

October 19, 2021

Town of Pembroke
Zoning Board of Appeals
Town Hall
100 Center Street
Pembroke, Massachusetts 02359

Attn: Sabrina Chilcott, Assistant Town Manager
schilcott@townofpembrokemass.org

**RE: Comprehensive Permit Peer Review
River Marsh Village - Water Street
Pembroke, Massachusetts**

Dear Ms. Chilcott and Members of the Board,

As requested, Merrill Engineers & Land Surveyors (Merrill) has completed our review of the most recent submittal of the Comprehensive Permit Application for the above referenced project for compliance under the Town of Pembroke Zoning Board of Appeals Comprehensive Permit Rules and Regulations. This report is based on our review of the submitted documents listed below:

- **River Marsh – Pembroke MA, Comprehensive Permit Application, prepared by River Marsh LLC, 196 pages, undated**
- **River Marsh Village - Comprehensive Permit Plan, Water Street, Pembroke, Massachusetts, prepared by McKenzie Engineering Group, 23 sheets, dated September 22, 2016. Revised September 13, 2021.**
- **Drainage Calculations and Stormwater Management Plan, Comprehensive Permit Plan, River Marsh Village, Pembroke, MA, prepared by McKenzie Engineering Group, dated November 27, 2018. Revised August 31, 2021.**
- **Traffic Impact Assessment, Proposed Residential Development, Pembroke, Massachusetts, prepared by Vanasse & Associates, dated March, 2019.**
- **Response to ZBA Review Report, Comprehensive Permit Plan, River Marsh Village, Pembroke, MA, prepared by McKenzie Engineering Group, dated April 5, 2021.**
- **Subsurface Sewage Disposal System Sizing Calculations, prepared by McKenzie Engineering Group, dated April 5, 2021.**
- **Response to ZBA Review Report, Comprehensive Permit Plan, River Marsh Village, Pembroke, MA, prepared by McKenzie Engineering Group, dated July 19, 2021.**
- **Architectural Plans - River Marsh Village, Water Street, Pembroke, MA prepared by Axiom Architects, dated December 2, 2016.**
- **Updated Waiver List prepared by Baker, Braverman & Barbadoro, P.C. dated June 24, 2021.**
- **River Marsh Village - Comprehensive Permit Plan, Sheets C-1 and D-5, Water Street,**

Pembroke, Massachusetts, prepared by McKenzie Engineering Group, 8 sheets, dated September 22, 2016. Revised September 13, 2021.

- Response to ZBA Review Report, Comprehensive Permit Plan, River Marsh Village, Pembroke, MA, prepared by McKenzie Engineering Group, dated October 12, 2021.
- Response to Ron Muller Review Report, Comprehensive Permit Plan, River Marsh Village, Pembroke, MA, prepared by McKenzie Engineering Group, dated October 12, 2021.

INTRODUCTION/BRIEF NARRATIVE OF PROJECT

The property is located on the westerly side of Water Street approximately 200 feet north of the intersection of Water Street and Church Street (Route 139). It is bordered on the west by the North River and on the east by Water Street. The project site consists of a total area of 49.94 acres, of that 22.53 acres is upland and 27.41 acres is wetlands. A Superseding Order of Resource Area Delineation (ORAD) confirming the wetland resource areas has been issued by Massachusetts DEP. The site is located in the Residence "A" Zoning District and the Business "B" Zoning District. The topography of the site generally slopes in a westerly direction towards the North River.

The project proposes the construction of 56 residential condominium units consisting of 3, 4 and 5 unit building as well as the construction of approximately 2,422 linear feet of roadway, stormwater management system, utilities and parking areas. The units will be connected to a common wastewater treatment plant and subsurface sewage disposal system which is proposed on the southerly side of the property. Access to the property will be provided by two (2) driveways from Water Street. A wetlands crossing is proposed for the construction of the roadway to access the proposed wastewater treatment plant and subsurface sewage disposal system. As presented on the plan, a wetlands alteration area of 188 square feet is proposed and the wetlands replication area of approximately 1,148 square feet is proposed. The stormwater management system will consist of catch basins and manholes which will direct the stormwater runoff from the roadway and some overland areas to a stormwater infiltration basin with outlets to the wetlands.

A number of revisions have been made to the plan since the last August 3, 2021 Public Hearing. A 5'-0" wide bituminous concrete sidewalk with a precast vertical concrete curb along one side of each internal roadway is now proposed. The proposed stormwater management system has been revised to now consist of a large Subsurface Stormwater Infiltration System, a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and four (4) Subsurface Roof Leaching Drywells Systems.

We offer the following comments on the proposal and have organized our comments in order of the referenced sections of the Town of Pembroke Zoning Board of Appeals Comprehensive Permit Rules and Regulations. The format of this report will follow the format and sections outlined in the Rules and Regulations and only addresses areas where comments are required. The report does not include a detailed review of the proposed septic system design.

Our original comments are presented below in normal text with our updated comments, if any, presented in ***bold and italic text***.

COMPREHENSIVE PERMIT RULES AND REGULATIONS

3.01 The application for a Comprehensive Permit shall consist of:

The following is a listing of the items required by the Zoning Board of Appeals shown in *italic print* with our comments noted below.

- a) *Site Control: Evidence that the developer has control over the property in question; a copy of the deed, purchase and sale agreement or option agreement.*

This information has been submitted as part of the Application material referenced above. Since much of the information in the Application is dated 2018, we recommend that it be updated or documentation provided that the information in the Application is still valid.

The Applicant's attorney, Baker, Braverman & Barbadoro, P.C. has submitted a letter on March 8, 2021 which updated the information. Comment satisfactorily addressed.

