Stabilized Construction Exit

- Establish a temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway.
- Stabilize bare areas (entrances, construction routes, equipment parking areas) immediately as work takes place. Top these areas with gravel or maintain vegetative cover.
- Sediment tracked onto public streets should be removed or cleaned on a daily basis.
- A description of the Stabilized Construction Exit is included in Section VRequired Erosion and Sediment Control Practices.

Perimeter Sediment Controls

- Silt fence material and installation must comply with the standard drawing and specifications.
- Silt fencing and hay bale barriers will be entrenched to eliminate sediment underflow.
- Silt fences will be installed based on appropriate spacing intervals. This interval will decrease as the slope increases. Silt fence should be placed on or parallel to contours where there is no concentration of water flowing to the silt fence and where erosion occurs in the form of sheet erosion. On sloped areas, the area below the final silt fence shall be undisturbed ground.
- Principal sediment basins will be installed after construction site is assessed.
- Additional sediment traps and barriers will be installed as needed during grading.
- Erosion control blankets will be stapled and/or staked into place on slopes 2:1 or greater.
- The erosion control barriers will be inspected and maintained routinely throughout the duration of the project.

Runoff Control

- Install practices after sediment traps are installed and before land grading starts.
- Control the runoff in each small drainage area before flow reaches runoff from entire site.
- Divert offsite or clean runoff from disturbed areas.
- Convey surface flows from highly erodible soil and steep slopes to more suitable stable areas.
- Runoff from existing or proposed cut and fill slopes should be redirected to reduce water velocity without causing erosion.

- Final site drainage should be designed to prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.

Runoff Conveyance System

- Stabilize conveyance system.
- Channels and streambanks need to be seeded at the outlet points.
- Install check dams to slow down the velocity of concentrated flow.
- Protect existing natural drainage systems and streams by maintaining vegetative buffers and by implementing other appropriate practices.

Groundwater Recharge Measures

- Install practices to infiltrate the runoff on the site as much as possible.
- Provide groundwater recharge to maintain the hydrologic regime of the downstream water bodies and simulate predevelopment hydrology.
- Use infiltration practices to prevent concentrated flows.
- Provide soil decompaction or minimizing unneccessary soil compaction on site.

Temporary sediment basins will be constructed during this phase. Temporary berms and swales will be used to direct runoff to the basins on the site.

No sediment-laden water will be allowed to discharge to resource areas or to the existing stormwater management system on the site. Following the installation of erosion and sediment controls, the site grading and excavation will occur.

Construction Stage

The proposed building, access drive, utility/infrastructure, stormwater management system, and landscaping will be constructed during this phase. Temporary swales and berms will be constructed and maintained and relocated by the contractor as necessary to control and direct runoff to temporary basins during this phase.

Grading

- Limit the initial clearing and earth disturbance to that necessary to install sediment control measures. Excavation for footings, clearing, or other earth disturbance may only take place after the sediment and erosion controls are installed.
- Stockpile the topsoil removed from the site. The topsoil should be protected, stabilized and sited in a location away from the storm drains and waterbodies, and saved on-site for reuse if not contaminated.
- Changes in grade or removal of vegetation should not disturb established buffers and should not be allowed within any regulated distance from wetlands, the

high water line of a body of water affected by tidal action, or other such protected zones.

- Avoid unnecessry disturbance of steep slopes.
- An undisturbed buffer should be maintained to control runoff from steep slopes within sensitive areas.
- Proposed grading should not impair existing surface drainage resulting in a potential erosion hazard impacting adjacent land or waterbodies.

Erosion Control (Stabilization)

- Implement erosion control practices to keep the soil in place.
- Stabilization should be completed immediately for the surface of all perimeter controls and perimeter slopes.
- When activities temporarily cease during construction, soil stockpiles and exposed soil should be stabilized by seed, mulch or other appropriate measures as soon as possible, but in no case more than 14 days after construction activity has ceased.
- Apply temporary or permanent stabilization measures immediately on all disturbed areas where work is delayed or completed.
- Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable;
- For an area to be disturbed is more than five (5) acres at one time; in areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specification for Erosion and Sediment Control.
- Consult the local Soil and Water Conservation District for proper timing and application rate of seed, fertilizer and mulch.

Sediment Control

- At any location where surface runoff from disturbed or graded areas may flow off the construction area, sediment control measures must be installed to prevent sediment from being transported off site. No grading, filling or other disturbance is allowed within existing drainage swales.
- Swales or other areas that transport concentrated flow should be appropriately stabilized.
- Downspout or sump pump discharges must have acceptable outfalls that are protected by splash blocks, sod, or piping as required by site conditions (i.e., no concentrated flow directed over fill slopes).

Maintenance and Inspections

- Identify the type, number and frequency of maintenance actions required for stormwater management and erosion control during construction and for permanent practices that remain on the site once construction is finalized.
- Inspections must be indicated on the Construction Sequence Schedule to be prepared by the owner/contractor.
- Inspections must be performed every 7 calendar days.
- For construction where soil disturbance activities are greater than five (5) acres of soil at any one time, the inspection must be performed at least two (2) times every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
- Inspections must verify that all practices are adequately operational, maintained properly, and that sediment is removed from all control structures.
- Inspections must look for evidence of the soil erosion on the site, potential of pollutants entering drainage systems, problems at discharge points (such as turbidity in receiving water), and signs of soil and mud transport from the site to the public road at the entrance.
- Routine maintenance must be identified on the schedule and performed on a regular basis and as soon as a problem is identified.
- Identify the person or entities responsible for conducting the maintenance actions during construction and post-construction.
- Retain a copy of the inspection on-site with the SWPPP.
- Color photographs shall be taken during inspection and shall be included in the inspection report.
- Inspection and maintenance shall be in compliance with Part IV of the SPDES Permit requirements.

Final Grading and Stabilization Stage

Final site grading and stabilization will be completed as soon as practicable to eliminate exposed soils and potential sources of erosion. Areas to be paved will be covered by bituminous pavement after final subgrades are established. All litter, as well as debris generated by construction activities, will be removed by hand from the site and adjacent undeveloped areas.

Finalize Grading & Landscaping

- Identify the final grading and stabilization plan once the construction is completed.
- All open areas, including borrow and spoil areas must be stabilized.
- Plan a permanent top soil, seed, sod, mulch, riprap or other stabilization practices in the remaining disturbed areas as appropriate.

- Stabilization must be undertaken no later than 14 days after construction activity has ceased except as noted in the GP-0-15-002.
- Remove the temporary control measures.
- Provide soil decompaction or minimizing unneccessary soil compaction on site.

Post-construction Controls

- Identify the permanent structural or non-structural practices that will remain on the site.
- Ensure that the permanent structural or non-structural practices utilized during construction are properly designed to suit the post-construction site conditions.
- In finalizing the plan, evaluate the post-construction runoff condition on the site.
- Minimize the risk of concentrated flow and erosion.
- On-site runoff controls help reduce the risk of increased runoff velocity, erosion and point source discharge. In addition to the standard runoff and erosion control practices identified in NY Standards for Erosion and Sediment Control, some of the techniques discussed under on-site runoff control in the discussion of Site Preparation may be applied.

Project Materials

The materials or substances below are expected to be present on-site during the construction period:

Structural Steel	*Welding Supplies*
Concrete	*Petroleum-Based Products*
Metal Studs	*Paints*
Cleaning Solvents	*Wood*
Detergents	*Fertilizer*

This materials list will be updated by the contractor, as necessary, prior to and during the construction process.

Non-Industrial Discharges

The following non-stormwater discharges may occur on this construction site:

- Fire hydrant flushing;
- Potable water including uncontaminated water line flushing;
- Pavement wash water where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
- Uncontaminated air conditioning or compressor condensate;

- Uncontaminated ground water or spring water;
- Foundation or footing drains where flows are not contaminated with process materials such as solvents; and
- Uncontaminated excavation dewatering;

V

Required Erosion and Sediment Control

The Owner/Operator will be responsible for ensuring that the specified stormwater pollution control measures are installed, maintained, relocated and added to as necessary. Details of recommended stormwater pollution control techniques are provided below. Refer to Attachment F for erosion and sediment control plan.

Erosion and Sediment Controls

The purpose of an erosion and Sediment control program is to minimize temporary impacts to downgradient wetlands during the construction phase of the project by retaining sediment on site to the maximum extent practicable. The program incorporates BMPs specified in guidelines developed by the DEC[1] and complies with the requirements of the SPDES General Permit for Storm Water Discharges from Construction Activities and Village of Mamaroneck.

Proper implementation of the erosion and Sediment control program will:

- minimize exposed soil areas through temporary seeding and construction sequencing;
- place structures to manage stormwater runoff and erosion; and
- establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

All manufactured control measures must be installed and maintained in accordance with the manufacturer's specifications. The following sections describe the erosion and Sediment controls that will be used on this site. The Owner/Operator will implement and add to these site conditions, when required.

Stabilization Practices

Stabilization practices to be used on this site include mulching and temporary seeding. Stabilization practices will be initiated as soon as practicable in portions of the site where

1 New York State Department of Environmental Conservation (DEC). *New York Stormwater Management Design Manual*, January 2015 and *New York Standards and Specifications for Erosion and Sediment Control*, November 2016

construction activities have temporarily or permanently ceased. The project has been designed to preserve existing vegetation where possible.

Site Layout

A naturally occurring vegetated buffer that will be flagged on site before construction will provide protection for the on-site wetland areas and resources adjacent to the site in addition to the various selected BMPs.

Mulching

Straw mulching will be employed on all inactive and disturbed areas that will remain unstabilized for more than 14 days. Mulch materials will be spread uniformly by hand or machine at a rate of approximately 100 pounds per 1,000 square feet. Mulch will be spread such that at least 75 percent of the ground surface is covered. Mulching may be used with temporary or permanent seeding, or with slope stabilization techniques. Hydro mulch may also be used for temporary soil stabilization

- For an area to be disturbed is more than five (5) acres at one time; in areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specification for Erosion and Sediment Control.

Erosion Control Slope Blankets

Upon completion of final grading, any areas not covered by pavement, other forms of stabilization or landscaping and which are on slopes of 2:1 and greater will be protected with erosion control slope blankets and seeded with an erosion control seed mix. The blanket will be installed from the top of the slope, with the upper edge of the blanket secured in a trench. Blankets shall be unrolled down the slope or swale in the direction of the water flow. Edges of blanket shall be stapled with approximately four inches of overlap where two or more strip widths are required. The end of an upper blanket shall overlap the end of a lower blanket by at least six inches and both ends shall be stapled in place. The blankets will be staked and/or stapled into place as per manufacturer's recommendations.

