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25035

Town of Wayland
Planning Board
41 Cochituate Road
Wayland, MA 01778

February 15, 2017

Attention: Sarkis Sarkisian, Town Planner

RE: Request for Amendment - Whittemore Place Subdivision (Klempner) off Old Connecticut Path, Wayland.

Dear Board Members:

The owner of the subject subdivision, Mark S Klempner, is hereby requesting an Amendment to the previously approved Definitive Subdivision plan in accordance with the provisions of the most recent Subdivision Modification Approval (with Condition) issued by the Planning Board dated January 13, 1998. That Approval requires that the owner of the subdivision re-apply to the Planning Board prior to construction to allow the Planning Board and other Boards and Departments the opportunity to consider whether there have been any material changes to the Subdivision Regulations and other applicable regulations and requirements that would affect the approved subdivision.

We are submitting this request together with the amended plans that have been changed to comply with changes in the applicable regulations and requirements since the time of the above approval. The proposed plan modifications are detailed below in this request letter.

At this time, the following two requests are being made:

- Request for review and approval of the attached "Definitive Subdivision Amendment Plan" and accompanying documents, and to approve the necessary waivers to facilitate this.

- Request for the release of Lot 1 with the associated Parcels 1A and 1B from the Subdivision.

Summary of Proposed Modifications

1. **Revision of Lots 1 and 2:**
   Lot 1 contains the existing house and structures at #209 Old Connecticut Path. Under the approved Definitive Plan, Lot 1 has insufficient frontage on Old Connecticut Path to be a lot independent of the subdivision. The frontage for that lot is presently provided on the subdivision roadway. The lot has recently been sold to the current owners, David and Traci Green, and that owner has asked to have the lot released. To facilitate that release, the subdivision plan is being modified to provide sufficient frontage on Old Connecticut Path by

modifying Lot 2 and a revision of the new Right of Way intersection radius from 20 feet to 10 feet. Two small parcels, 1A and 1B, are created and these are to be conveyed to the owners of Lot 1. This provides that lot with 182.82 feet of frontage on Old Connecticut Path (Minimum is 180 feet). Lot 2 will slightly smaller and will be renamed as Lot 2A.

This change makes practical sense, as the existing house faces Old Connecticut Path and the existing driveway is accessed to that road, so the current use and configuration of that property will remain unchanged. This is the preferred arrangement of the current owners of that property. Both lots will remain in compliance with Zoning, and the minor change in the road right-of-way does not affect compliance with the Planning Board Rules and Regulations.

There has been a change in the Zoning sideline setback since the original approval in this district that increased the setback from 15 feet to the current 25 feet. Due to the change in Lot 2, it is our understanding that Lot 2 (now Lot 2A) would lose it's grandfathered protection under zoning. For that reason, we have revised the sideline setback for Lot 2A (shown on Plan Sheet 3) to conform to the current zoning setback. All the other lots remain unchanged and setbacks are the same for those lots as on the originally approved plans.

2. **Change in Driveway at 213 Old Connecticut Path:**
On January 3, 2017, the Applicant met with the Planning Board to discuss the concept for the revisions being proposed for the Subdivision. During that meeting, the Planning Board raised concerns about the number of curb cuts on Old Connecticut Path with the proposed subdivision road and the two existing driveways. The Applicant has met with the owners of #213 and they have agreed to change their driveway to access the new roadway and eliminate their existing curb cut on Old Connecticut Path. Their existing driveway would be very close to the new roadway, so this arrangement would be a significant improvement over leaving it as is. This proposed driveway connection to the new road is shown on the Amended Plan.

3. **Modification to the Roadway:**
The roadway as previously approved essentially meets the current Design Standards for a Limited Residential Roadway under Section IV of the current Subdivision Rules and Regulations. However, after meeting with the Town Planner and subsequently with the Planning Board on January 3, 2017, the owner is requesting approval of the plan for a reduced roadway design that would modify the plan to one with substantial environmental benefits as well as benefits for the Town and neighborhood over the previous approved plan.