- b) *Preliminary site development plans showing the locations and outlines of proposed buildings, the proposed locations, general dimensions and materials for streets, drives, parking areas, walks and paved areas; and proposed landscaping improvements and open areas within the site. An applicant proposing to construct or rehabilitate four (4) or fewer units may submit a sketch of the matters in 760 CMR 56.05(2)(a) and 31.02 (2)(c) which need not have an architect's signature. All projects of five or more units must have site development plans prepared by a registered architect or engineer.*

A Comprehensive Permit Plan prepared by a registered professional engineer has been submitted for this project as required. The plan set consists of eight (8) sheets: Existing Conditions Plan, Preliminary Site Layout Plan, Preliminary Grading & Drainage Plan, Preliminary Utilities Layout Plan and Construction Details Sheets 1-4. The dimensions and materials for the roadway are show on the Detail Sheet. The plan shows that the existing dwelling is to be retained. If this is the case, this is extremely close to the proposed Building 2 and additional information should be provided.

A number of revisions have been made to the plan due to the presence of an offsite certified vernal pool. The wastewater treatment plant, soil absorption system, the stormwater infiltration basin and the layout of the buildings has been revised. This also resulted in the elimination of the wetland crossing to the wastewater treatment plant and eliminated all work within the 300 foot Scenic River Corridor. The proposed stormwater management system, which previously consisted of a large Stormwater Infiltration Basin, now consists of a Subsurface Stormwater Infiltration System and an Extended Dry Stormwater Detention Basin.

A number of additional revisions have been made to the plan which are discussed below including the addition of a 5'-0" wide bituminous concrete sidewalk with a precast vertical concrete curb along one side of each internal roadway. The proposed stormwater management system has been revised to now consist of a large Subsurface Stormwater Infiltration System, a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and four (4) Subsurface Roof Leaching Drywells Systems.

The existing dwelling at 274 Water Street is to remain and the plan has been revised to reduce the number of units proposed for Building 2 from five units to three units. The McKenzie Engineering Group (MEG) 4/06/21 Response Letter states that this distance has been increased to 45.3 feet. We recommend that this dimension be checked in as much as the dimensional arrow or the distance appears to be incorrect.

As noted above, the plan has been revised in a number of areas and the distance has been clarified. Comment satisfactorily addressed.

Grading is proposed immediately adjacent to abutting properties at a number of locations. We recommend that a vegetated buffer be provided for those areas of the project abutting residential dwellings. As shown on the plan, no sidewalks are proposed. In order to provide for pedestrian safety along the roadway system, we recommend that sidewalks be provided within the project area and possibly extend off-site. The deck for the northern most unit of Building 10 is extremely close to the roadway. Additional setback distance should be provided from the roadway.

A Preliminary Landscaping Plan, Sheet L-1, has been added to the plans set and the plan has been revised to provide for a 10 foot wide natural buffer in some areas. No specific sizes, number or type of plants are specified; however, Note 1 on the sheet specifies that the landscaping shown is for preliminary purposes only and that the final plan is to be designed and stamped by a Landscape Architect. The Board of Appeals should determine whether this is acceptable. No additional information has been provided relative to sidewalks. As previously stated, in order to provide for pedestrian safety along the roadway system, we recommend that sidewalks be provided within the project area and possibly extend off-site. The location of Building 10 has been revised to increase the setback distance from the roadway from 2 feet to 10 feet.

As previously stated, Note 1 on the Preliminary Landscaping Plan specifies that the landscaping shown on the plan is for preliminary purposes only and that the final plan is to be designed and stamped by a Landscape Architect. The Board of Appeals should determine whether this is acceptable.

The plan has been revised to include thirty-five (35) – 6' tall Green Giant Arborvitaes abutting the rear property lines of #248, #260 and #268 Water Street. The McKenzie Engineering Group (MEG) Response dated August 31, 2021 states that the specific sizes, number or type of other plants will be provided on the final landscaping plan. The Board of Appeals should determine whether this is acceptable.

The McKenzie Engineering Group (MEG) Response dated July 19, 2021, specifies that "Based on anticipated demographics, a sidewalk within the development will not be provided." As previously stated, in order to provide for pedestrian safety along the roadway system, we recommend that sidewalks be provided within the project area and possibly extend off-site. We recommend that a grass strip be provided between the back of the berm and the sidewalk if the roadway edging is to consist of Cape Cod Berm. If no grass strip is proposed, we recommend that the roadway edging consist of cement concrete curb.

A 5'-0" wide bituminous concrete sidewalk with a precast vertical concrete curb with a six-inch reveal along one side of each internal roadway is now proposed. Wheelchair ramps are proposed to be cement concrete with detectable warning panels. We recommend that crosswalks and wheelchair ramps be provided at all legs of the intersection of Road "A" and Road "B". Due to the addition of the sidewalk, the typical roadway section has been revised from two (2) 11-foot travel lanes to two (2) 10-foot travel lanes. The plan does show that the 10-foot travel lane provides adequate lane width; however, it would be tight. It should be noted that the Pembroke Planning Board Rules and Regulations require a minimum 12-foot travel lane. No sidewalks are proposed beyond the limits of the project.

The plans have been revised to provide crosswalks and wheelchair ramps at all legs of the intersection of Road "A" and Road "B". Comment satisfactorily addressed.

Due to the addition of the sidewalk, the typical roadway section has been revised from two (2) 11-foot travel lanes to two (2) 10-foot travel lanes. The plan does show that the 10-foot travel lane provides adequate lane width; however, it would be tight. It should be noted that the Pembroke Planning Board Rules and Regulations require a minimum 12-foot travel lane. No sidewalks are proposed beyond the limits of the project. The (MEG) Response Letter dated October 12, 2021 states that a 40B project is exempt from the Planning Board Rules and Regulations. Some of the turning movements presented on Sheet C-6 of the plans appear difficult and should be reviewed and approved by the Fire Department.

We recommend that the following additional information be shown on the plans:

- Distance between buildings

This information has been added to Sheet C-1 of the plan. The Fire Department should review this information and determine if this is acceptable.