Temporary Seeding

A temporary vegetative cover will be established on areas of exposed soils (including stockpiles) that remain inactive and unstabilized for a period of more than 14 days for slopes. The seeded surfaces will be covered with a layer of straw mulch or hydro mulch as described above.

Permanent Seeding

Upon completion of final grading, any areas not covered by pavement, other forms of stabilization, or other methods of landscaping will be seeded with an erosion control seed mix. Loamed and seeded areas will be mulched with hay to prevent erosion prior to germination of the seed.

Structural Practices

Structural erosion and Sediment controls to be used on the site include the following:

Hay Bale and Silt Fence Barriers

Prior to any ground disturbance, a professional engineer or land surveyor will certify that a barrier of staked hay bales and silt fence is in place at the downgradient limit of work in accordance with the plan filed with the Conservation Commission (see relevant plans). When necessary, additional hay bale and silt fence barriers will be installed immediately downgradient of erosion-prone areas, such as the base of steep exposed slopes and around the base of stockpiles, throughout the construction phase of the project. The barriers will be entrenched into the substrate to prevent underflow.

The erosion control barriers will be inspected weekly and after every storm event. Any sediment that collects behind the barriers will be removed and will be either reused at the site or disposed of at a suitable offsite location. Any damaged sections of silt fence or hay bales will be repaired or replaced.

Catch Basin Inlet Protection

The inlets of proposed catch basins will be protected from sediment inflow during the work period by following the guideline specify by New York State Standards and Specifications for Erosion and Sediment Control (aka blue book) or approved equal.

Stabilized Construction Exits

Stone anti-tracking pads will be installed at each access point to the work area to prevent the off-site transport of sediment by construction vehicles. The stabilized construction exits will be at least fifty feet long and will consist of a 6-inch thick layer of crushed stone (1.5 to 2.5 inches in diameter). The stone will be placed over a layer of non-woven filter fabric. The anti-tracking pads will remain in place until a binder coat of pavement has been established in areas to be paved.

Diversion Channels

Diversions will also be used to collect runoff from construction areas and convey it to a temporary sediment basin or trap. Diversion Channels must be constructed properly with *stabilized beds using crushed stone, plastic or other approved materials, crushed stone check dams as necessary.*

Temporary diversions will remain in place until slopes are permanently stabilized or graded level. If vegetation of the diversion channel is required to avoid erosion of the channel, the channel will be temporarily stabilized to ensure viability of the grass seed.

VI
Additional Erosion and Sediment Controls

The following controls may be implemented at the site if necessary.

Interior Site Erosion Controls

Additional erosion controls may be used in the central portions of the site in the event that excessive erosion occurs. Placement of temporary silt fence, hay bales or earthen berms may be used to control the movement of material within the site. If such controls are deemed necessary for adequate protection, they will be installed perpendicular to the flow direction to contain sediment. These measures will be installed to prevent perimeter erosion controls and diversion swales from becoming compromised.

Dust Control

Fugitive dust from large areas of unstabilized soil can be a problem during construction. On dry and windy days when dust generation is a concern, a water truck will traverse the site and spray water as necessary to prevent dust from forming.

VII
Water Quality Controls

The Owner/Operator will be responsible for ensuring that the specified water quality and water quantity control measures are installed and maintained as necessary. Details of recommended stormwater pollution control techniques are provided below.

Water Quality Controls

Water quality control measures are designed to minimize impact to receiving waterbodies from stormwater pollution. As stormwater runoff travels across impervious surfaces, it collects pollutants such as sediments, oil, and trash and carries them to a receiving waterbody. Properly installed and maintained stormwater best management practices (BMPs) can capture these pollutants and reduce the impact that the proposed development has on the environment. The BMPs selected for this project were designed based on guidelines developed in the New York State Stormwater Management Design Manual[2] and Village of Mamaroneck.

Proper implementation of the water quality control measures will:

- reduce post-construction sediment impacts; and
- promote infiltration of stormwater to maintain pre-construction hydrology

All manufactured control measures must be installed and maintained in accordance with the manufacturer's specifications. The following sections describe the water quality controls that will be used on this site. The Owner/Operator will implement and add to these site conditions, when required.

2 New York State Department of Environmental Conservation (DEC). *New York Stormwater Management Design Manual*, January 2015

Non-structural Practices

Pavement Sweeping

The sweeping program will remove sediments and contaminants directly from paved surfaces before their release into stormwater runoff. Pavement sweeping has been demonstrated to be an effective initial treatment for reducing pollutant loading.

Catch Basin Cleaning

Sediments and other contaminants that are not removed by pavement sweeping are transported by stormwater runoff to the site's catch basin system. Once in the catch basin, they settle to the bottom of the system. This material will be removed on a regular basis to prevent contaminants from migrating out of the drainage system during high flow events or reducing the infiltration capacity of the devices.

Infiltration Practices

The following infiltration practices have been selected and approved for installation at this site.
Infiltration Basin
Infiltration basin capture, temporarily store and infiltrate the WQv into the soil.

Filtering Practices

The following filtering practice has been selected and approved for installation at this site.
Bioretention Basin
Bioretention basin is a filtering practices to temporarily store the WQv and filter it through a special engineering soil mixture.

VIII

Maintenance, Inspections and Project Documentation

The SPDES Construction General Permit requires that the Owner/Operator be responsible for implementing, inspecting and maintaining each of the stormwater controls described in the plan. In addition, the Owner/Operator must document compliance with the Permit throughout construction.

Inspections

The operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP and required by this permit have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days. If the soil disturbance is greater than five (5) acres at any one time, the qualified inspector shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. During each inspection, the qualified professional shall record the information required by Part IV.C.4 of the Permit. Color photographs shall be taken during inspection and shall be included in the inspection report

Inspections shall include all areas of the site disturbed by construction activity and areas used for materials storage that are exposed to precipitation. The Inspector must look for evidence of, or the potential for, pollutants entering the storm water system, inspect the BMPs installed as part of the Plan, inspect the site drainage outfalls and inspect the site egress points for tracking. If, in the course of the inspection, the inspector identifies an eroded area or an area impacted by sedimentation, additional erosion and Sediment controls will be implemented, and the SWPPP will be revised to include these changes.

For each inspection, the inspector must complete a written inspection report in accordance with the Permit. The operator shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the operator shall certify in the site log book that the SWPPP, prepared in accordance with Part III of this permit, meets all Federal, State and local erosion and sediment control requirements. The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

The completed forms become part of the Owner/Operator's SWPPP and should be maintained for five years after the filing of the Notice of Termination. Prior to filing of the Notice of Termination or the end of permit term, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

Maintenance

All erosion and sediment controls and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections identify BMPs that are not operating effectively, maintenance, modification or replacement with an alternative or additional BMPs must be performed as soon as possible, and before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as possible.

The following maintenance program is proposed to ensure the effectiveness of the structural controls during the construction phase of this project:

- The on-site representative will inspect all sediment and erosion control structures and records of the inspections will be prepared and maintained on-site by the Owner/Operator.
- Silt shall be removed from behind barriers if greater than 6-inches deep or as needed.
- Paved areas of the site will be swept on an as needed basis during the site construction.
- Damaged or deteriorated items will be repaired immediately after identification.
- The underside of hay bales should be kept in close contact with the earth and reset as necessary.
- Sediment from sediment traps or sedimentation ponds must be removed when design capacity has been reduced by 50 percent or every five to six years.
- Sediment that is collected in structures shall be disposed of properly and covered if stored on-site.

- Erosion control structures shall remain in place until all disturbed earth has been securely stabilized. After removal of structures, disturbed areas shall be re-graded and stabilized as necessary.

If, in the course of the inspection, the inspector identifies an eroded area or an area impacted by sedimentation, additional erosion and sediment controls will be implemented, and the SWPPP will be revised to include these changes.

Documentation

The following records must be maintained as part of the Owner/Operator's SWPPP:

- Dates when major grading activities occur;
- Dates when construction activities temporarily or permanently cease on a portion of the site;
- Dates when stabilization measures are initiated;
- Inspection dates and processes.

Homeowner Association

Upon completion of proposed development construction, the homeowner association would be responsible for inspection and maintaining of the proposed stormwater management facilities.

- Refer to attachment A and B for the construction inspection and maintenance inspection checklist for the stormwater management practices.
- Refer to attachment E for CDS inspection and maintenance manual.
- A conspicuous and legible sign of not less than 18 inches by 24 inches shall be erect or post in the immediate vicinity of each stormwater management practices bearing the following information:

  Stormwater Management Practice – (name of practice)
  Project Identification - (SPDES Construction Permit #, other)
  Must Be Maintained in Accordance With O&M Plan
  DO NOT REMOVE OR ALTER

IX
Spill Prevention Plan and Response Procedures

All construction personnel will be instructed regarding spill prevention practices and procedures. Notices stating these practices will be posted in the office trailer, and the site construction supervisor will be responsible for seeing that these procedures are followed.

Material Management Practices

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. These include good housekeeping practices and guidelines for the handling of hazardous products.

The following good housekeeping practices will be followed on-site during the construction period.

- An effort will be made to store only enough products required to do the job.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers, and (if possible) under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site superintendent will inspect the storage area daily to ensure proper use and disposal of materials on-site.

The following practices will reduce the risks associated with hazardous materials (e.g., petroleum products, solvents):

- A copy of all Material Safety Data Sheets (MSDS) for materials or products used during construction will be kept in the office trailer.
- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data (MSD sheets) will be retained; they contain important product information.
- If surplus product must be disposed, manufacturer's or local- and state-recommended methods for proper disposal will be followed.

Product-Specific Practices

The following product-specific practices will be followed on-site. Recommendations are provided for petroleum products, fertilizers, solvents, paints, and other hazardous substances, and concrete.

Petroleum Products

All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. No vehicle maintenance or handling of petroleum products will occur within 100 feet of a wetland or waterway. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on-site will be applied according to manufacturer's recommendations. No petroleum-based or asphalt substances will be stored within 100 feet of a wetland or waterway.

Fertilizers

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed; and the contents of any partially used bags will be transferred to a sealable, plastic bin to avoid spills. No fertilizer storage will occur within 100 feet of a wetland or waterway. Refer to the “NYS Dishwater Detergent and Nutrient Runoff Law” for regulation regarding usage of fertilizers. Usage of fertilizers also shall be restricted in the aquifer overlay district and any restrictions from the habitat management plan.

Solvents, Paints, and other Hazardous Substances

All containers will be tightly sealed and stored when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations. No storage will occur within 100 feet of a wetland or waterway.

Concrete Trucks

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water within 100 feet of wetland resources or into catch basins that are already in place.