The roadway for the subdivision will serve as access to only three new homes plus the existing home at 213 Old Connecticut Path. A full size 22 foot roadway with curbs, a paved sidewalk and a full 90 foot diameter paved turn-around would be much more than what is necessary for this purpose. Essentially the current proposal is a "Limited Impact Design" that reduces the roadway width and turn-around and eliminates the sidewalk. Following consultation with the Planning Board, the roadway is still intended to be a public way.

Certain waivers from the Design Standards of the Planning Board Rules and Regulations would be required from the Planning Board for this design. The road would be reduced from the current 22 foot wide paved road with curbs, paved sidewalk and a 90 foot diameter paved cul-de-sac, to an 18 foot wide paved road with 2 ft. wide grassed shoulders with no curbs except at the entry. The road pitches at 2 percent to one side rather than have a crown in the middle. It would have a "T" style turn-around at the end. The roadway will be adequate for the homeowners and sufficient for fire access, delivery vehicles, etc. The Wayland Fire Chief has reviewed the design and found it satisfactory for fire access purposes.

This arrangement will reduce the amount of impervious surface by 8,035sq. ft., for a 45% reduction from the previous proposed 17,800 sq. ft. paved area. This results in more vegetated open space and less stormwater runoff. The driveway base and pavement thickness will be the same as the Town standard. The road profile is essentially unchanged and the water main, hydrant and other utilities will be in accordance with the previous plan

The road right-of-way will be the same as the previous plan so that the frontage of each of the three new lots is unchanged and in conformance with current zoning. The one exception is the modification of the easterly rounding at the intersection discussed in Item 1 above which does not affect compliance with the standard design requirements.

4. **Stormwater Management:** There has been substantial changes to the requirements for stormwater management designs since the previous approval. These include the new Wayland Stormwater and Land Disturbance Bylaw adopted in 2015 and the Massachusetts Stormwater Management Regulations which are referenced as design criteria in the Bylaw. The Massachusetts Stormwater Management Handbook (Feb 2008) sets the minimum design criteria for current design of stormwater systems (Best Management Practices or BMPs). This has resulted in a significantly improved stormwater management design for this project.

   Note that, since the development is for four or fewer lots, the project is exempt from the Mass. Stormwater Management Regulations. However, the local Bylaw makes the design standards of the Mass. Regulations applicable to the project.

   There have also been substantial advances in the methods of computing stormwater runoff and particularly for stormwater infiltration BMP designs since the original approval in 1989. There is much better topographic mapping and aerial photography available that allows for more accurate determination of the watershed areas and the areas of impervious surfaces and cover types in the watershed. A key factor for this project is that the U.S. Natural Resource Conservation Service has revised the Hydrologic Soil Group (HSG) of two of the three soil types found in the watershed from HSG "B" to HSG "A" to more accurately reflect the runoff characteristics of these soils. In this case, it means that there is actually less runoff in the watershed than previously predicted. The predicted level of flooding within the on-site depression and to the neighboring properties to the west is significantly less than previously computed.

Complete stormwater runoff and design calculations and compliance information are contained in the stormwater report submitted with this request. The following summarizes the present design:

- The proposed concept plan uses a "Limited Impact Development" (LID) approach. Under present stormwater regulations, consideration of LID concepts is required. In this concept, runoff from the driveway will simply shed off to a grass lined swale that will drain to a pre-treatment unit and then to the existing easterly depression. The project site is in the Zone 2 of a Town water supply well, so pre-treatment to a minimum 44% TSS (Total Suspended Solids) removal is required prior to recharge. For this we are proposing use of a CDS Technology Unit which is rated by MASTEP and the New Jersey Tarp for 74% TSS removal. To enhance infiltration, the lowest portion of the depression will be changed to a stone line recharge basin (another LID practice).