In response to Fire Chief Kenneth McCormick's July 29, 2021 letter the (MEG) Response dated August 31, 2021 states that all building except Building 1 will be equipped with sprinklers.

- Distance along driveway from edge of pavement to garages

This information has been added to Sheet C-1 of the plan.

- Distance from the stormwater basin to units and property line

This information has been added to Sheet C-1 of the plan.

- Roof Drains

This information has not been added to the plan; however, as stated in 04/06/21 MEG Response Letter the stormwater system has been correctly sized assuming all roof runoff will be directed into the infiltration basin. This will need to be confirmed by review of the final construction plans and if approved and acceptable to the Board of Appeals could be made a Condition of Approval.

This information has not been added to the plan. The MEG 07/19/21 Response Letter states that all roof runoff will be directed into the Subsurface Stormwater Infiltration System and the Subsurface Stormwater Infiltration System has been designed accordingly. This will need to be reviewed and confirmed by review of the final construction plans and if approved and acceptable to the Board of Appeals this could be made a Condition of Approval. It appears that a separate system of pipes will be required to convey all of the roof runoff to the Subsurface Stormwater Infiltration System.

The plan has been revised to add four (4) subsurface roof leaching drywells

systems to treat 1-inch off roof runoff for Buildings 5,6,7,8,9,12,13,14,16 and 17. The (MEG) Response dated August 31, 2021 states that these systems will be equipped with a surcharge pipe and splash block. Overflows from these drywells will run overland into the proposed closed drainage system that will outfall into Subsurface Infiltration System 2P located behind Building 10. We recommend that additional soil testing be performed at the location of each of the four (4) subsurface roof leaching drywells systems to confirm the soil conditions and depth to the estimated seasonal high groundwater elevation (ESHW) used in the stormwater management system design and calculations. We were unable to find HydroCAD calculations for the four (4) subsurface roof leaching drywells systems but it appears that these systems will surcharge and flow overland frequently and we recommend that the location of the proposed overflow/surcharge pipes and splash pads be shown on the plan with the associated grading. Typical details and cross sections of these systems is shown on sheet D-7 of the plans. We recommend that the details and cross-sections be revised to show the elevations of each system as well as the ESHW.

The (MEG) Response Letter dated October 18, 2021 states that soil testing will be performed prior to the submission of the final construction plans and outlines four (4) actions, as stated below, which will be required based on the results of the soil testing.

- a. ***If the test pits confirm assumed soil textural analysis and depth to seasonal high groundwater, then no further action is required.***
- b. ***If the test pits indicate more-restrictive soil texture, then the design of the drywell system(s) shall be reevaluated. Results of the reevaluation shall be submitted to the ZBA for review.***
- c. ***If the seasonal high groundwater is found to be less than two feet from the bottom of any drywell system, the system shall be redesigned to provide a minimum of two feet of separation.***
- d. ***Any modifications to a drywell system design shall be submitted to the ZBA for review***

If the project is approved and if acceptable to the Board of Appeals this could be made a Condition of Approval. In any event, we recommend that HydroCAD calculations for the four (4) subsurface roof leaching drywell systems be submitted for review and approval prior to or as part of the submittal of any final construction plans. In addition, we recommend that the location of the proposed overflow/surcharge pipes, splash pads and associated grading as well as specific details and cross sections of these systems be shown prior to or on any final construction plans.

- Designated Open Areas

This information has been added to Sheet C-1 of the plan.

- Landscaping, in particular for the areas in close proximity to abutting property and around the stormwater basin

A Preliminary Landscaping Plan, Sheet L-1, has been added to the plans set and the plan has been revised to provide for a 10 foot wide natural buffer in some

areas. No specific sizes, number or type of plants are specified; however, Note 1 on the sheet specifies that the landscaping shown is for preliminary purposes only and that the final plan is to be designed and stamped by a Landscape Architect. The Board of Appeals should determine whether this is acceptable.

The plan has been revised to include 35 – 6' tall Green Giant Arborvitaes abutting the rear property lines of #248, #260 and #268 Water Street. The McKenzie Engineering Group (MEG) Response dated August 31, 2021 states that the specific sizes, number or type of other plants will be provided on the final landscaping plan. The Board of Appeals should determine whether this is acceptable.

- Estimated earthwork quantities

This information has been added to Sheet C-2 of the plan. As shown the preliminary Estimated Earthwork Quantities the project proposes an excess volume of 28,506 cubic yards which will need to be trucked off site. We recommend that if this project is approved and if acceptable to the Board of Appeals that the submittal of a Construction Traffic Management Plan be made a Condition of Approval.

- Preliminary proposed roadway profiles should be presented to demonstrate that adequate sight distances are provided.

This information has been added to Sheet C-4 of the plan.

- The type of curbing and all curb radii specified

This information has been added to Sheet C-1 of the plan.

- The perimeter of the subject property shown in darker/thicker line type.

This information has been added to the plan.

- Topographic and utility information on Water Street adjacent to the site

This information has been added to the plan.

- Additional topography between the site and Water Street.

This information has been added to the plan.

- Sight Distance triangles at both project driveways

This information has been added to the plan.

- Provisions for Accessible Parking Spaces including details

This information has been added to the plan.

- A Fire Truck Access Plan should be added to the plan set.

Fire Truck Access Plans have been added to the plan set and are shown on Sheets C-5 and C-6. This information should be reviewed and approved by the Fire Department. We recommend that the Inbound Access Plan include the apparatus entering the southerly site roadway (Road B) from the south, the intersection of Water Street and Church Street. In addition, the Outbound Access Plan should include the apparatus exiting the southerly site roadway (Road B) and turning to the south, the intersection of Water Street and Church Street.

The plan has been revised to provide the recommended additional turning movements. Some of the turning movements presented on Sheet C-6 of the plans appear difficult and should be reviewed and approved by the Fire Department.