Spill Control/Notification Practices

In addition to the good housekeeping and material management practices discussed above, the following practices will be followed for spill control, notification and cleanup.

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but will not be limited to, shovels, wheelbarrows, brooms, dustpans, mops, rags, gloves, goggles, kitty litter or Speedi-Dry, sand, sawdust, and plastic and metal trash containers specifically designated for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material in excess of reportable quantities, as established by the New York State Department of Environmental Conservation (NYSDEC), will be reported to the NYSDEC Spill Hotline: 1-800-457-7362 (within NYS) or 1-518 457-7362 (from outside NYS) or to the National Response Center: 1-800-424-8802. The Emergency Spill Response Procedure is attached.
- The construction superintendent responsible for the daily operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel to receive spill prevention and cleanup training. The names of the responsible spill personnel will be posted in the material storage area and in the on-site office trailer.

Source Control

Trash removal, designated trash storage areas, pavement sweeping and the controlled use of fertilizer and deicing agents on the site will reduce the pollutant load in the site’s stormwater management system.

Construction Trash Removal

Daily loose trash removal will prevent litter, construction debris, and construction chemicals exposed to stormwater from becoming a pollutant source for stormwater discharges. All loose trash will be placed in appropriate storage containers until disposed of properly off-site.

Covered Trash/Storage Areas

Areas to be used for storing dumpsters, compactors or other raw or waste materials will be covered to prevent contact with stormwater.

Pavement Sweeping

Pavement sweeping may be required daily or even more frequently during construction where sediment tracking from construction equipment is a problem.

Fertilizer

Only slow-release organic fertilizers will be used in landscaped areas. This will limit the amount of nutrients that could enter the stormwater and wetland systems. Fertilizer use will be reduced once the proposed landscaping is established. Refer to the "NYS Dishwater Detergent and Nutrient Runoff Law" for regulation regarding usage of fertilizers.

Waste Disposal

All waste materials will be collected and stored in securely lidded metal dumpsters leased from a licensed solid waste management company and the dumpster will be emptied as necessary. Trash will be hauled by a licensed contractor and disposed in accordance with federal, state, and local environmental regulations. No trash or construction waste will be buried on-site, and all personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and the site construction supervisor will be responsible for seeing that these procedures are followed.

Hazardous Waste

All hazardous waste materials (e.g., petroleum products, solvents) will be disposed in the manner specified by local and state regulation, or by the manufacturer. Site personnel will be instructed in these practices, and the site construction supervisor will be responsible for seeing that these procedures are followed.

Sanitary Waste

All sanitary waste will be collected from the portable units by a licensed contractor a minimum of three times weekly, and disposed in compliance with state and local regulation.

Spill Response Procedure

Initial Notification

In the event of a spill, the facility and/or construction manager or supervisor will be notified immediately.

Facility Manager: (name) ______________________________

(phone) ______________________________

Construction Manager: (name) ______________________________

(phone) ______________________________

Assessment - Initial Containment

The supervisor or manager will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. The supervisor will first contact the *Village of Mamaroneck* Fire Department and then notify the *Village of Mamaroneck* Police Department and *Westchester County* Public Health Commission. The fire department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department: 911 or *(914) -698-0200*

Police Department: *(914) 777-1122*

Westchester County Public Health Commission: *(914) 813-5000*

Further Notification

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The New York Department of Environmental Conservation and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of cleanup and notification required. The attached list of emergency phone numbers shall be posted in the main construction/facility office and readily accessible to all employees.

NYSDEC Spill Hotline: 1-800-457-7362 (within NYS)

National Response Center: 1-800-424-8802 / (518) 457-7362 (outside NYS)

For further information, contact:

New York State Department of Environmental Conservation

Division of Environmental Remediation

Bureau of Spill Prevention & Response

625 Broadway – 11th Floor

Albany, NY 12233-7020

(518) 402-9546

HAZARDOUS WASTE / OIL SPILL REPORT

Date_____/_____/______ Time_______________ AM / PM

Exact location (Transformer #)____

Type of equipment______________________________Make_______________Size________________

S / N_____________________________________Weather Conditions______________________

On or near water ☐ Yes If yes, name of body of water________________________

☐ No

Type of chemical / oil spilled______________________________

Amount of chemical / oil spilled___________________________

Cause of spill____

____

____

Measures taken to contain or clean up spill____

____

____

Amount of chemical / oil recovered___________________Method________________________

Material collected as a result of clean up

_______________drums containing____

_______________drums containing____

_______________drums containing____

Location and method of debris disposal____

____

Name and address of any person, firm, or corporation suffering damages_______________________

____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring________

____

Spill reported to General Office by_____________________________Time______________AM / PM

Spill reported to DEC / National Response Center by____________________________________

DEC Date_____/_____/______ Time___________ AM / PM Inspector__________________

NRC Date_____/_____/______ Time___________ AM / PM Inspector__________________

Additional comments____

____

____

EMERGENCY RESPONSE EQUIPMENT
INVENTORY

The following equipment and materials shall be maintained at all times and stored in a secure area for construction activities emergency response need.

--	SORBENT PADS	5 PADS
--	SAND BAGS (empty)	10
--	SPEEDI-DRI ABSORBENT	5 40# BAGS
--	SHOVEL	1
--	PICK	1
--	PRY BAR	1

The following items shall be placed in a convenient, readily accessible location on site.

--	HAY BALES & GRADE STAKES	10
--	SAND	2 CUBIC YARDS

EMERGENCY NOTIFICATION PHONE NUMBERS

1. SUPERVISOR/MANAGER
   NAME: ____________________ BEEPER: ___________________________
   PHONE: ____________________ HOME PHONE: ____________________

   ALTERNATE:
   NAME: ____________________ BEEPER: ___________________________
   PHONE: ____________________ HOME PHONE: ____________________

2. *Village of Mamaroneck* FIRE DEPARTMENT
   EMERGENCY: 911 or *(914) -698-0200*

   Village of Mamaroneck POLICE DEPARTMENT
   GENERAL NUMBER: *(914) 777-1122*

3. CLEANUP CONTRACTOR: ________________________________
   ADDRESS: ____
   PHONE: ____

4. NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION
   EMERGENCY: 1-800-457-7362
   OUTSIDE NEW YORK: 1-518 457-7362

5. NATIONAL RESPONSE CENTER
   PHONE: 1-800-424-8802

   ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY
   BUSINESS: 1-212-637-3660

6. *Westchester County* PUBLIC HEALTH COMMISSION – ENVIRONMENTAL PROTECTION
   PHONE: *(914) 813-5000*

X
Notice of Termination Form

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

5. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. ☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP.
***Date final stabilization completed** (month/year): ____

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? ☐ yes ☐ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed?
☐ yes ☐ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? ☐ yes ☐ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):
- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, the deed of record has been modified to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? ____________________ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes ☐ no
(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:
(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued	
VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2010)

XI
SPDES Permit & Fact Sheet

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

John J. Ferguson
Chief Permit Administrator

1 / 12 / 15

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL").*

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:
http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES

I. **Part I. PERMIT COVERAGE AND LIMITATIONS**

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

(ii) Control stormwater *discharge*s to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharge*s from the site;

(vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

(vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and

(viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from dewatering activities, including *discharge*s from dewatering of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharges*.** The following *discharges* are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

   a. ***Sizing Criteria* for *New Development***

      (i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

      (ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

      In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

b. ***Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed**

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

c. ***Sizing Criteria* for *Redevelopment Activity***

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

d. ***Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development***

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **<u>not</u>** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharges* from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

II. **Part II. OBTAINING PERMIT COVERAGE**

A.Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

NOTICE OF INTENT
NYS DEC, Bureau of Water Permits
625 Broadway, 4th Floor
Albany, New York 12233-3505

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI.

The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied <u>all</u> of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

(ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

(iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. The Department may suspend or deny an *owner's or operator's* coverage

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall

have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *regulated, traditional land use control MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice

D. Permit Coverage for Discharges Authorized Under GP-0-10-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

E. Change of *Owner or Operator*

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, <u>in writing,</u> of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

III. Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

   b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   > "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

   In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project;

   b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

   c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

   d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

   b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

   c. A Stormwater Modeling and Analysis Report that includes:

      (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

      (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

      (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

      (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

IV. Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

   d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of *discharge* from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

(Part IV.C.4.i)

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

V. Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

   b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

   c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.

   d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

(Part V.A.5)

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

   a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

   b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

   c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

   d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

VI. Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

VII. Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

   a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

VIII. **APPENDIX A**

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “*Construction Activity(ies)*” also.

***Construction Activity*(ies) -** means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State
or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

New Development – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York..

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

IX. **APPENDIX B**

Required SWPPP Components by Project Type

Table 1
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other agricultural building, silo, stock yard or pen.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Bike paths and trails
- Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* <u>or</u> *alter the hydrology from pre to post development* conditions, <u>and</u> are not listed in Table 1