- The existing 100 year flood elevation for the easterly on-site depression was previously computed to be 159.8. Using the current standards and methodology, the existing 100 year flood elevation is now computed to be 157.6, or over 2 feet less.

- A small infiltration basin (Basin 2) will be installed similar to the one proposed on the previously approved plan to protect the neighboring properties to the west which was a very important consideration in the approval of the previous plan in 1989.

- The re-grading and enlargement of the existing easterly depression that was required for the previous approved plan is eliminated with this design concept. The existing woodland on that portion of the site can remain intact and undisturbed rather than cleared and altered. This saves nearly one acre of existing woodland on the site. This also further reduces stormwater runoff.

- To further reduce runoff, the roofs of the individual houses will drain to seepage pits or drip trenches to spread recharge over the site rather than be concentrated at few locations (another LID concept).

- The result of the amended design will be that the flooding level will be completely contained within the existing depression without alteration of the basin. The increase in the level of flooding will be less than 6 inches over existing levels for all storms up to a 100 year event. The flooding will be contained within the drain easements provided. There will also be a further reduction of stormwater runoff to the abutters to the west than the previous design.

5. **Amended Form O – Environmental Data Form**

Due to the proposed amendments, we have provided an amended Form O – Environmental Data Form that reflects the proposed plan revisions.

Wayland Planning Board
RE: Whittemore Place Subdivision (Klempner)

February 15, 2017

SUBMITTED MATERIALS

Check for filing fee to Town of Wayland $250.00

10 Copies of this cover letter with the following attachments:
- Attachment 1: Form O – Environmental Data Form (Amended)
- Attachment 2: Narrative Summary from the Stormwater Management Report

10 Full Size Copies of the Plans entitled "Definitive Subdivision Amendment for Whittemore Place in Wayland Massachusetts" prepared by Schofield Brothers LLC, dated February 14, 2017, (6 sheets).

6 Half Size copies of the above plan

4 Copies of the full Stormwater Management Report (2/15/17)

We look forward to meeting with you regarding the proposed subdivision amendment.

Sincerely,
Schofield Brothers LLC

Fredric W. King, PE, LEED AP
Senior Engineer

CC: Mark S. Klempner, MD

ATTACHMENT 1

Form O – Environmental Data Form (Amended)

FORM O

ENVIRONMENTAL DATA FORM

Note that this document is a modification of the document submitted with the original Definitive Plan submittal in December of 1987. Responses that are identical to that submittal are so noted. Responses are in italics.

IMPACT ON DRAINAGE:

1. How much run-off will be generated by the proposed development as compared to the run-off prior to development? Show as time-volumes and locations.

   Response 2/15/17: The information on this is detailed on the Stormwater Management Report included with this submittal.

2. Describe the proposed requirements for drainage and the system to collect and distribute drainage. Will the new system be tied into an existing system? Describe.

   Response 2/15/17: The proposed stormwater system will not connect into the public drain system. The information on the proposed system is detailed on the Stormwater Management Report included with this submittal.

3. Can the existing system adequately handle the additional drainage?

   Response 2/15/17: Not Applicable for the public drain system. The proposed system will meet applicable standards. The information on the proposed system is detailed on the Stormwater Management Report included with this submittal.

4. If not, what do you propose?

   Response 2/15/17: Not applicable.

5. What is the destination(s) of run-off water (ponds, streams, reservoirs, etc.)? Current and proposed.

   Response 2/15/17: The proposed roadway will drain to the existing on-site depression and is contained on the site. Under existing conditions, runoff from the property and off site watershed also drains via overland flow to private properties to the west. To improve the off-site runoff, under the proposed project the off-site discharges will remain but will be reduced from existing conditions. This is the same for the previous project as well as the amended project.

6. Will these area handle the additional run-off? Give specific reasons supporting your answer.

Response 2/15/17: Yes. This is detailed in the Stormwater Management Report included with this submittal.

7. What is the average, maximum, and minimum depth to seasonal high water table on the site prior to development and projected after development?