- c) *A report on existing site conditions and a summary of conditions in the surrounding areas, showing the location and nature of existing buildings, existing street elevations, traffic patterns and character of open areas, if any, in the neighborhood. This submission may be combined with that required in 760 CMR 56.05(2)(a).*

Information on the Existing Conditions has been provided. An Overall Map at a scale of 1 inch = 250 feet is presented on the Comprehensive Permit Plan and a USGS Locus Map is provided in the Drainage Calculations and Stormwater Management Plan showing the location and nature of existing buildings and existing streets. As required, a detailed Transportation Impact Assessment prepared by Vanasse & Associates Inc. discussing both existing and future conditions has been submitted for this project. A peer review of the Transportation Impact Assessment is being performed by Ron Muller & Associates and is being submitted as a separate document.

Soil Logs for soil testing performed in 1992 were included in the submittal. We recommend that the plan be revised to label all test pits and that additional updated soil testing be performed regarding the existing soil conditions and depth to estimated seasonal high

groundwater (ESHW) since these conditions have a significant impact on the design of the proposed stormwater management system and proposed subsurface sewage disposal system. We recommend that the soil testing results be shown on the plan. The depth to groundwater as well as the infiltration capabilities of the soil will have a significant impact on the size and elevation of these systems. This may impact the building placement as well as the elevation of the roadway and consequently the total amount of fill which may be necessary for construction.

Additional updated soil testing has been performed within the limits of the proposed stormwater infiltration basin as recommended. The soil testing indicated that the ESHGW ranges from elevation 7.5 to elevation 9.4. The proposed bottom elevation of the Stormwater Infiltration Basin is 11.5 which provides a groundwater separation of 2.1 feet. A mounding analysis is required when the separation from the bottom of an infiltration basin to ESHGW is less than four (4) feet and the basin is used to attenuate peak discharges from the 10 year or higher 24-hour storm. The HydroCAD calculations do not take into account infiltration for the 10 year or higher 24-hour storms and consequently the separation to ESHGW meets the MassDEP minimum criteria of 2.0 feet.

Additional soil testing was performed at the specific locations of the Subsurface Stormwater Infiltration System and the Extended Dry Stormwater Detention Basin on May 17 and 18th 2021. The Subsurface Stormwater Infiltration System has been designed to provide 4 feet of separation from the bottom of the system to estimated seasonal high groundwater (ESHGW) and consequently the separation to ESHGW meets the MassDEP minimum criteria of 4.0 feet. The Extended Dry Stormwater Detention Basin has been designed to provide 0.5 feet of separation from the bottom of the basin to ESHGW. The MassDEP Stormwater Regulations do not require a minimum separation to the ESHGW; however, the regulations specify that if the water table is within 2 feet of the bottom of the basin problems with standing water may occur. We recommend that this be addressed by the design engineer.

The use of the Extended Dry Stormwater Detention Basin has been eliminated and a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay is now proposed. Sufficient soil testing had previously been performed at this location and the estimated seasonal high groundwater elevation (ESHGW) was determined to be elevation 15.00. The proposed bottom elevation of the Pocket Wetlands is below the ESHGW which is consistent with the requirements presented in the MassDEP Stormwater Handbook. We recommend that additional soil testing be performed at the location of each of the four (4) subsurface roof leaching drywells systems to confirm the soil conditions and depth to the estimated seasonal high groundwater elevation (ESHGW) used in the stormwater management system design and calculations.

The (MEG) Response Letter dated October 18, 2021 states that soil testing will be performed prior to the submission of the final construction plans and outlines four (4) actions, as previously stated, which will be required based on the results of the soil testing. If the project is approved and if acceptable to the Board of Appeals this could be made a Condition of Approval. In any event, we recommend that HydroCAD calculations for the four (4) subsurface roof leaching drywell systems be submitted for review and approval prior to or as part of the submittal of any final construction plans. In addition, we recommend that the location of the proposed overflow/surcharge pipes, splash pads and associated grading as well as specific details and cross sections of these systems be shown prior to or on any final construction plans.

A Mounding Analysis has been performed at the location of the large Subsurface Stormwater Infiltration System as discussed at the August 2 2021 Public Hearing and in response to Mr. Scott Horsley's letter dated August 2, 2021.

No additional soil testing has been performed in the location of the proposed subsurface sewage disposal system since the soil testing must also be witnessed by MassDEP and will be addressed during the Groundwater Discharge Permitting Process. As proposed the sanitary sewer system will be a pump system and any grading associated with the subsurface sewage disposal system will not impact building elevation placement or the elevation of the roadway.

- d) *Preliminary, scaled, architectural drawings. For each building the drawings shall be prepared by a registered architect, and shall include typical floor plans, typical elevations, and sections, and shall identify construction type and exterior finishes.*

Preliminary, scaled, architectural drawings showing typical floor plans, typical elevations, and typical sections are contained in the Comprehensive Permit Application document. Due to the scale of the plans, 8-1/2" X 11", it is unclear whether the construction type and exterior finishes were provided. We recommend that full scale preliminary, scaled, architectural drawings be submitted.

Architectural Plans prepared by Axiom Architects and dated December 2, 2016 have been submitted along with a Narrative describing the type of construction and exterior finishes. The plans include typical floor plans, typical elevations, and cross sections.

No additional comment required.

- e) *A tabulation of proposed buildings by type, size (number of bedrooms, floor area) and ground coverage, and a summary showing the percentage of the tract to be occupied by buildings, by parking and other paved vehicular areas, and by open areas.*

A tabulation of proposed buildings is contained in Section 6. of the Comprehensive Permit Application document.

No additional comment required.

- f) *Where a subdivision of land is involved, a preliminary subdivision plan is required.*

Not Applicable.

No additional comment required.

