1(C)(2)(k) - Forebays [1][b] requires forebays be sized to contain 0.25 inches per impervious acre of contributing drainage. *The forebay has been sized for .25 inches per impervious contributing area. The 0.25 inches volume has been provided. However, the proposed 2:1 side slope does not meet MSH requirements and the sewer pipe is above the forebay surface. The sewer pipe has been relocated. Resolved.*
2. 198-31.1(A)(1)(b) - requires treatment of the Water quality (First Flush = (1.25" of entire impervious area on site), see First Flush definition for calculation formula (198-33). 1.25 inch of runoff from the site will be routed through the storm treatment system. **The 1.25" water quality storm should be provided within the wetland basin with 48 hours detention time. 198-31.1(C)(4)(a)[2].** *The water quality volume will pass through the constructed pocket wetland and receive the required treatment. This is not an extended detention basin, so there is no need for 24-hour detention. Attachment A demonstrates that the constructed pocket wetland meets the design criteria. GCG concurs that the proposed pocket wetland meets the % removal efficiency requirements. Applicant should request a waiver for 198-31.1(A)(1)(b). Show the bottom and stage pocket wetland contour, pocket wetland should be excavated to the groundwater table, and update calculation sheet.*
3. 198-31.1(A)(1)(a)[2] - No increase will be allowed in the volume of runoff off of the site up to the ten-year, twenty-four-hour design storm. The proposed drainage calculations shown increase of runoff volume during 2-year and 10-year storm events. *A waiver on not increasing the volume of runoff is being requested. The poor onsite soils are not suitable for infiltration. The applicant has requested a waiver for the runoff volume increase during the 2-year and 10-year storm events. Based on the HydroCAD report the pre-development and post-development runoff volume during 10-year storm event were 0.269 and 0.411 acre feet, respectively. This requirement is under local regulation and is not required by the MSH. This regulation would require approximately additional 6,000 square feet of infiltration area to contain the post-development runoff volume increase, based on the HSG 'C' site soil with 72 hours draw down time. A waiver is being requested. The latest HydroCAD calculations shown a net increase of post-development runoff volume of 0.149 AF and 0.148 AF during the 2-year and 10-year storm events, respectively. MSH has no requirement for post-development runoff volume control. The Applicant has requested a*

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waiver for the runoff volume increases. In order to meet the volume control requirements, the applicant would have to create an additional infiltration basin at the south and southeast sides of the proposed maintenance shed. 198-31.1(A)(1)(a)[2] waiver has been requested. Please verify DP-1 pre-development and post-development volumes shown on the drainage summary, it should match with the HydroCAD report. The plan proposed an infiltration area downstream of pocket wetland outfall. Plan calls for 1,750 S.F. 400 CU. FT. of storage which is 0.23 feet depth. The infiltration area is wooded and would be impossible to maintain the required volume without proper maintenance. This area should be sized as an infiltration basin per MSH standard to control the post-development volume up to the 10-year storm event. Infiltration area/basin calculations should be included in the HydroCAD report.

4. 198-31.1(C)(2)(n)[1-7] – storm drainage system capacity should be calculated based on 25-year storm event. *The pipes have been sized to carry the 25-year design storm. CB-1 grate capacity was calculated based on 0.25' head over the grate, the surface water will excess beyond the 3' gutter width. (C)(2)(n)[3]. GCG recommends to replace CB-1 with 5' diameter double grates catch basin. Double grates have been added as requested. Resolved.* The proposed single catch basin grate is located at the development entrance and is at capacity (with ponding) during the 25-year storm event. GCG recommends installing a double catch basin grates with 5' diameter structure.
5. Please provide roof drain infiltration unit storage volume calculations to meet Groundwater Recharge volume. *The roof infiltration computations were presented on the bottom of sheet 3. There appears to be less than 65% of the site impervious area drains into the infiltration BMPs. Storage volume calculations should be increased per MSH Vol.3, Ch.1, Pg.27 with sample calculations shown on pg. 28. The calculations as presented was based on the MSH requirements and does not meet the Fairhaven Water Quality Storm requirements, a waiver was requested for increase of runoff volume above. A waiver has been requested. See Drawing Sheet 3, item 1 comment. Infiltration area/basin calculations should be credited for the recharge volume, with the roof drain chambers to meet the 65% rules.*
6. The proposed Rain Garden requires pre-treatment to qualify for 90% TSS removal. *A grass filler strip was added upgradient of the rain garden. A grass swale was proposed, a vegetated filter strip with stone diaphragm should be used. The 10-foot filter strip has been added. Resolved..*
7. Please verify pre-development paved parking area. The two sub-catchments combined 7,889 s.f. of pavement area. GCG scaled approximately 5,550+/- s.f. *The pre-development paved area has adjusted to 5,488 square feet. Resolved.*
 198-31.1(C)(4)(a)[2] - provide water quality volume (First Flush) 24 hour detention volume. *The 24-hour first flush detention time applies only to extended detention basins which are required in the Nasketucket Basin. The subject site is not in the Nasketucket Basin. The 24 hour detention is required for 80% total suspended solids, 30% total phosphorus, and 15% total nitrogen removal only. (For development within the Nasketucket Basin would require additional treatment to removal 30% nitrogen and 50% phosphorous per 198-31.1 (A)(b)[2], which would require a wet extended detention pond/basin (WP).) Refer to response to Grading and Utilities Item 6. Based on MSH's Constructed Stormwater Wetlands listed Pollutant Removal Efficiencies, the proposed pocket wetland meets the % removal efficiency requirements of 198-31.1(C)(4)(a)[2]. GCG recommends the applicant request a waiver for the 24 hour detention of First Flush volume. Applicant should request Board approval of other water quality (constructed pocket wetland) MBPs which provided the pollutant removal requirements, per 198-31.1(C)(3)(d).*
8. *Reduce pocket wetland outlet pipe size to gain separation between drainpipes. The proposed 18" pipe carries 0.37 cfs during the 100-year storm event.*