   Response 2/156/17: The depth to the seasonal high groundwater table varies over the site. Generally the water table slopes down from southeast to northwest toward Old Connecticut Path. The hydrogeology and groundwater impacts of the project were extensively studied during the original Definitive Subdivision Filing and showed no significant impact. The current Subdivision Amendment results in less impact than the previous proposal due to the narrower road design with less impervious surface and substantially less tree clearing due to less disturbance of the existing wooded depression. The conclusions of the previous studies regarding the impacts of the development would therefore be further reduced.

8. What pollution to groundwater or other effluent problems do you anticipate and how do you propose to deal with them?

   Response 2/15/17: Due to the fact that the site is within the Zone II of the public water supply wells, the current Title 5 limits the amount of sewage effluent that can be discharged to the ground to protect the water resources. The project must by law comply with these requirements.

   Since the subdivision is four or less lots, and there are no wetlands involved, the project is technically no subject to the Mass. Stormwater Regulations. However, the Wayland Stormwater and Land Disturbance Bylaw does require that the project be designed to meet the standards for the design of the stormwater system. As such, the project has been designed to meet the pre-treatment requirements of the Mass. Stormwater regulations for infiltration systems within a Zone II to protect the groundwater resources. This is detailed in the Stormwater Management Report included with this submittal.

IMPACT ON SEWAGE DISPOSAL:

1. What type of sewage disposal will be used (septic tank and leaching fields, sewage disposal system, etc.)?

   Response: Conventional septic tank and leaching field systems are proposed. (No change from the previous submittal).

2. What is the hourly and daily capacity?

IMPACT ON TRAFFIC:

1. What is the nearest intersection and it's distance to the proposed development?

   Response: The nearest intersection with the proposed Klempner Lane is Davelin Road, located 350 feet westerly. (No change from previous submittal.)

2. What is the traffic flow (total number if cars/day, number of cars per hour throughout the day) now and after development on the nearest existing intersections of roads leading to the development?

   Response: The impact of the three residences on the traffic flow on Old Connecticut Path is minimal, being approximately 12 vehicle trips per day. (No change from previous submittal.)

3. What is the average speed of cars at peak hour on the nearest existing roads now and after development?

   Response: The average speed of vehicles at the peak hour at the intersection of Klempner Lane and Old Connecticut Path is 35 mph. (posted speed) (No change from previous submittal.)

4. Do all existing and proposed connecting roads provide visibility meeting current Planning Board standards. If not, what modifications are proposed?

   Response: The proposed intersection provides adequate visibility meeting current standards. (No change from previous submittal.)

5. What is the distance to the nearest public transportation? What mode is that transportation? How frequent is it.

   Response: No public transportation is currently available. (No change from previous submittal.)

6. What will the impact on commercial areas (identified by the Planning Board) be relative to: parking areas; traffic congestion; pollution from noise; air; etc.; market demand -- where people will likely shop?

   Response: The size of the development being limited to three additional residences, the impact in existing commercial areas will be minimal and will be confined to the general market of dry goods, hardware and groceries, all of which are available locally and in the surrounding communities. (No change from previous submittal.)

IMPACT ON WATER SUPPLY:

6. What actions are proposed to minimize erosion and sedimentation problems?

   Response: The majority of the runoff on and from off site is contained within the site. Erosion control will be maintained by careful construction measurers and by planting of exposed slopes immediately after construction. Catchment areas will be constructed on site to prevent sediment from being discharged off site.

   Added Information 2/15/17: The total area of alteration will be in excess of one acre, so the project will be subject to the U.S. Environmental Protection Agency's "National Pollution Discharge Elimination System" (NPDES) Construction General Permit (CGP)requirements. As such, the developer will be required to prepare a full Stormwater Pollution Prevention Plan (SWPPP) and file a Notice of Intent with the EPA for coverage under the CGP. The project will also be subject to the Wayland "Stormwater and Land Disturbance Bylaw Chapter 193" that requires the filing for a Stormwater Management and Land Disturbance Permit with the Conservation Commission. This also requires a full SWPPP be prepared and approved prior to construction.