- g) *A preliminary utilities plan showing the proposed location and types of sewage, drainage, and water facilities, including hydrants. Adequate supporting information, including pre-construction and post-construction drainage calculations and soil test results (which result shall have been witnessed by an appropriate and qualified Town Official or a qualified Town consultant) shall be provided to demonstrate that the proposed drainage system shall meet all Stormwater Management Guidelines promulgated by the Massachusetts Department of Environmental Protection, or best management practices, whichever is more stringent and shall result in no net increase in the rate or volume of stormwater runoff;*

A preliminary utilities plan showing the proposed location of the subsurface sewage disposal system as well as the stormwater management system and water facilities, including hydrants, is shown on the plans.

We recommend that additional design information be provided to demonstrate that the size of the subsurface sewage disposal system has been adequately designed to meet the state and local regulations. This additional information should include soil testing results and a mounding analysis.

No additional soil testing has been performed in the location of the proposed subsurface sewage disposal system since the soil testing must also be witnessed by MassDEP and will be addressed during the Groundwater Discharge Permitting Process. As proposed the sanitary sewer system will be a pump system and any grading associated with the subsurface sewage disposal system will not impact

building elevation placement or the elevation of the roadway. Satisfactory preliminary Subsurface Sewage Disposal System Sizing Calculations, prepared by McKenzie Engineering Group, dated April 5, 2021 have been submitted.

A stormwater management report entitled "Drainage Calculations and Stormwater Management Plan" has been submitted and indicates that the overall stormwater management system will attenuate the post development stormwater flows to a level not exceeding the existing conditions. The stormwater management report should provide the information to demonstrate that the project is capable of meeting the 10 Standards for Compliance with the Massachusetts DEP Stormwater Management Regulations.

We offer the following comments regarding the stormwater management system design and analysis:

- ***The proposed stormwater management system has been revised to now consist of a large Subsurface Stormwater Infiltration System, a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and four (4) Subsurface Roof Leaching Drywells Systems. As re-designed the peak rate of post-development stormwater runoff now exceeds the pre-development stormwater runoff for the 2-year and 100-year storm events for Design Point 1. Since the project discharges to Land Subject to Coastal Storm Flowage as defined in 310 CMR 10.04 and attenuation of any increase in the peak rate of stormwater runoff is not required.***
- We recommend that a MassDEP "Checklist for Stormwater Report" be submitted for this project.

A MassDEP "Checklist for Stormwater Report" has been submitted for this project. Comment satisfactorily addressed.

- As previously stated, we recommend that updated additional soil testing be performed within the limits of the proposed stormwater infiltration basin to confirm the soil conditions and depth to the Estimated Seasonal High Groundwater Elevation (ESHGW) used for the design and to demonstrate that the design meets the criteria specified in the Mass DEP Stormwater Management Handbook.

Additional updated soil testing has been performed within the limits of the proposed stormwater infiltration basin as recommended. See above. Comment satisfactorily addressed.

Updated soil testing has been performed within the limits of the proposed Subsurface Stormwater Infiltration System and Extended Dry Stormwater Detention Basin. See above. Comment satisfactorily addressed.

We recommend that additional soil testing be performed at the location of each of the four (4) subsurface roof leaching drywells systems to confirm the soil conditions and depth to the estimated seasonal high groundwater elevation (ESHGW) used in the stormwater management system design and calculations. Typical details and cross sections of these systems is shown on sheet D-7 of the plans. We recommend that the details and cross-sections be revised to show the elevations of each system as well as the ESHGW.

The (MEG) Response Letter dated October 18, 2021 states that soil testing will be performed prior to the submission of the final construction plans and outlines four (4) actions, as previously stated, which will be required based on the results of the soil testing. If the project is approved and if acceptable to the Board of Appeals this could be made a Condition of Approval. In any event, we recommend that HydroCAD calculations for the four (4) subsurface roof leaching drywell systems be submitted for review and approval prior to or as part of the submittal of any final construction plans. In addition, we recommend that the location of the proposed overflow/surcharge pipes, splash pads and associated grading as well as specific details and cross sections of these systems be shown prior to or on any final construction plans.

- Watershed Plans for both the Existing and Post-Development Conditions have been included in the Drainage Calculations and Stormwater Management Plan. We recommend that the Post-Development Watershed Plan be revised to account for the offsite areas which will be flowing onto the proposed roadway and consequently into the proposed stormwater basin. Additional topographic contours should be shown between the site and Water Street.

Additional topographic contours have been shown between the site and Water Street and revised Watershed Plans for both the Existing and Post-Development Conditions have been submitted which take into consideration those offsite areas which will be flowing into the project site. The stormwater calculations have also been revised as necessary. Comment satisfactorily addressed

- The post development watershed plan indicates that all roof runoff will be directed into the proposed stormwater infiltration basin. We recommend that the roof drains be shown on the plan. The size and material of the roof drains should be specified.

This information has not been added to the plan; however, as stated in 04/06/21 MEG Response Letter, the stormwater infiltration basin has been correctly sized assuming all runoff will be directed into the infiltration basin. This will need to be confirmed by the final construction plans and if approved and acceptable to the Board of Appeals this could be made a Condition of Approval.

This information has not been added to the plan. The MEG 07/19/21 Response Letter states that all roof runoff will be directed into the Subsurface Stormwater Infiltration System and the Subsurface Stormwater Infiltration System has been designed accordingly. This will need to be reviewed and confirmed by review of the final construction plans and if approved and acceptable to the Board of Appeals this could be made a Condition of Approval. It appears that a separate system of pipes will be required to convey all of the roof runoff to the infiltration system.