X. **APPENDIX C**

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

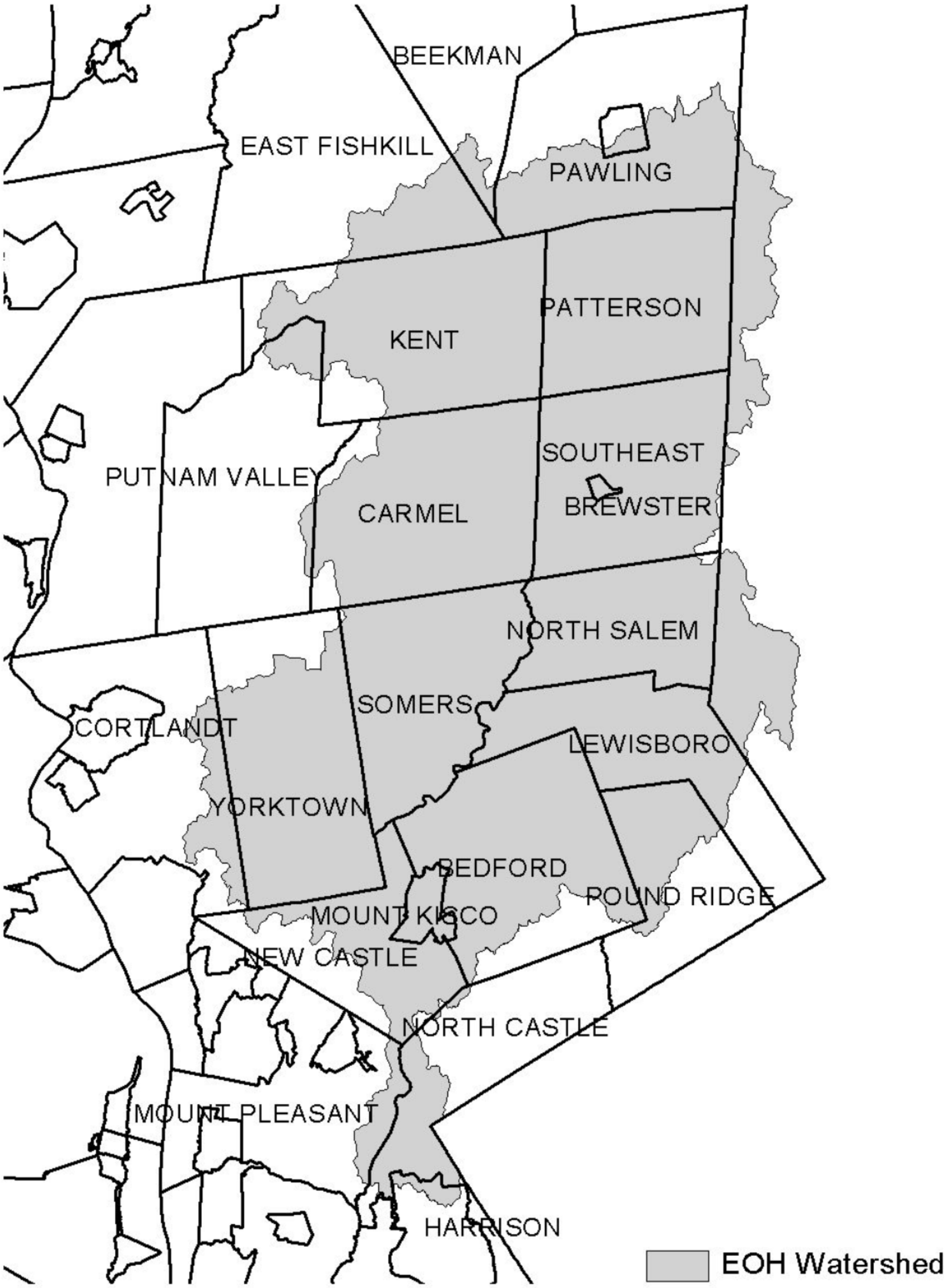


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

Figure 4 - Oscawana Lake Watershed

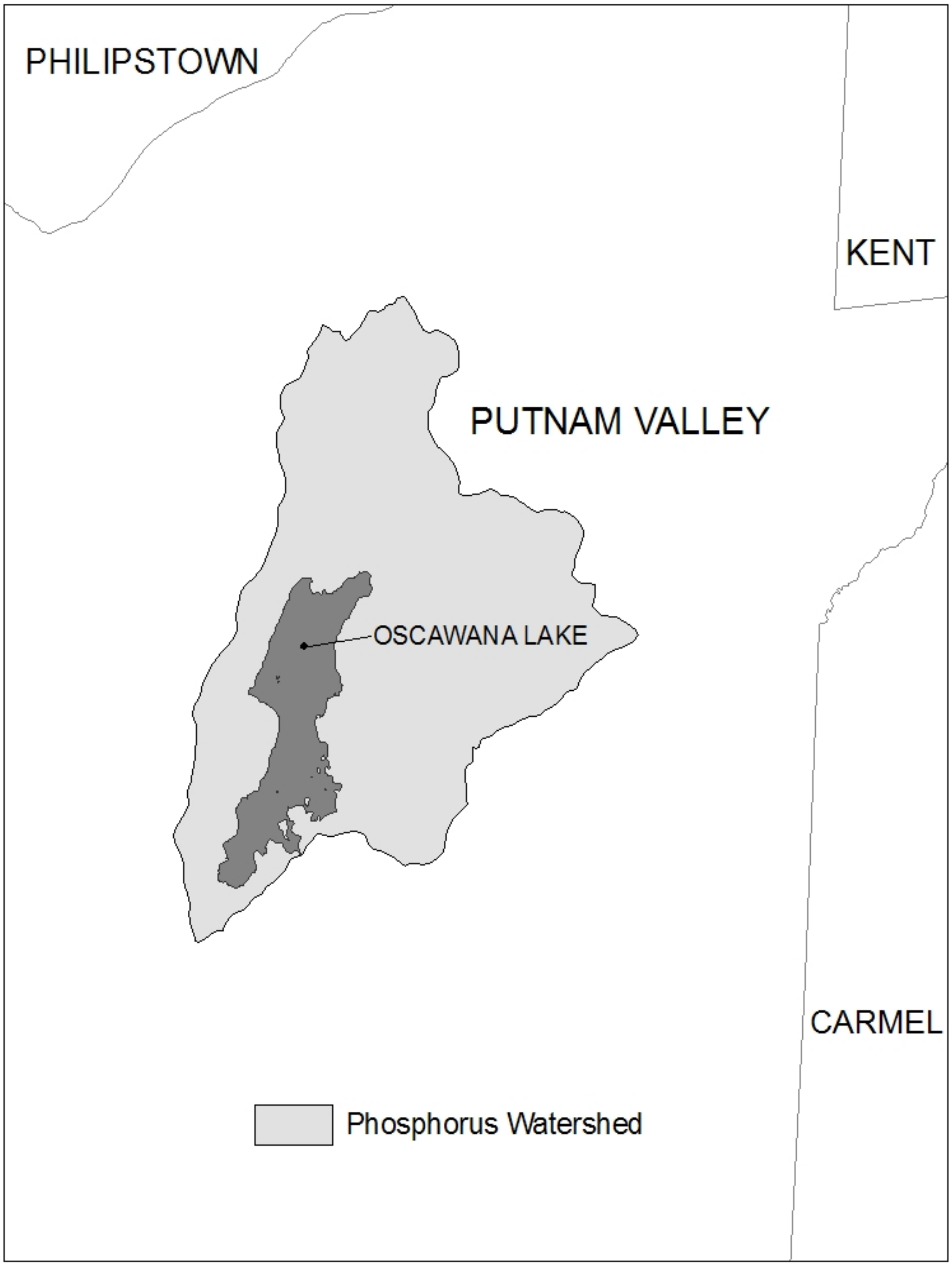
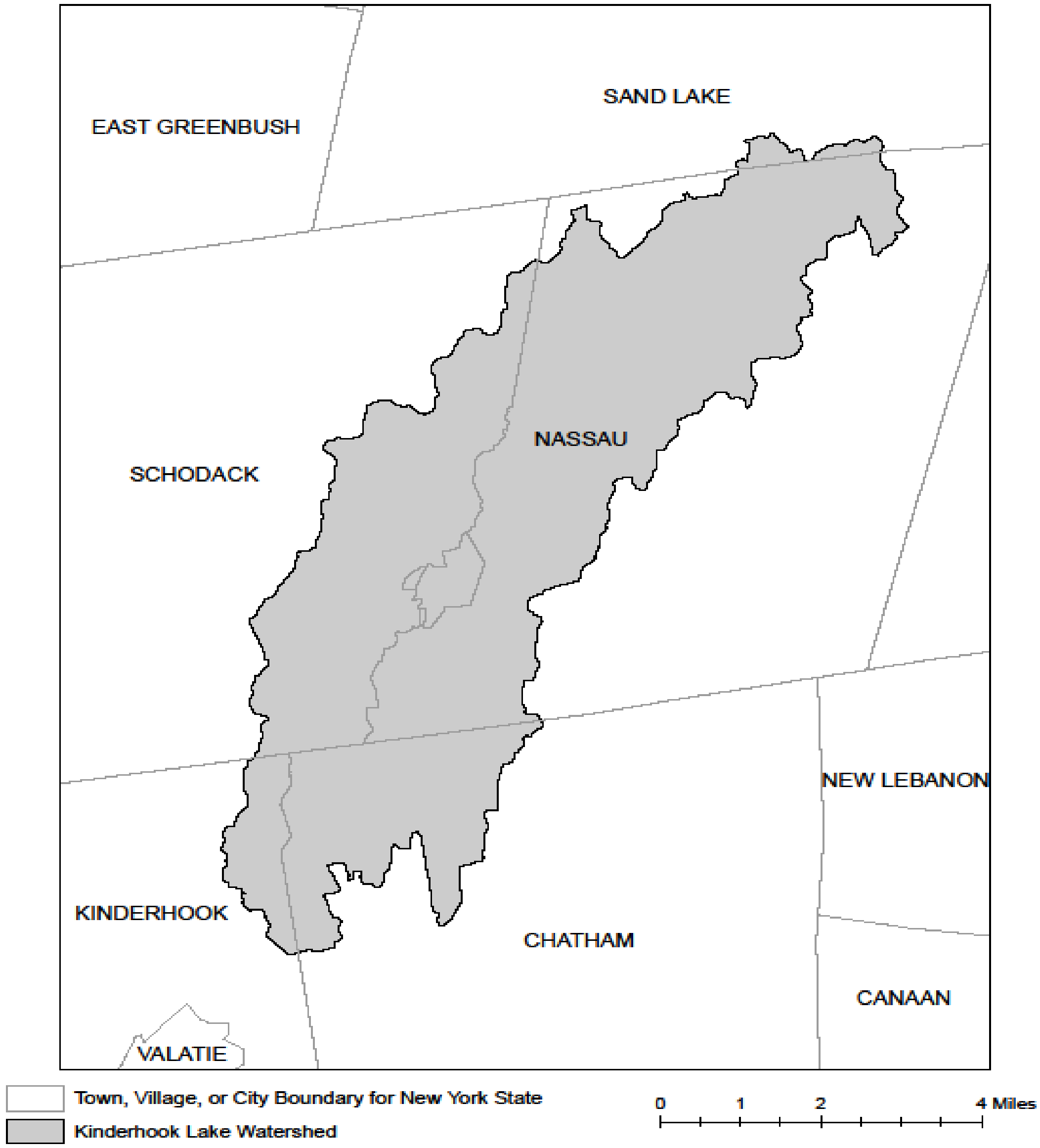