IMPACT ON SLOPES:

1. What changes in topography are proposed and why?

   Response 2/15/17: No significant changes in existing topography are proposed. The minimal alteration in elevation are those required by the roadway construction. The previous enlargement of the existing depression contained in the previous approved Definitive Subdivision Plan has essentially been eliminated by the proposed Plan Amendment.

2. What effect will these changes have on erosion, drainage, existing vegetation and on access ways?

   Response: These items are detailed in the Stormwater Management Report included with this submittal.

ATTACHMENT 2

Narrative Summary from the Stormwater Management Report (Section 1)

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SECTION 1
STORMWATER MANAGEMENT NARRATIVE & SUMMARY

Definitive Subdivision Amendment – "Whittemore Place"

This report contains the hydrologic computations and design information relative to the existing and proposed stormwater runoff conditions for the proposed Definitive Subdivision Amendment for the Whittemore Place residential development. It includes information on the proposed stormwater management system design, assessment of stormwater impacts and compliance with the current Wayland Bylaws, Subdivision Rules and Regulations and the Massachusetts Department of Environmental Protection (Mass DEP) Stormwater Management Regulations.

Note that the project is exempt from the Mass. Stormwater Management Regulations as it is a residential subdivision of 4 lots or less. However the Wayland "Stormwater and Land Disturbance Bylaw refers to the Mass. Stormwater Management Regulations as a standard for design and calculations, so this brings the State standards into the requirements for the project.

The report includes the following documents as required by the Mass DEP Stormwater Regulations:

- "Soils Information" (Appendix 1)
- DEP Stormwater Management Checklist, compliance calculations and Best Management Practices (BMP) design calculations (Section 2)
- "Long Term Pollution Prevention Plan (LTPPP) that includes a "Stormwater Management System Operation and Maintenance Plan" (Appendix 2)
- The hydrologic models of existing and proposed stormwater runoff conditions for the site are included in Sections 3 and 4 respectively. The watershed maps for the models are included in Appendix 3.

This project is subject to the U.S. EPA's Construction General Permit under the NPDES Program. A full Stormwater Pollution Prevention Plan (SWPPP) will be prepared and submitted by the Developer / Contractor for review and approval prior to the start of construction.

HYDROLOGIC MODELING AND COMPUTATIONS:
The hydrologic analysis of the existing conditions and proposed watershed was based on the nationally recognized watershed modeling techniques developed by the USDA, Soil Conservation Service (SCS). The techniques and runoff models are described in the following SCS publications:

- "Urban Hydrology for Small Watersheds, Technical Release Number 55", 1986 and Technical Release 20.
- National Engineering Handbook, Hydrology, Section 4, 1972.
- "A Method for Estimating Volume and Rate of Runoff in Small Watersheds, Technical Release No. 149" 1973.
- "Hydrology Handbook for Conservation Commissions" March 2002, Mass. DEP.

The watershed modeling was performed using computer software "HydroCAD" version 10.0 by Applied Microcomputer Systems, which is based on the publications referenced above. Best management practices were designed utilizing the DEP "Stormwater Management Standards Handbook," February, 2008

Rainfall depths selected for the hydrologic analysis are per the current Planning Board Rules and Regulations that call for the 5, 10, 25, 50 and 100 year storm. We have also added the 2 year storm per TP 40 as required by the Mass. Stormwater Management Regulations. The rainfall depths are as follows:

2 year storm	3.2 inches
5 year storm	4.0 inches
10 year storm	4.5 inches
25 year storm	5.5 inches
50 year storm	6.5 inches
100 year storm	7.0 inches

GENERAL PROJECT DESCRIPTION

This project is a residential subdivision that includes the existing house at 209 Old Connecticut Path and three new house lots that will be served by a new public roadway 470 feet in length from Old Connecticut Path. The total area of the site is 4.3 acres. The project is in a 40,000 sq. ft. residential zone and each lot requires 180 feet of frontage along the roadway.