The plan has been revised to add four (4) subsurface roof leaching drywells systems. The MEG Response dated August 31, 2021 states that these systems will be equipped with a surcharge pipe and splash block have been added to treat 1-inch off roof runoff for Buildings 5,6,7,8,9,12,13,14,16 and 17. Overflow from these drywells will run overland into the proposed closed drainage system that will outfall into Subsurface Infiltration System 2P located behind Building 10. We recommend that

additional soil testing be performed at the location of each of the four (4) subsurface roof leaching drywells systems to confirm the soil conditions and depth to the estimated seasonal high groundwater elevation (ESHGW) used in the stormwater management system design and calculations. The ESHGW should be shown in the applicable BMP cross-sections. We were unable to find the HydroCAD calculations for the four (4) subsurface roof leaching drywells systems but it appears that these systems will surcharge and flow overland frequently and we recommend that the location of the proposed overflow/surcharge pipes and splash pads be shown on the plan with the associated grading. Details should also be provided.

The (MEG) Response Letter dated October 18, 2021 states that soil testing will be performed prior to the submission of the final construction plans and outlines four (4) actions, as previously stated, which will be required based on the results of the soil testing. If the project is approved and if acceptable to the Board of Appeals this could be made a Condition of Approval. In any event, we recommend that HydroCAD calculations for the four (4) subsurface roof leaching drywell systems be submitted for review and approval prior to or as part of the submittal of any final construction plans. In addition, we recommend that the location of the proposed overflow/surcharge pipes, splash pads and associated grading as well as specific details and cross sections of these systems be shown prior to or on any final construction plans.

- We recommend capacity calculation for the roadway stormwater system be provided and that the Preliminary Grading & Drainage Plan be revised to show the pipe size, material, slope and flow arrows for all drain lines.

This information has not been provided; however, as stated in 04/06/21 MEG Response Letter will be submitted with the development of the final construction plans. Due to the elevations of the proposed roadways and the outlets for the stormwater basin this would be satisfactory and if approved and acceptable to the Board of Appeals this could be made a Condition of Approval.

- Capacity calculation should be provided for the proposed arch culvert at STA 10+42 Road B.

Additional acceptable capacity calculations have been included in the HydroCAD Calculations. Comment satisfactorily addressed.

The location of the Wastewater Treatment Plan (WWTP) and associated soil absorption system (SAS) has been revised eliminating the need for a wetlands crossing and the proposed arch culvert at STA 10+42 Road B. Comment no longer applicable.

- Calculations should be submitted to demonstrate that the sediment forebay for stormwater infiltration basin contains the required volume.
Calculations have been submitted that demonstrate that the sediment forebay for stormwater infiltration basin has been properly designed and contains the required volume. Comment satisfactorily addressed.

The proposed stormwater management system, which previously consisted of a large Stormwater Infiltration Basin, now consists of a Subsurface Stormwater

Infiltration System and an Extended Dry Stormwater Detention Basin. Calculations have been submitted that demonstrate that the sediment forebay for the Extended Dry Stormwater Detention Basin has been properly designed and contains the required volume.

The proposed stormwater management system has been revised to now consist of a large Subsurface Stormwater Infiltration System, a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and four (4) Subsurface Roof Leaching Drywells Systems. The use of the Extended Dry Stormwater Detention Basin has been eliminated and the Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay is now proposed. Calculations have been submitted that demonstrate that the sediment forebay for the Constructed Stormwater Wetland (Pocket Wetland) has been properly designed and contains the required volume.

- The Hydro CAD analysis for the stormwater infiltration basin (Pond 1P) lists an outlet “Special and User Defined”. Additional information should be provided to clarify the specific type of outlet, it appears that it may be infiltration and if so, the backup calculations should be submitted.

Additional information has been provided. Comment satisfactorily addressed.

- As specified in the Mass DEP Stormwater Management Handbook, stormwater infiltration basins shall be designed to exfiltrate in no less than 72 hours. Calculations should be provided to show that the basin meets this requirement.

Calculations have been submitted showing that the stormwater basin will drain in 11 hours. Comment satisfactorily addressed.

The proposed stormwater management system, which previously consisted of a large Stormwater Infiltration Basin, now consists of a Subsurface Stormwater Infiltration System and an Extended Dry Stormwater Detention Basin. Calculations have been submitted showing that the Subsurface Stormwater Infiltration System will drain in 14 hours. For the Extended Dry Stormwater Detention Basin, the calculation indicate that the basin will drain in approximately 40 hours. We recommend that the exact drain time be provided by the design engineer.

The use of the Extended Dry Stormwater Detention Basin has been eliminated and the Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay which is now proposed which will drain in approximately 26 hours.

- A cross-section of the stormwater infiltration basin is shown on sheet C-5 of the plans. We recommend that the elevation of the estimated seasonal high groundwater (ESHGW) be provided to demonstrate that the minimum separation to groundwater is provided. A mounding analysis is required when the separation from the bottom of an infiltration basin to ESHGW is less than four (4) feet and the basin is used to attenuate peak discharges from the 10 year or higher 24 hour storm.

The elevation of the ESHGW has been shown on the plan to demonstrate that the minimum separation to groundwater is provided. Comment satisfactorily addressed.

The use of the Extended Dry Stormwater Detention Basin has been eliminated and the Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay is now proposed. Since no infiltration is considered within this BMP, a mounding analysis is not required.

- We recommend that all flared end sections (FES) are reinforced concrete and equipped with trash racks/safety grates and erosion control pads and that these erosion control pads be presented on the Grading and Utility Sheets.

The plan has been revised to show that all flared end sections (FES) are reinforced concrete and equipped with trash racks/safety grates and erosion control pads. Comment satisfactorily addressed.

- Calculations have been submitted which satisfactorily demonstrate that the detention time within the Extended Dry Stormwater Detention Basin is a minimum of 24 hours for the calculated Water Quality Volume.

The use of the Extended Dry Stormwater Detention Basin has been eliminated and consequently this comment is no longer applicable.

- The depth of water within the Extended Dry Stormwater Detention Basin ranges from 1.3 feet for the 2-year storm to 3.3 feet for the 100-year storm. Due to the proximity of the dwelling units, we recommend that the basin be enclosed by a fence.