Figure 5: Kinderhook Lake Watershed



XI. APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

XII. APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond
Albany	Basic Creek Reservoir
Allegheny	Amity Lake, Saunders Pond
Bronx	Van Cortlandt Lake
Broome	Whitney Point Lake/Reservoir
Broome	Fly Pond, Deer Lake
Broome	Minor Tribs to Lower Susquehanna (north)
Cattaraugus	Allegheny River/Reservoir
Cattaraugus	Case Lake
Cattaraugus	Linlyco/Club Pond
Cayuga	Duck Lake
Chautauqua	Chautauqua Lake, North
Chautauqua	Chautauqua Lake, South
Chautauqua	Bear Lake
Chautauqua	Chadakoin River and tribs
Chautauqua	Lower Cassadaga Lake
Chautauqua	Middle Cassadaga Lake
Chautauqua	Findley Lake
Clinton	Great Chazy River, Lower, Main Stem
Columbia	Kinderhook Lake
Columbia	Robinson Pond
Dutchess	Hillside Lake
Dutchess	Wappinger Lakes
Dutchess	Fall Kill and tribs
Erie	Green Lake
Erie	Scajaquada Creek, Lower, and tribs
Erie	Scajaquada Creek, Middle, and tribs
Erie	Scajaquada Creek, Upper, and tribs
Erie	Rush Creek and tribs
Erie	Ellicott Creek, Lower, and tribs
Erie	Beeman Creek and tribs
Erie	Murder Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs
Erie	Little Sister Creek, Lower, and tribs
Essex	Lake George (primary county: Warren)
Genesee	Black Creek, Upper, and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem
Genesee	Oak Orchard Creek, Upper, and tribs
Genesee	Bowen Brook and tribs
Genesee	Bigelow Creek and tribs
Genesee	Black Creek, Middle, and minor tribs
Genesee	LeRoy Reservoir
Greene	Schoharie Reservoir

COUNTY	WATERBODY
Greene	Sleepy Hollow Lake
Herkimer	Steele Creek tribs
Kings	Hendrix Creek
Lewis	Mill Creek/South Branch and tribs
Livingston	Conesus Lake
Livingston	Jaycox Creek and tribs
Livingston	Mill Creek and minor tribs
Livingston	Bradner Creek and tribs
Livingston	Christie Creek and tribs
Monroe	Lake Ontario Shoreline, Western
Monroe	Mill Creek/Blue Pond Outlet and tribs
Monroe	Rochester Embayment - East
Monroe	Rochester Embayment - West
Monroe	Unnamed Trib to Honeoye Creek
Monroe	Genesee River, Lower, Main Stem
Monroe	Genesee River, Middle, Main Stem
Monroe	Black Creek, Lower, and minor tribs
Monroe	Buck Pond
Monroe	Long Pond
Monroe	Cranberry Pond
Monroe	Mill Creek and tribs
Monroe	Shipbuilders Creek and tribs
Monroe	Minor tribs to Irondequoit Bay
Monroe	Thomas Creek/White Brook and tribs
Nassau	Glen Cove Creek, Lower, and tribs
Nassau	LI Tribs (fresh) to East Bay
Nassau	East Meadow Brook, Upper, and tribs
Nassau	Hempstead Bay
Nassau	Hempstead Lake
Nassau	Grant Park Pond
Nassau	Beaver Lake
Nassau	Camaans Pond
Nassau	Halls Pond
Nassau	LI Tidal Tribs to Hempstead Bay
Nassau	Massapequa Creek and tribs
Nassau	Reynolds Channel, east
Nassau	Reynolds Channel, west
Nassau	Silver Lake, Lofts Pond
Nassau	Woodmere Channel
Niagara	Hyde Park Lake
Niagara	Lake Ontario Shoreline, Western
Niagara	Bergholtz Creek and tribs
Oneida	Ballou, Nail Creeks
Onondaga	Ley Creek and tribs
Onondaga	Onondaga Creek, Lower and tribs

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY
Onondaga	Onondaga Creek, Middle and tribs
Onondaga	Onondaga Creek, Upp, and minor tribs
Onondaga	Harbor Brook, Lower, and tribs
Onondaga	Ninemile Creek, Lower, and tribs
Onondaga	Minor tribs to Onondaga Lake
Onondaga	Onondaga Creek, Lower, and tribs
Ontario	Honeoye Lake
Ontario	Hemlock Lake Outlet and minor tribs
Ontario	Great Brook and minor tribs
Orange	Monhagen Brook and tribs
Orange	Orange Lake
Orleans	Lake Ontario Shoreline, Western
Oswego	Pleasant Lake
Oswego	Lake Neatahwanta
Putnam	Oscawana Lake
Putnam	Palmer Lake
Putnam	Lake Carmel
Queens	Jamaica Bay, Eastern, and tribs (Queens)
Queens	Bergen Basin
Queens	Shellbank Basin
Rensselaer	Nassau Lake
Rensselaer	Snyders Lake
Richmond	Grasmere, Arbutus and Wolfes Lakes
Rockland	Congers Lake, Swartout Lake
Rockland	Rockland Lake
Saratoga	Ballston Lake
Saratoga	Round Lake
Saratoga	Dwaas Kill and tribs
Saratoga	Tribs to Lake Lonely
Saratoga	Lake Lonely
Schenectady	Collins Lake
Schenectady	Duane Lake
Schenectady	Mariaville Lake
Schoharie	Engleville Pond
Schoharie	Summit Lake
Schuyler	Cayuta Lake
St. Lawrence	Fish Creek and minor tribs
St. Lawrence	Black Lake Outlet/Black Lake
Steuben	Lake Salubria
Steuben	Smith Pond
Suffolk	Millers Pond
Suffolk	Mattituck (Marratooka) Pond
Suffolk	Tidal tribs to West Moriches Bay
Suffolk	Canaan Lake
Suffolk	Lake Ronkonkoma
Suffolk	Beaverdam Creek and tribs
Suffolk	Big/Little Fresh Ponds
Suffolk	Fresh Pond
Suffolk	Great South Bay, East
Suffolk	Great South Bay, Middle
Suffolk	Great South Bay, West
Suffolk	Mill and Seven Ponds
Suffolk	Moriches Bay, East
Suffolk	Moriches Bay, West
Suffolk	Quantuck Bay
Suffolk	Shinnecock Bay (and Inlet)
Sullivan	Bodine, Montgomery Lakes
Sullivan	Davies Lake
Sullivan	Pleasure Lake
Sullivan	Swan Lake
Tompkins	Cayuga Lake, Southern End
Tompkins	Owasco Inlet, Upper, and tribs
Ulster	Ashokan Reservoir
Ulster	Esopus Creek, Upper, and minor tribs
Ulster	Esopus Creek, Lower, Main Stem
Ulster	Esopus Creek, Middle, and minor tribs
Warren	Lake George
Warren	Tribs to L.George, Village of L George
Warren	Huddle/Finkle Brooks and tribs
Warren	Indian Brook and tribs
Warren	Hague Brook and tribs
Washington	Tribs to L.George, East Shr Lk George
Washington	Cossayuna Lake
Washington	Wood Cr/Champlain Canal, minor tribs
Wayne	Port Bay
Wayne	Marbletown Creek and tribs
Westchester	Lake Katonah
Westchester	Lake Mohegan
Westchester	Lake Shenorock
Westchester	Reservoir No.1 (Lake Isle)
Westchester	Saw Mill River, Middle, and tribs
Westchester	Silver Lake
Westchester	Teatown Lake
Westchester	Truesdale Lake
Westchester	Wallace Pond
Westchester	Peach Lake
Westchester	Mamaroneck River, Lower
Westchester	Mamaroneck River, Upp, and tribs
Westchester	Sheldrake River and tribs
Westchester	Blind Brook, Lower
Westchester	Blind Brook, Upper, and tribs
Westchester	Lake Lincolndale
Westchester	Lake Meahaugh
Wyoming	Java Lake
Wyoming	Silver Lake

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

XIII. APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

FACT SHEET

For

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES
from
CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

January 2015

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INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) has renewed the SPDES General Permit for Stormwater Discharges from Construction Activity as GP-0-15-002. The new general permit is effective on January 29, 2015. GP-0-15-002 replaces the previous general permit, GP-0-10-001 which expires on January 28, 2015.

The SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) is a five (5) year permit intended to cover discharges of stormwater to surface waters of the State from construction activities as defined in 40 CFR Part 122.26(b)(14)(x) and (b)(15)(i - ii). This general permit may also authorize discharges of stormwater to groundwater in cases where the NYSDEC has determined that a permit is necessary.

Pursuant to Section 402 of the Clean Water Act (“CWA”), stormwater discharges from certain construction activities (including discharges through a municipal separate storm sewer system) are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York’s State Pollutant Discharge Elimination System (SPDES) is a NPDES-approved program with permits issued in accordance with the Environmental Conservation Law (“ECL”). An owner or operator of a construction activity must obtain permit coverage through either an individual SPDES permit which address the stormwater discharges or obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) prior to the commencement of construction activity.

GENERAL CHANGES

Addition of EPA's Construction and Development Effluent Guidelines (ELGs): Part I.B.1 of the general permit contains new source performance standards (ELGs) as required by 40 CFR 450.21. The ELGs apply primarily to the selection, design, and implementation of the erosion and sediment controls (i.e. during construction controls) to be used on the site. These are technology based effluent limitations that represent the degree of reduction attainable by the application of best practicable technology currently available. These non-numeric effluent limits require an owner or operator to ensure that water quality standards are being met and the discharge of pollutants are minimized through the selection, design and implementation of erosion and sediment control measures. As newly defined in the general permit, the term "minimize" means to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically achievable (BAT) and practicable (BPT) in light of best industry practice. The control measures specified in the New York State Standards & Specifications for Erosion & Sediment Control ("Blue Book") have been determined to be technologically available and economically achievable and practicable. The erosion and sediment control measures documented in the Stormwater Pollution Prevention Plan (SWPPP) must be installed and implemented to achieve the effluent limits contained in Part I.B.

Addition of Sizing Criteria from the New York State Stormwater Management Design Manual ("Design Manual"): Part I.C. of the general permit specifies the criteria for post construction stormwater management practices.

> **Performance Criteria** - Part I.C.1 clarifies when deviations from the Design Manual are allowed. The general permit specifies that where post construction stormwater management practices are not designed in conformance with the *performance criteria* contained in the Design Manual, the owner or operator must demonstrate that the deviation or alternative design is equivalent to the Design Manual. The general permit defines *performance criteria* to be that criteria listed under "required elements" in sections in Chapters 5, 6 and 10 of the Design Manual. The general permit defines e*quivalent (equivalence)* to mean that the practice or measure meets all performance, longevity, maintenance and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.
>
> **Sizing Criteria -** Part I.C.2 requires that post-construction stormwater management practices must meet the applicable sizing criteria contained in Part I.C.2(a),(b),(c) or (d) of the general permit. The sizing criteria are defined as the criteria included in Chapters 4, 9 and 10 of the Design Manual (i.e. WQv, RRv, CPv, Qp and Qf). Associated changes to the Design Manual were also made to ensure consistency between the general permit and Design Manual and to provide clarifications to the requirements. Deviations from the sizing criteria are

not allowed. If an owner cannot meet the required sizing criteria they would need to apply for coverage under an individual SPDES permit. The Department has been applying this criterion in the review of the Notice of Intent (NOI) since the Phase II program went into effect in 2003.