The project was originally approved by the Planning Board in 1989 and the Decision was subsequently modified in January of 1998. The construction of the subdivision has not gone forward and the 1998 Decision required that, prior to construction, the owner must re-apply to the Planning Board to allow that Board and other Boards and departments to consider whether there had been any material changes to the Subdivision Rules and Regulations and other applicable regulations and requirements that would affect the subdivision. In compliance with that requirement, the plans have been modified to address changes in the regulations since the original approvals and the Owner is now applying to the Planning Board for a Definitive Subdivision Amendment for approval of the revisions.

In this amended plan, the lots and road right-of-way remain essentially the same as the previous approved plan. The most significant changes in the regulations are the requirements relative to stormwater management. As part of compliance with the current stormwater management regulations, the plan has been amended to consider Limited Impact Development (LID) techniques. This includes a reduction of the road width from 22 feet with curbs and a sidewalk and a 90 foot diameter paved turn-around, to an 18 foot wide roadway and tee style turn-around. The former catch basin, drain manhole and piped drain system design has been changed to a Country Drainage System with vegetated drain swale.

The use of the existing on-site depression for infiltration of stormwater and the provision of a small basin to infiltrate and control runoff to the abutting properties to the west remains as part of the project, however, the designs have been updated to current standards.

EXISTING SITE DESCRIPTION

The project site is a 4.3 acre parcel of land containing the existing house, garage, driveway, pool and utilities at 209 Old Connecticut Path. The existing house is in the front of the site near the roadway and the remainder of the property is a mix of woodland and meadows.

The subject site is within the Zone II Wellhead Protection Area of a Town water supply well located west of the site. This is defined as a Critical Area that affects stormwater management designs.

In the southeastern portion of the site there is a natural depression. This depression is wooded and receives stormwater runoff from a 7.5 acre watershed. The soils in the watershed are within Hydrologic Soil Group A, so runoff is minimal and all water draining to the depression is contained within the basin and infiltrates into the soil.

Ponding within the depression occurs only rarely and the area does not support any wetland vegetation. The existing conditions runoff calculations show that there is no surface runoff to the depression up to and including a 2 year storm. Since the area clearly does not contain water on an annual basis, the area is not classified under the Mass. Wetlands Protection Act as an Isolated Land Subject to Flooding. This was confirmed by the issuance of a "Negative Determination of Applicability" by the Wayland Conservation Commission in 1988.

The current Rules and Regulations under the Wayland Wetlands and Water Resources Bylaw protects "Land Subject to Flooding and Inundation" that includes isolated flooding areas. Under those regulations, the volume and area criteria for isolated flooding is smaller than the Mass. Wetlands Regulations, but still require the flooding "at least once

during a year". So the area also does not appear to qualify as wetland area under the local regulations.

Approximately 3 acres of the site drains overland onto abutting properties along Davelin Road. There are existing drainage issues for that neighborhood, so this was an important consideration during the original subdivision approval process to design the project to not increase and preferably reduce runoff to the west.

Existing Stormwater Runoff

Assessment of runoff conditions for the area is based on the current on-site topographic survey and the areas off site are based on the Town GIS mapping and Mass. GIS aerial photo imagery. These were checked by field reconnaissance by Schofield Brothers LLC. The watershed subcatchment boundaries are shown on the Existing Conditions Watershed Map in Appendix 3 of this Report.

As described above roughly one third of the site plus about 5.3 acres of off-site area drains to an on-site depression where it is contained and infiltrated. Approximately 3 acres of the site and including the existing house at 213 Old Connecticut Path drains to the residential properties to the west and then to the drain system in Davelin Road.

A HydroCAD analysis was performed for the Existing Conditions to determine the stormwater flows to two design point under the 2, 5, 10, 25, 50 and 100 year storms. Design Point 1 is the existing on-site depression in the southeast portion of the site. Design Point 2 is the flow to the properties to the west.