The use of the Extended Dry Stormwater Detention Basin has been eliminated and the Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay is now proposed. As recommended, the plans have been revised to provide a 6-foot high fence around this structure. We recommend that a detail of the fence be included in the final plans.

It is general practice to design sites to comply with Massachusetts DEP Stormwater Management Regulations. The following section describes the 10 Standards for Compliance with Stormwater Management Regulations and the status of the submittal relative to each standard.

The proposed stormwater management system, which previously consisted of a large Stormwater Infiltration Basin, now consists of a Subsurface Stormwater Infiltration System and an Extended Dry Stormwater Detention Basin. The Drainage Calculations and a Stormwater Management Plan has been revised to reflect plan revision.

The proposed stormwater management system has been revised to now consist of a large Subsurface Stormwater Infiltration System, a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and four (4) Subsurface Roof Leaching Drywells Systems. The Drainage Calculations and a Stormwater Management Plan have been revised to reflect plan revision.

Standard 1 – Untreated Stormwater

This standard requires that no new untreated point source discharges are created and that point source or sheet flow discharges do not result in erosion into or scour of wetlands.

A new point source discharge is proposed from the stormwater basin, calculations and details should be provided for the design of the plunge pool and outlet at the basin. In addition, as previously stated, we recommend that updated additional soil testing be performed within the limits of the proposed stormwater infiltration basin.

Additional calculations and details have been provided. Also, as previously stated, updated additional soil testing has been performed within the limits of the proposed stormwater infiltration basin. This Standard has been met.

Additional soil testing was performed at the specific locations of the Subsurface Stormwater Infiltration System and the Extended Dry Stormwater Detention Basin on May 17 and 18th 2021. The Subsurface Stormwater Infiltration System has been designed to provide 4 feet of separation from the bottom of the system to estimated seasonal high groundwater (ESHGW) and consequently the separation to ESHGW meets the MassDEP minimum criteria of 4.0 feet. The Extended Dry Stormwater Detention Basin has been designed to provide 0.5 feet of separation from the bottom of the basin to ESHGW. The MassDEP Stormwater Regulations do not require a minimum separation to the ESHGW; however, the regulations specify that if the water table is within 2 feet of the bottom of the basin problems with standing water may occur. We recommend that the design engineer address this issue. Additional information required.

The use of the Extended Dry Stormwater Detention Basin has been eliminated and a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay is now proposed. Since the site discharges to Outstanding Resource Waters which is considered a Critical Area under the MassDEP Stormwater Management Standards, stormwater discharges near or to any critical areas require specific source control and pollution prevention measures. The use of Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay is consistent with Table CA 2: Standard 6 in the Stormwater Management Handbook. These BMPs are typically designed with the bottom below the ESHGW. The proposed bottom elevation of the Pocket Wetlands is below the ESHGW which is consistent with the requirements presented in the MassDEP Stormwater Handbook. We recommend that additional soil testing be performed at the location of each of the four (4) subsurface roof leaching drywells systems to confirm the soil conditions and depth to the estimated seasonal high groundwater elevation (ESHGW) used in the stormwater management system design and calculations.

The (MEG) Response Letter dated October 18, 2021 states that soil testing will be performed prior to the submission of the final construction plans and outlines four (4) actions, as previously stated, which will be required based on the results of the soil testing. If the project is approved and if acceptable to the Board of Appeals this could be made a Condition of Approval. In any event, we recommend that HydroCAD calculations for the four (4) subsurface roof leaching drywell systems be submitted for review and approval prior to or as part of the submittal of any final construction plans. In addition, we recommend that the location of the proposed overflow/surcharge pipes, splash pads and associated grading as well as specific details and cross sections of these systems be shown prior to or on any final construction plans.

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.

A stormwater management report entitled “Drainage Calculations and Stormwater Management Plan” has been submitted and indicates that the overall stormwater management system will attenuate the post development stormwater flows to a level not exceeding the existing conditions. Additional information as noted above is necessary.

The recommended additional information has been submitted and since the project discharges to Land Subject to Coastal Storm Flowage attenuation of any increase in the peak rate of stormwater runoff is not required; however, as designed the peak rates of post-development stormwater runoff does not exceed the pre-development stormwater runoff. This Standard has been met.

The proposed stormwater management system has been revised to now consist of a large Subsurface Stormwater Infiltration System, a Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and four (4) Subsurface Roof Leaching Drywells Systems. As re-designed the peak rate of post-development stormwater runoff now exceeds the pre-development stormwater runoff for the 2-year and 100-year storm events for Design Point 1. Since the project discharges to Land Subject to Coastal Storm Flowage as defined in 310 CMR 10.04 the attenuation of any increase in the peak rate of stormwater runoff is not required. This Standard has been met.

Standard 3 – Recharge to Groundwater

This standard requires that designs provide on-site recharge to mimic pre-development conditions.

Calculations should be submitted to demonstrate compliance with this Standard.

Revised acceptable Recharge Calculations have been submitted demonstrating compliance. This Standard has been met.

Standard 4 – 80% Total Suspended Solids (TSS) Removal

This standard requires runoff be treated to remove suspended solids (TSS) to at least 80% removal. In areas with a rapid infiltration, pretreatment of 44% is required prior to infiltration systems.

No Total Suspended Solids (TSS) calculations have been submitted. A TSS Removal Calculation Worksheet for each of the treatment trains should be submitted.

Acceptable TSS Calculation Worksheets have been submitted for the treatment train directed to the Stormwater Infiltration Basin. TSS Calculation Worksheets should be provided for those areas of the proposed roadway not directed to the Stormwater Infiltration Basin. Additional information required.

Acceptable Total Suspended Solids (TSS) Calculation Worksheets have been submitted for the treatment train directed to the Extended Dry Stormwater Detention Basin and for Pre-treatment for the Subsurface Stormwater Infiltration System. The TSS Calculation Worksheet for the Subsurface Stormwater Infiltration System should be revised to eliminate the credit for the Extended Dry Detention Basin since that BMP is not part of the treatment train. Additional information required.