Discharges to Impaired Waters: For construction sites that directly discharge to one of the 303(d) segments listed in Appendix E[1] or is located in one of the watersheds listed in Appendix C, the general permit now requires more frequent inspections by a qualified inspector (see Part IV.C.2.e.) and shortened timeframes for stabilization of exposed soils (see Part I.B.1.b.) to ensure that discharges to impaired waters are in compliance with the terms and conditions of the general permit. The Department believes that this additional oversight will provide the protection necessary for impaired waters that will allow construction activities to be covered under the General Permit rather than excluding them from eligibility. This is consistent with how EPA addressed this issue in their 2012 Construction General Permit ("CGP"). The Department expects that compliance with the conditions and effluent limitations in the general permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards for ALL waters.

Authorization Period using eNOI: The general permit modifies Part II.B.3(a) and (b) to reflect that electronic filing of the NOI will be authorized within 5 business days from the date DEC receives a complete NOI for projects that conform to the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005; and the New York State Stormwater Management Design Manual, dated January 2015 ("technical standards") for projects that require post-construction stormwater management practices pursuant to Part III.C of the general permit. The timeframe for authorization of coverage for paper NOIs has been increased from 5 to 10 business days for projects that conform to the technical standards. No changes proposed for projects that deviate from the technical standards (60 business days)

State Historic Preservation Act (SHPA) Review Process/Consultation with Office of Parks Recreation & Historic Preservation (OPRHP): A Letter of Resolution (LOR) has been finalized with OPRHP on the general permit that satisfies DEC's obligation under the NYS Historic Preservation Act, Section 14.09, 9 NYCRR 428.4 for both the renewal and implementation of the general permit. The LOR formalizes and fine tunes a process for owners/operators to identify and address potential impacts on archeological and historic resources well in advance of submission of the NOI. Construction activities that have the potential to affect historic and/or archeological resources are not eligible for coverage under the general permit unless there is documentation that such impacts have been resolved prior to submission of the NOI. The general permit requires that documentation demonstrating that potential impacts will be avoided or mitigated are in place at the time the NOI is submitted. Part I.F.8 of

[1] Appendix E of the general permit has been updated to list the 2014 303(d) waterbodies impaired by silt, sediment or nutrients.

the general permit specifies the documentation necessary to demonstrate eligibility. The NOI will require the owner/operator to specify the documentation used to demonstrate that potential impacts will be avoided or mitigated and certify that the documentation demonstrating eligibility is available upon request and will be maintained on site. Part II.C.2 specifies that the required documentation must be maintained on-site and available for inspection along with the SWPPP documents. Part VII.F of the general permit requires that the owner or operator provide copies of the documentation demonstrating eligibility to DEC within a reasonable specified time period of a written request. The LOR identifies certain categories of projects as exempt from SHPA review.(see Attachment 2 of the LOR). All other projects will be required to follow DEC's screening and consultation process that was developed with OPRHP. The final LOR (including attachments) and supporting guidance documents (i.e. Flow Charts) will be available on the following Department webpage:
http://www.dec.ny.gov/chemical/43133.html.

Watersheds Where Enhanced Phosphorus Removal Standards are Required: The Total Maximum Daily Load (TMDL) for Phosphorus in Kinderhook Lake was approved by EPA in September 2011. The approved report specifies that all new development throughout the watershed will be covered by enhanced phosphorus design requirements when GP-0-10-001 is renewed in 2015 as GP-0-15-002. In order to ensure compliance with the requirements necessary to implement this TMDL, the general permit adds the Kinderhook Lake Watershed to the list of watersheds specified in Appendix C where application of the Enhanced Phosphorus Removal Standards (Chapter 10 of the New York State Stormwater Management Design Manual) is required.

Trained Contractor Inspections: Part IV.B of the general permit has been updated to specify that the "Trained Contractor" shall perform the required maintenance inspections of the erosion and sediment controls being used on the site. This inspection requirement applies to all construction projects that are subject to the general permit.

Attachment A
BMP Construction Inspection Checklist

Infiltration Basin Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Runoff diverted		
Soil permeability tested		
Groundwater / bedrock depth		
2. Excavation		
Size and location		
Side slopes stable		
Excavation does not compact subsoils		
3. Embankment		
Barrel		
Anti-seep collar or Filter diaphragm		
Fill material		

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
4. Final Excavation		
Drainage area stabilized		
Sediment removed from facility		
Basin floor tilled		
Facility stabilized		
5. Final Inspection		
Pretreatment facility in place		
Inlets / outlets		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Bioretention Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility area cleared		
If designed as exfilter, soil testing for permeability		
Facility location staked out		
2. Excavation		
Size and location		
Lateral slopes completely level		
If designed as exfilter, ensure that excavation does not compact susoils.		
Longitudinal slopes within design range		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
3. Structural Components		
Stone diaphragm installed correctly		
Outlets installed correctly		
Underdrain		
Pretreatment devices installed		
Soil bed composition and texture		
4. Vegetation		
Complies with planting specs		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
5. Final Inspection		
Dimensions		
Proper stone diaphragm		
Proper outlet		
Soil/ filter bed permeability testing		
Effective stand of vegetation and stabilization		
Construction generated sediments removed		
Contributing watershed stabilized before flow is diverted to the practice		

Comments:

Actions to be Taken:

Attachment B
BMP Maintenance Inspection Checklist

Infiltration Basin Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
1. Debris Cleanout (Monthly)		
Basin surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Basin Sediment (Annual)		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
3. Dewatering (Monthly)		
Basin dewaters between storms		
4. Sediment Cleanout of Basin (Annual)		
No evidence of sedimentation in basin		
Sediment accumulation doesn’t yet require cleanout		
5. Inlets (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repair		
No evidence of erosion		
7. Basin Surface Repairs (Annual)		
Surface of basin clean		
Top layer of basin does not need replacement		
Basin does not need rehabilitation		

Comments:

Actions to be Taken:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Attachment C
Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Westchester County, New York

June 18, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:6,880 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 100, 200, 400, 600

Feet: 0, 300, 600, 1200, 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 10, Sep 17, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Westchester County, New York (NY119)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
CrC	Charlton-Chatfield complex, rolling, very rocky	7.8	7.3%
CsD	Chatfield-Charlton complex, hilly, very rocky	0.0	0.0%
CtC	Chatfield-Hollis-Rock outcrop complex, rolling	24.4	22.8%
Uc	Udorthents, wet substratum	63.2	59.2%
Uf	Urban land	0.0	0.0%
UlC	Urban land-Charlton-Chatfield complex, rolling, very rocky	10.5	9.9%
W	Water	0.9	0.8%
Totals for Area of Interest		**106.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Westchester County, New York

CrC—Charlton-Chatfield complex, rolling, very rocky

Map Unit Setting

National map unit symbol: bd8f
Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 50 percent
Chatfield and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: sandy loam
H3 - 24 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Description of Chatfield

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 24 inches: flaggy silt loam
H3 - 24 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Minor Components

Hollis

Percent of map unit: 5 percent

Rock outcrop

Percent of map unit: 5 percent

Sutton

Percent of map unit: 4 percent

Sun

Percent of map unit: 2 percent
Landform: Depressions

Leicester

Percent of map unit: 2 percent

Palms

Percent of map unit: 1 percent
Landform: Marshes, swamps

Carlisle

Percent of map unit: 1 percent
Landform: Swamps, marshes

CsD—Chatfield-Charlton complex, hilly, very rocky

Map Unit Setting

National map unit symbol: bd8g
Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield and similar soils: 45 percent
Charlton and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 24 inches: flaggy silt loam
H3 - 24 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Description of Charlton

Setting

Landform: Hills, ridges, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: sandy loam
H3 - 24 to 60 inches: sandy loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Minor Components

Rock outcrop

Percent of map unit: 5 percent

Hollis

Percent of map unit: 5 percent

Sutton

Percent of map unit: 4 percent

Sun

Percent of map unit: 2 percent
Landform: Depressions

Leicester

Percent of map unit: 2 percent

Palms

Percent of map unit: 1 percent
Landform: Marshes, swamps

Carlisle

Percent of map unit: 1 percent
Landform: Marshes, swamps

CtC—Chatfield-Hollis-Rock outcrop complex, rolling

Map Unit Setting

National map unit symbol: bd8h
Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield and similar soils: 30 percent
Hollis and similar soils: 30 percent
Rock outcrop: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: A thin mantle of loamy till derived mainly from schist, granite, and gneiss

Typical profile

H1 - 0 to 1 inches: fine sandy loam
H2 - 1 to 16 inches: fine sandy loam
H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D

Description of Chatfield

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from granite, gneiss, or schist

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 24 inches: flaggy silt loam
H3 - 24 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Description of Rock Outcrop

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Minor Components

Charlton

Percent of map unit: 8 percent

Sutton

Percent of map unit: 5 percent

Leicester

Percent of map unit: 2 percent

Sun

Percent of map unit: 2 percent
Landform: Depressions

Unnamed soils, very shallow

Percent of map unit: 2 percent

Palms

Percent of map unit: 1 percent
Landform: Swamps, marshes

Uc—Udorthents, wet substratum

Map Unit Setting

National map unit symbol: bd7g
Elevation: 50 to 2,400 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 72 inches: very gravelly loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.6 inches)

Minor Components

Udorthents

Percent of map unit: 5 percent

Urban land

Percent of map unit: 5 percent

Paxton

Percent of map unit: 2 percent

Raynham

Percent of map unit: 2 percent

Fredon

Percent of map unit: 2 percent
Landform: Depressions

Ipswich

Percent of map unit: 2 percent
Landform: Tidal marshes

Hinckley

Percent of map unit: 2 percent

Uf—Urban land

Map Unit Setting

National map unit symbol: bd7j
Elevation: 50 to 2,400 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Udorthents

Percent of map unit: 5 percent

Udorthents, wet substratum

Percent of map unit: 2 percent

Unadilla

Percent of map unit: 2 percent

Chatfield

Percent of map unit: 2 percent

Sutton

Percent of map unit: 2 percent

Riverhead

Percent of map unit: 2 percent

UIC—Urban land-Charlton-Chatfield complex, rolling, very rocky

Map Unit Setting

National map unit symbol: bd7n
Elevation: 100 to 1,000 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 40 percent
Charlton and similar soils: 20 percent
Chatfield and similar soils: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Till plains, hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid loamy till derived mainly from schist, gneiss, or granite

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 24 inches: sandy loam
H3 - 24 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Description of Chatfield

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Loamy till derived mainly from granite, gneiss, or schist