The existing conditions HydroCAD calculations are included in Section 3 of this report and a summary of the results including flood elevations of the existing depression is contained in the Summary Table at the end of this Narrative.

It is noted that the existing computed 100 year flood elevation of the on-site depression is 157.6. The maximum depth is 1.4 feet. There is no ponding for a 2 year storm event.

SOILS AND GROUNDWATER

Soil test pits and evaluation of soil permeability and groundwater monitoring through the spring of 1988 to determine seasonal high groundwater were performed in 1987 and 1988 by Schofield Brothers, Inc. Also borings were conducted by Miller Testing to determine depths of soil strata and permeability for a groundwater mounding analysis that was performed by SEA Consultant's Inc. in 1988. Many of these tests performed were also witnessed by the Agent for the Wayland Board of Health.

Testing was also performed to determine the suitability of the soils for on-site septic systems. The testing clearly demonstrates the suitability, however, the testing

methodology has changed in Mass. Title 5, so confirmatory testing will be necessary for septic system designs.

With the exception of the northwest portion of the property and at 213, the soils are a sandy loam topsoil over a loamy sand subsoil overlying the glacial outwash sands and gravels. Per the NRCS Soils Mapping, these soils are classified as Haven and Merrimack soils. The soil in the northwest corner are a Narraganset soil which is a sandy glacial till. All these soils are classified by the NRCS as being in Hydrologic Soil Group (HSG) A.

Test logs, groundwater monitoring results and the NRCS soils information are contained in Appendix 1 of this report. See Section 2 under Standard 3 for information on the mounding analysis.

PROPOSED STORMWATER DESIGN

The general stormwater management design is similar to the original approved design in the following ways:

- The existing on-site depression will be utilized as the primary discharge point for the Roadway and the eastern portion of the site, and will be utilized as a stormwater infiltration area.

- The watershed area draining to the abutting properties to the west will be reduced and a small infiltration basin will be provided to reduce the stormwater and groundwater flows to those properties to reduce the existing flooding conditions to some extent.

There have been substantial changes to the requirements for stormwater management designs since the previous approval. These include the new Wayland Stormwater and Land Disturbance Bylaw adopted in 2015 and the Massachusetts Stormwater Management Regulations which are referenced as design criterial in the Bylaw. The Massachusetts Stormwater Management Handbook (Feb 2008) sets the minimum design criteria for current design of stormwater systems (Best Management Practices or BMPs). This has resulted in a significant change in the proposed stormwater management design for this project.

There have also been substantial advances in the methods of computing stormwater runoff and particularly for stormwater infiltration BMP designs since the original approval in 1989. There is much better topographic mapping and aerial photography available that allows for more accurate determination of the watershed areas and the areas of impervious surfaces and cover types in the watershed. A key factor for this project is

that the U.S. Natural Resource Conservation Service has revised the Hydrologic Soil Group (HSG) of two of the three soil types found in the watershed from HSG "B" to HSG "A" to more accurately reflect the runoff characteristics of these soils. In this case, it means that there is actually less runoff in the watershed than previously predicted. The predicted level of flooding within the on-site depression and to the neighboring properties to the west is significantly less than previously computed.

Complete stormwater runoff calculations for the proposed conditions are contained in Section 4 of this report. Design calculations and compliance information are contained in Section 2. The Proposed Conditions Watershed Map is in Attachment 3. The following summarizes the present design:

- The proposed concept plan uses a "Limited Impact Development" (LID) approach. Under present stormwater regulations, consideration of LID concepts is required. In this concept, runoff from the driveway will simply shed off to a grass lined vegetated swale that will drain to a pre-treatment unit and then to the existing easterly depression. The project site is in the Zone 2 of a Town water supply well, so pre-treatment to a minimum 44% TSS (Total Suspended Solids) removal is required prior to recharge. For this we are proposing use of a CDS Technology Unit which is rated by MASTEP and the New Jersey Tarp for 74% TSS removal. To enhance infiltration and ease maintenance, the lowest portion of the depression will be changed to a stone lining to form a recharge basin.