Revised acceptable Total Suspended Solids (TSS) Calculation Worksheets have been submitted for both treatment trains. This Standard has been met.

Standard 5 – Higher Potential Pollutant Loads

This project is not considered a source of higher pollutant loads. This Standard is not applicable.

No additional comment required.

Standard 6 – Protection of Critical Areas

The project is not located in a Critical Area based on DEP requirements. This standard is not applicable under DEP requirements.

As pointed out during the August 3, 2021 Public Hearing process, the site discharges to Outstanding Resource Waters which is considered a Critical Area under the MassDEP Stormwater Management Standards stormwater discharges near or to any use of Constructed Stormwater Wetland (Pocket Wetland) with a Sediment Forebay and the large Subsurface Stormwater Infiltration System is consistent with Table CA 2: Standard 6 in the Stormwater Management Handbook. This Standard has been met.

Standard 7 – Redevelopment Projects

This project is not considered a redevelopment project and consequently this Standard is not applicable.

No additional comment required.

Standard 8 – Erosion/Sediment Control

This standard requires construction phase erosion controls.

No construction phase plan has been provided. The limits of erosion controls are indicated on the Grading and Drainage Plan. A filter sock erosion control device is provided at the limit of construction and a detail is presented on the plans. We recommend that a detailed construction sequencing be provided and that the location of the construction entrance, stockpile areas and temporary sedimentation basins be included. Calculations should be submitted for sizing of the basins and details of the sedimentation basins be provided including the proposed grading as well as the type of outlet control structures. An EPA Notice of Intent and Stormwater Pollution Prevention Plan (SWPPP) will be required since the project proposes more than 1 acre of disturbance. If this project is approved and if acceptable to the Board of Appeals the submittal of this additional information could be made a Condition of Approval.

No additional comment required.

Standard 9 – Operation and Maintenance Plan

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

A Post-Construction Best Management Practices Operation and Maintenance Plan (O&M) has not been submitted. This information should be submitted and we recommend that the O&M be a standalone document with a plan that identifies BMP locations, snow storage areas, locations for landscape debris disposal if proposed, etc.

A “Construction Phase Pollution Prevention and Erosion and Sedimentation Control Plan” as well as a “Post-Development Best Management Practice Operation and Maintenance Plan & Long-Term Pollution Prevention Plan” is included in the Drainage Calculations and Stormwater Management Plan. The “Post-Development Best Management Practice Operation and Maintenance Plan & Long-Term Pollution Prevention Plan has been revised to include pet waste management in response to Mr. Scott Horsley’s letter dated August 2, 2021. If this project is approved and once construction plans have been finalized both of these documents should be submitted as stand-alone documents.

Standard 10 – Illicit Discharges

In order to meet this standard, an “Illicit Discharge Compliance Statement” meeting the requirements specified in the Stormwater Management Regulations has been submitted. This statement requires a signature. Additional Information required.

The “Illicit Discharge Compliance Statement” has been signed as required. This Standard has been met as required.

- h) *A Project Eligibility Letter that satisfies all of the requirements of 760 CMR 56.*

A Project Eligibility Letter/Site Approval Letter from Mass Housing dated February 15, 2018 is included in Section 7 of the Comprehensive Permit Application. This Approval is valid for two (2) years unless extended by Mass Housing.

The Applicant’s attorney, Baker, Braverman & Barbadoro, P.C. has submitted a letter on March 8, 2021 which updated the information. Comment satisfactorily addressed.

- i) *A list of requested exemptions to local requirements and regulations, including local codes, ordinances, bylaws or regulations.*

A List of Waivers and Other Exemptions dated August 29, 2018 is included in Section 8 of the Comprehensive Permit Application.

An Updated Waiver List was submitted to the Zoning Board of Appeals on June 24, 2021 by the Applicant’s attorney, Baker, Braverman & Barbadoro, P.C.

- j) *A complete copy of any and all materials and applications submitted by the applicant to any prospect subsidizing agency or source, including, but not limited to applications for site approval.*

It appears that copies of any and all materials and applications submitted by the applicant to any prospect subsidizing agency or source, including, but not limited to applications for site approval are included in the Comprehensive Permit Application. This should be confirmed by the Applicant.

The Applicant’s attorney, Baker, Braverman & Barbadoro, P.C. has submitted a letter on March 8, 2021 which updated the information. Comment satisfactorily addressed.

- k) *A list of each member of the development and marketing team, including all contractors and subcontractors, to the extent known at the time of application. The Applicant shall also be required to disclose its relationship to all such entities.*

A List of River Marsh Development Team is included in Section 10 of the Comprehensive Permit Application.

No additional comment required.

- l) *A list of all prior development project completed by the Applicant, along with a brief description of each such project.*

A statement regarding the applicant's prior development projects is included in Section 11 of the Comprehensive Permit Application. The statement states that "The applicant is an entity created for the sole purpose of developing River Marsh, a multi-family housing development in accordance with M.G.L. 40B, S 20-23, and therefore it has not completed any projects. The Development Team behind the Applicant has successfully constructed commercial developments and residential developments that are similar in nature, such as Washington Woods that consist of seven residential buildings and associated site work on approximately 10 acres off of Washington Street (Route 53) in Norwell, Massachusetts."

No additional comment required.

We recommend that additional revised project submittals include a Response Letter to address the review comments presented above.

Merrill Engineers and Land Surveyors appreciates the opportunity to review this project for the Board of Appeals. Please feel free to call me with any questions or to request additional information.

Very truly yours,

MERRILL ENGINEERS AND LAND SURVEYORS



Peter G. Palmieri, P.E.
Director of Engineering

cc: Matthew Heins, Pembroke Planning Board
Amy E. Kwesell, Esq.
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