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 24 inches: flaggy silt loam
H3 - 24 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 3.2 inches)

Minor Components

Sutton

Percent of map unit: 5 percent

Udorthents

Percent of map unit: 5 percent

Leicester

Percent of map unit: 5 percent
Landform: Depressions

Rock outcrop

Percent of map unit: 5 percent

Hollis

Percent of map unit: 2 percent

Sun

Percent of map unit: 2 percent
Landform: Depressions

Palms

Percent of map unit: 1 percent
Landform: Marshes, swamps

W—Water

Map Unit Setting

National map unit symbol: bd7z
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff–Westchester County, New York			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
CrC—Charlton-Chatfield complex, rolling, very rocky			
Charlton	50	—	B
Chatfield	30	—	B

Hydrologic Soil Group and Surface Runoff–Westchester County, New York			
Map symbol and soil name	**Pct. of map unit**	**Surface Runoff**	**Hydrologic Soil Group**
CsD—Chatfield-Charlton complex, hilly, very rocky			
Chatfield	45	—	B
Charlton	35	—	B
CtC—Chatfield-Hollis-Rock outcrop complex, rolling			
Chatfield	30	—	B
Hollis	30	—	D
Rock outcrop	20	—	—
Uc—Udorthents, wet substratum			
Udorthents, wet substratum	80	—	A/D
Uf—Urban land			
Urban land	85	—	—
UlC—Urban land-Charlton-Chatfield complex, rolling, very rocky			
Urban land	40	—	—
Charlton	20	—	B
Chatfield	15	—	B
W—Water			
Water	100	—	—

Data Source Information

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 10, Sep 17, 2014

Attachment D1
Existing and Proposed Drainage Maps

EX-1 (SHEET NUMBER)	HAMPSHIRE COUNTRY CLUB PLANNED RESIDENTIAL DEVELOPMENT (P.R.D) PREPARED FOR HAMPSHIRE RECREATION LLC VILLAGE OF MAMARONECK NEW YORK	EXISTING DRAINAGE AREA MAP	KHA PROJECT 112056005 JUNE 25, 2015 SCALE AS SHOWN DESIGNED BY MWJ DRAWN BY DAR CHECKED BY MWJ	LICENSED PROFESSIONAL

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Engineering, Planning, and Environmental Consultants
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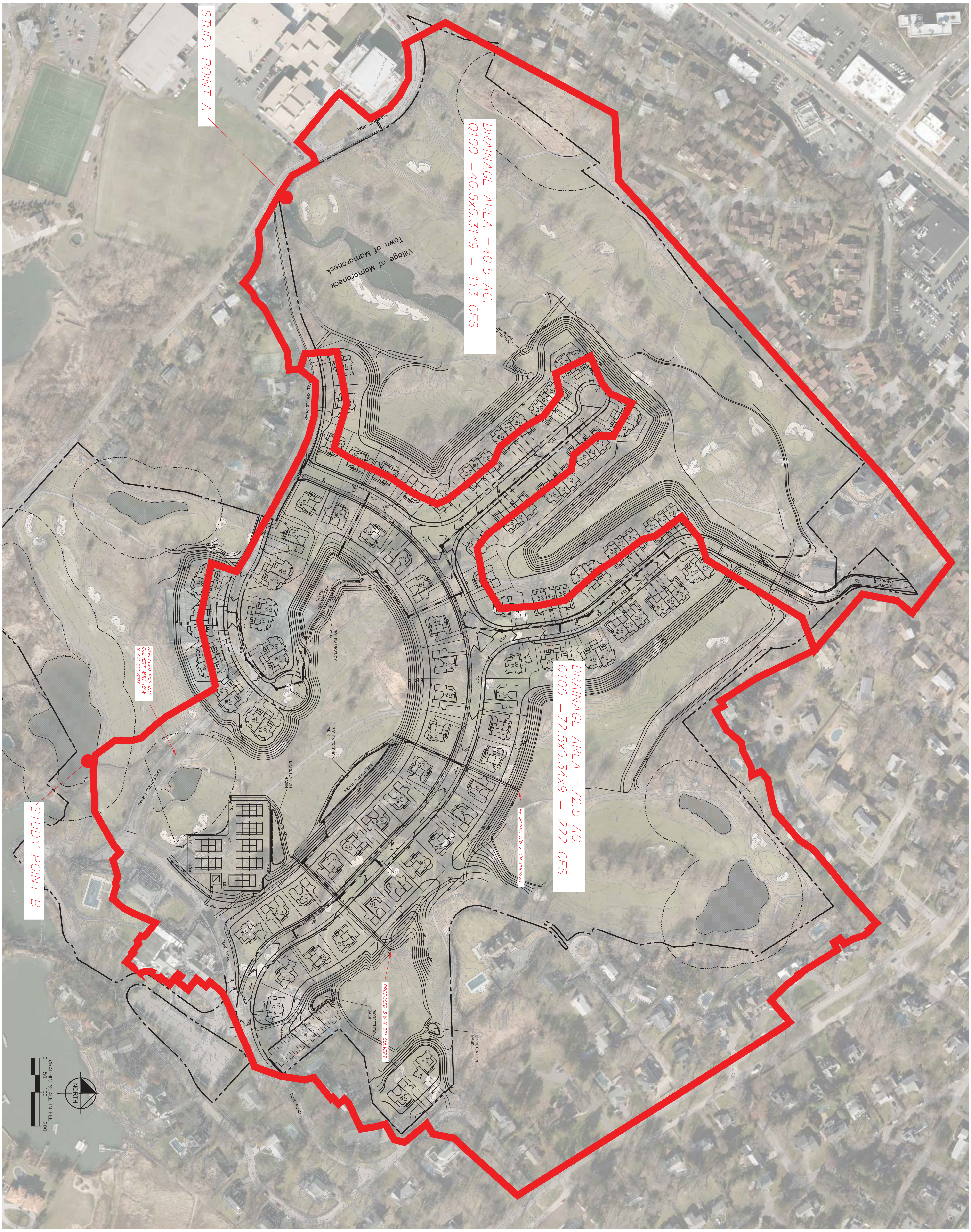
White Plains, NY 914-368-9200

No.	REVISIONS	DATE	BY
4	DEIS COMPLETENESS REVISION	08/23/18	MWJ
3	DEIS COMPLETENESS REVISION	10/20/17	MWJ
2	DEIS COMPLETENESS	8/04/17	MWJ
1	REVISED LAYOUT TO PRESERVE EXISTING GOLD COURSE	9/28/16	MWJ

Plotted By: Cheong, Jason Sheet Set: Kha Layout: PR Drainage April 10, 2019 03:39:31pm K:\WHP_Civil\112056005_HampshireCC\6. CAD\Drainage\28677.02-DA-PR.dwg



SHEET NUMBER PR-1

HAMPSHIRE COUNTRY CLUB
PLANNED RESIDENTIAL DEVELOPMENT (P.R.D)
PREPARED FOR
HAMPSHIRE RECREATION LLC
VILLAGE OF MAMARONECK NEW YORK

PROPOSED DRAINAGE AREA MAP

KHA PROJECT 112056005
JUNE 25, 2015
SCALE AS SHOWN
DESIGNED BY MWJ
DRAWN BY DAR
CHECKED BY MWJ

LICENSED PROFESSIONAL

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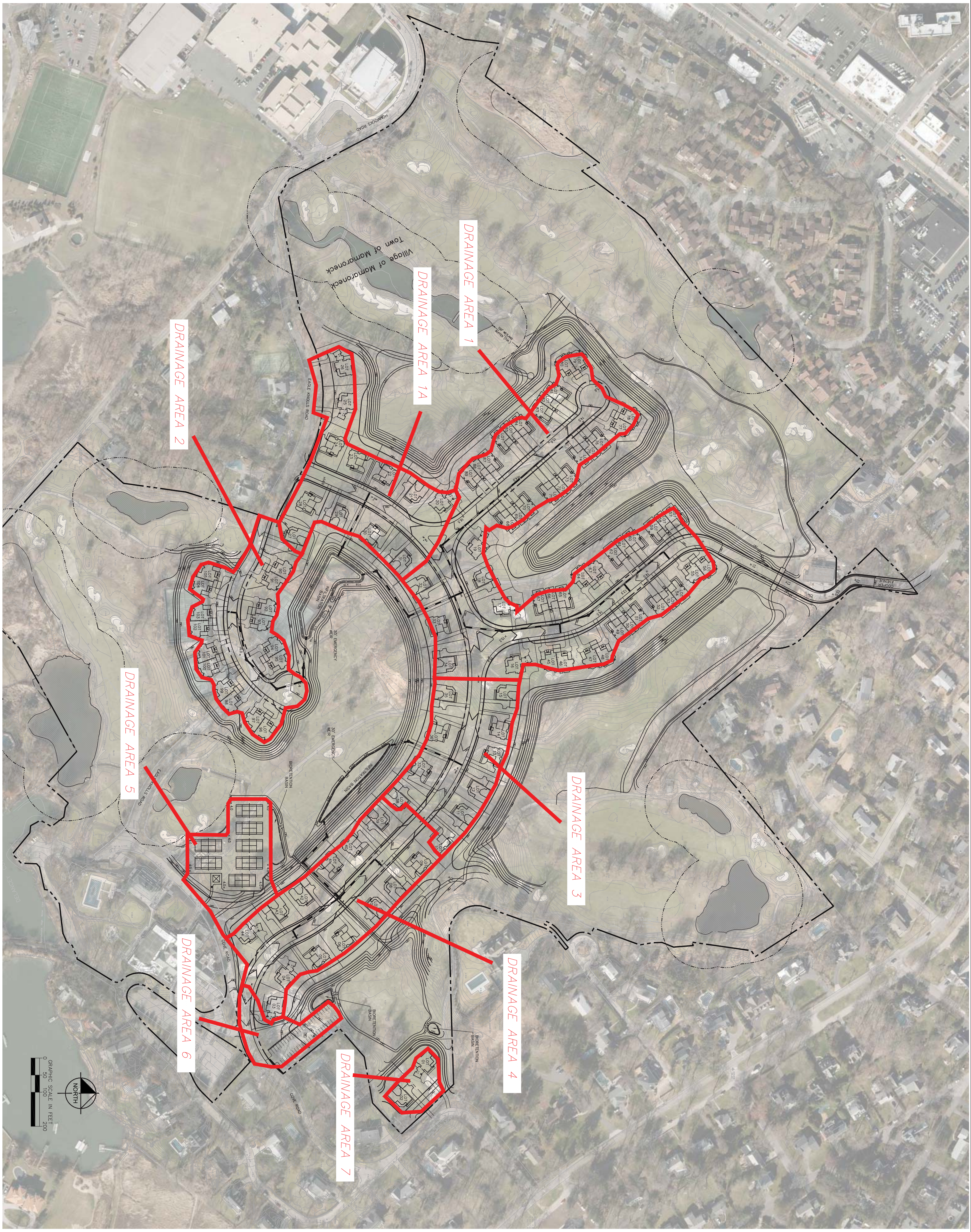
No.	REVISIONS	DATE	BY
5	FEIS COMMENT REVISION	04/09/19	MWJ
4	DEIS COMPLETENESS REVISION	08/23/18	MWJ
3	DEIS COMPLETENESS REVISION	10/20/17	MWJ
2	DEIS COMPLETENESS	8/04/17	MWJ
1	REVISED LAYOUT TO PRESERVE EXISTING GOLD COURSE	9/28/16	MWJ