- The existing 100 year flood elevation for the easterly on-site depression was previously computed to be 159.8. Using the current standards and methodology, the existing 100 year flood elevation is now computed to be 157.6, or over 2 feet less. Under the proposed condition, the flood elevation will increase slightly but is contained within the basin and drain easements are provided to encompass the working portion of the basin under all storm events. The increase in the level of flooding will be less than 6 inches over existing levels for all storms up to a 100 year event.

- A small infiltration basin (Basin 2) will be installed similar to the one proposed on the previously approved plan to protect the neighboring properties to the west which was a very important consideration in the approval of the previous plan in 1989. The results show a significant reduction in stormwater flows to the west under the proposed conditions.

- As part of the above, the subcatchment area draining to the west is reduced by just over 1 acre and will now drain to the southeast depression (Basin 1) as was done in the previous approved plan. This reduces both surface and groundwater flows to the west.

- The new roadway and portions of the driveway will drain to the southeast depression for recharge through pretreatment to 74 percent TSS removal. Some portions of the proposed house driveways that do not drain through the structural pre-treatment device will be pre-treated by draining across more than 50 feet of vegetated terrain for pre-treatment prior to the recharge basins.

- The re-grading and enlargement of the existing easterly depression that was required for the previous approved plan is eliminated with this design concept. The existing woodland on that portion of the site can remain intact and undisturbed rather than cleared and altered. This saves nearly one acre of existing woodland on the site. This also further reduces stormwater runoff.

- To further reduce runoff, the roofs of the new houses will drain to seepage pits or drip trenches to spread recharge over the site, rather than all at a central recharge facility (another LID concept).

Complete information on compliance with the 10 Standards under the Mass Stormwater Management Regulations is contained in Section 2. The following is a summary Table that shows the existing and proposed peak rates and volumes of runoff to the two design points and the existing and proposed peak elevations of ponding within the southeast depression.

Design Point #1

Storm Event	24 hr Rainfall	Peak Flow (Inflow - cfs)		Volume (acre feet)		Peak Elevation	
		Existing	Proposed	Existing	Proposed	Existing	Proposed
2 Year	3.20 in	0.00	0.26	0.000	0.035	None	156.71
5 Year	4.00 in	0.01	0.67	0.004	0.078	156.45	156.96
10 Year	4.50 in	0.03	0.98	0.023	0.126	156.66	157.13
25 Year	5.50 in	0.17	1.70	0.104	0.272	157.07	157.49
50 Year	6.50 in	0.82	2.64	0.236	0.476	157.43	157.82
100 Year	7.00 in	1.38	3.36	0.319	0.597	157.59	157.98

Design Point #2

Storm Event	24 hr Rainfall	Peak Flow (cfs)		Volume (acre feet)	
		Existing	Proposed	Existing	Proposed
2 Year	3.20 in	0.00	0.00	0.003	0.001
5 Year	4.00 in	0.03	0.01	0.021	0.007
10 Year	4.50 in	0.07	0.02	0.040	0.014
25 Year	5.50 in	0.33	0.14	0.096	0.037
50 Year	6.50 in	0.83	0.39	0.173	0.070
100 Year	7.00 in	1.16	0.56	0.218	0.089

EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

This project is over one acre in area and is subject to the NPDES Phase II requirements for construction sites. Coverage under the NPDES Construction General Permit is required.

As required for NPDES compliance, a detailed Storm Water Pollution Prevention Plan (SWPPP) will be prepared by the Developer / Contractor who will be responsible for the management of the site and compliance with the NPDES Construction General Permit and will file a Notice of Intent with the EPA for coverage under that permit. The SWPPP will also be provided for review and approval by the regulatory authorities for review prior to the start of work.