OPERATIONAL AND MAINTENANCE (O&M) PLAN COMMENTS

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1. Temporary Erosion Control should include catch basin silt sack. *Silt sacks have been added. Resolved. Silt sacks (on-site and off-site) should be included in the construction phase erosion control plan.*
2. Long term O&M plan 4.0 should include catch basin, street sweeping, constructed wetland, splash pool and rain garden operation and maintenance schedule. *The maintenance of catch basins, street sweepers, constructed wetlands, etc. have been added. Catch basin should be inspected and cleaned 4 times per year. Constructed pocket wetland shall be inspected twice a year for the first 3 years and clean out forebay once a year. Clean out sediment in basin/wetland once every ten years. Rain garden should be inspected monthly & remove trash. Vegetated filter strip mow 2-12 times per year. Mulch, fertilize, remove dead vegetation and prune annually. The Operation and Maintenance Plan has been modified. GCG recommends to remove the detention basin item from the O&M plan; The infiltration units and inlet shall be inspected twice a year; Catch basin should be inspected and cleaned 4 times per year; Pocket wetland forebay should be clean out once a year, pocket wetland should be inspected twice a year for the first three years, clean out sediment in basin/wetland system once every 10 years; Rain garden should be inspected & trash removed monthly, mow 2 to 12 times per year, mulch, fertilize, remove dead vegetation and prune annually; Disposal of removed sediment and debris according to federal, State and Local Regulations. Include infiltration area/basin in the permanent stormwater O&M Plan*
3. O&M plan should provide a signature block for responsible party/operator signature. *A signature block has been added. Resolved.*
4. O&M plan should include estimated annual operation budget and long-term O&M (sample) log. *The annual budget and log have been added. Update per comment #2. The Operation and Maintenance Plan has been revised. See Comment #2 above. Include infiltration area/basin O&M.*

Summary:

The proposed drainage system layout and design were based on Massachusetts Stormwater Handbook and did not meet the Fairhaven Chapter 198-31.1 Stormwater management standards.

Waivers requested:

1. *A 4: 1 side slope to the forebay is being provided. It is requested to allow all other slopes to be 3:1 and 2: 1 in order to save the large linden tree and to provide more separation from the wetlands (Section 198-31.1 (c)(2)(g)[6]. A 4:1 slope has been provided at the micropool area but not in the sediment forebay. GCG recommends providing at a minimum of 3:1 side slope (as required by MSH) along the sediment forebay, which requires annual cleaning and provide access path where side slope steeper than 3:1. The applicant has proposed a reasonable maintenance access with a 4:1 slope on one side of the sediment forebay, where annual maintenance is required. Although, the design does not meet the 15 feet width access path as required by MSH, which is under MDEP jurisdiction. Since the pocket wetland requires sediment clean once every ten years and will be maintained by a private contractor. GCG recommends the waiver be considered. Waiver Requested.*
2. *To allow the existing pipes in the detention basin and the proposed pipes that are not under paved areas to have less than 2 feet of cover since they will not be subjected to vehicle loads. Also, to allow HDPE pipe (c)(2)(n)[6]. Cover over the existing 18" RCP should be provided for maintenance equipment loads. Using HDPE pipe with*

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appropriate cover (depth as recommended by pipe manufacturer) in a private development site should have no adverse impacts to the drainage system. The existing RCPs are located at the bottom of constructed pocket wetland, which requires sediment clean out once every 10 years. GCG recommends the 2 feet minimum pipe cover waiver be considered. However, GCG recommends the applicant to install a foot of rip-rap stone over the two pipes for protections during sediment clean out. N/A

3. *The onsite soil is not suitable for infiltration. We request a waiver from not increasing the volume of runoff from the 10 year design storm Section (A)(1)(a)[2]. This is a Town of Fairhaven requirement and as proposed the post-development 10-year storm event would increase the runoff volume from pre-development condition's 0.269 a.f. to 0.411 a.f. It would require approximately additional 6,000 square feet of infiltration area to control the runoff volume. The latest calculations shown an increase of runoff volume of 0.148-acre feet (6,447 cubic feet) during the 10-year storm event. This is a local requirement, MSH does not control the post-development runoff volume. If a wavier is not considered, this would require an addition infiltration basin be designed at the down stream of pocket wetland outfall. Waiver Requested. GCG recommends to properly sizing the infiltration area based on MSH requirements without the required ESHGW separation. Infiltration volume calculations at the downstream of pocket wetland should be included in the HydroCAD report.*
4. *To allow an increase in the volume of runoff since the soils are not suitable for infiltration Section (A) (1) (a) [2]. See comment #3 above. See comment #3 above.*

If you have any questions regarding this matter, please contact our office.

Respectfully Submitted,
GCG Associates

Anthony Ma

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Senior Project Engineer

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