Attachment D2
Water Quality Map & Calculations

Plotted By: Cheong, Jason Sheet Set: Kha Layout: WQ MAP August 24, 2018 01:42:28pm K:\WHP_Civil\112056005_HampshireCC\6. CAD\Drainage\28677.02-WQ MAP.dwg



SHEET NUMBER WQ-1

HAMPSHIRE COUNTRY CLUB

PLANNED RESIDENTIAL DEVELOPMENT (P.R.D)

PREPARED FOR

HAMPSHIRE RECREATION LLC

VILLAGE OF MAMARONECK NEW YORK

WATER QUALITY AREA MAP

KHA PROJECT 112056005

JUNE 25, 2015

SCALE AS SHOWN

DESIGNED BY MWJ

DRAWN BY DAR

CHECKED BY MWJ

LICENSED PROFESSIONAL

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2	DEIS COMPLETENESS	8/04/17	MWJ
1	REVISED LAYOUT TO PRESERVE EXISTING GOLD COURSE	9/28/16	MWJ

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Date: 8/23/2018
Project:
Project No: 2867702

Calculated By: JC
Checked By:

Water Quality Volume Calculations for Drainage Area 1, 1A & 2

Compute Water Quality Volumes (Drainage Area 1)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1
Rv:	0.7045	= 0.05 + 0.009(I)
I:	6.000	= Impervious coverage area in acres)
I:	72.7	= Impervious coverage percentage
A:	8.25	= Total Drainage Area (in acres)

Use Rv = 0.7045

WQv: 0.727 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

Water Quality Volume Required

Required WQv = 0.727 ac-ft

Determine Pretreatment Water Quality Discharge (Qwq) for Drainage Area 1

P = 1.5 inch
Qa = WQv / Area
Qa = 1.06 inch

CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^0.5]
CN = 95.5

From TR-55, Table 4-1: Ia = 0.1 Ia / P = 0.06667

From TR-55, Exhibit 4-III: q_u = 650 csm/in

Q_{wq} = (q_u)(Site Area, ac/ 640 ac/ sq. mi)(Q_a)
Q_{wq} = 8.85 cfs

Proposed Q_{wq} = 14 cfs
(Use CDS5653-10-C)

100-Year By Pass Flow for CDS unit for Drainage Area 1

Q= CIA
= 0.67 x 9 x 8.25
= 49.7 cfs

Proposed CDS 5653-10-C by pass flow = 50 cfs ok

Compute Water Quality Volumes (Drainage Area 1A)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1	
Rv:	0.4400	= 0.05 + 0.009(I)	Use Rv = 0.4400
I:	1.430	= Impervious coverage area in acres)	
I:	43.3	= Impervious coverage percentage	
A:	3.3	= Total Drainage Area (in acres)	
WQv:	0.182	= Req'd Water Quality Volume (in ac-ft)	
		$= \frac{(P)(Rv)(A)}{12}$	

Water Quality Volume Required

Required WQv = 0.182 ac-ft

Determine Pretreatment Water Quality Discharge (Qwq) for Drainage Area 1A

P = 1.5 inch
Qa = WQv / Area
Qa = 0.66 inch

CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^0.5]
CN = 89.6

From TR-55, Table 4-1: Ia = 0.222 Ia / P = 0.148

From TR-55, Exhibit 4-III: q_u = 610 csm/in

Q_{wq} = (q_u)(Site Area, ac/ 640 ac/ sq. mi)(Q_a)
Q_{wq} = 2.08 cfs

Proposed Q_{wq} = 2.5 cfs
(Use CDS3025-6-C)

100-Year By Pass Flow for CDS unit for Drainage Area 1A

Q= CIA
= 0.53 x 9 x 3.3
= 15.7 cfs

Proposed CDS 3025-6-C by pass flow = 20 cfs ok

Compute Water Quality Volumes (Drainage Area 2)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1	
Rv:	0.6475	= 0.05 + 0.009(I)	Use Rv = 0.6475
I:	2.025	= Impervious coverage area in acres)	
I:	66.4	= Impervious coverage percentage	
A:	3.05	= Total Drainage Area (in acres)	

WQv: 0.247 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

Water Quality Volume Required

Required WQv = 0.247 ac-ft

Determine Pretreatment Water Quality Discharge (Qwq) for Drainage Area 2

P = 1.5 inch

Qa = WQv / Area

Qa = 0.97 inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = 94.5

From TR-55, Table 4-1: Ia = 0.11 Ia / P = 0.07333

From TR-55, Exhibit 4-III: q_u = 650 csm/in

Q_{wq} = (q_u)(Site Area, ac/ 640 ac/ sq. mi)(Q_a)

Q_{wq} = 3.01 cfs

Proposed Q_{wq} = 4.5 cfs
(Use CDS4030-8-C)

100-Year By Pass Flow for CDS unit for Drainage Area 2

Q= CIA

= 0.64 x 9 x 3.05

= 17.6 cfs

Proposed CDS 4030-8-C by pass flow = 30 cfs ok

Total Required Water Quality Volume for Drainage Area 1, 1A and 2

Total WQv =	1.155 ac-ft

Infiltration Basin Design for Drainage Area 1, 1A and 2

Contour Elev. (ft)	Contour Area Proposed (ft^2)	Average (ft^2)	Proposed (ac)	Average (ac)	Depth (ft)	Volume Provided (ft^3)	Volume Provided (ac-ft)	Cummulative Volume Provided (ac-ft)
2	10300		0.2365					
		12200		0.2801	2	24400	0.5601	0.5601
4	14100		0.3237					
		16100		0.3696	2	32200	0.7392	1.2994
6	18100		0.4155					

WQ elevation =	5.6	ft

WQv Provided > WQv Required	**OK**

Dewatering within 48 hours

Percolation rate at Basin = 3"/hour = 0.25 ft/hour
Depth of water quality elevation = 3.6 ft
Time for completely dewater the pond = 14.40 hour (OK)

Emergency Weir Design

100-year Flow, Q100 = 83.00

Weir to convery the larger storm
Width of weir = 30 ft.
Q_{es} = $CLH^{3/2}$
83.00 = 3.1*L*(Hp^1.5)
Hp = **0.93** ft
Top of Weir = 5.6 ft
Design High Water Elevation = Weir + Hp
= 5.6 + 0.93
= 6.5
Top of Basin Berm Elevation = 7.0

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Project:
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Water Quality Volume Calculations for Drainage Area 3 & 4

Compute Water Quality Volumes (Drainage Area 3)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1
Rv:	0.4654	= 0.05 + 0.009(I)
I:	1.200	= Impervious coverage area in acres)
I:	46.2	= Impervious coverage percentage
A:	2.6	= Total Drainage Area (in acres)

Use Rv = 0.4654

WQv: 0.151 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

Water Quality Volume Required

Required WQv = 0.151 ac-ft

Determine Pretreatment Water Quality Discharge (Qwq) for Drainage Area 3

P = 1.5 inch
Qa = WQv / Area
Qa = 0.70 inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$
CN = 90.3

From TR-55, Table 4-1: Ia = 0.222 Ia / P = 0.148

From TR-55, Exhibit 4-III: q_u = 610 csm/in

Q_{wq} = (q_u)(Site Area, ac/ 640 ac/ sq. mi)(Q_a)
Q_{wq} = 1.73 cfs

Proposed Q_{wq} = 2.5 cfs
(Use CDS3025-6-C)

100-Year By Pass Flow for CDS unit for Drainage Area 3

Q= CIA
= 0.55 x 9 x 2.6
= 12.9 cfs

Proposed CDS 3025-6-C by pass flow = 20 cfs ok

Compute Water Quality Volumes (Drainage Area 4)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1		
Rv:	0.4408	= 0.05 + 0.009(I)	Use Rv =	0.4408
I:	1.650	= Impervious coverage area in acres)		
I:	43.4	= Impervious coverage percentage		
A:	3.8	= Total Drainage Area (in acres)		

WQv: 0.209 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

Water Quality Volume Required

Required WQv = 0.209 ac-ft

Determine Pretreatment Water Quality Discharge (Qwq) for Drainage Area 4

P = 1.5 inch

Qa = WQv / Area

Qa = 0.66 inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = 89.6

From TR-55, Table 4-1: Ia = 0.222 Ia / P = 0.148

From TR-55, Exhibit 4-III: q_u = 610 csm/in

Q_{wq} = (q_u)(Site Area, ac/ 640 ac/ sq. mi)(Q_a)

Q_{wq} = 2.39 cfs

Proposed Q_{wq} = 2.5 cfs
(Use CDS3025-6-C)

100-Year By Pass Flow for CDS unit for Drainage Area 4

Q= CIA
= 0.54 x 9 x 3.8
= 18.5 cfs

Proposed CDS 3025-6-C by pass flow = 20 cfs ok

Total Required Water Quality Volume for Drainage Area 3 and 4

Total WQv =	0.361 ac-ft

Infiltration Basin Design for Drainage Area 3 and 4

Contour Elev. (ft)	Contour Area Proposed (ft^2)	Average (ft^2)	Proposed (ac)	Average (ac)	Depth (ft)	Volume Provided (ft^3)	Volume Provided (ac-ft)	Cummulative Volume Provided (ac-ft)
0	8600		0.1974					
		9900		0.2273	2	19800	0.4545	0.4545
2	11200		0.2571					

WQ elevation =	1.6	ft

WQv Provided > WQv Required	**OK**

Dewatering within 48 hours

Percolation rate at Basin = 0.5"/hour = 0.0417 ft/hour
Depth of water quality elavation = 1.6 ft
Time for completely dewater the pond = 38.37 hour (ok)

Emergency Weir Design

100-year Flow, Q100 = 31.50

Weir to convery the larger storm

Width of weir = 30 ft.
$Q_{es} = CLH^{3/2}$
31.50 = 3.1*L*(Hp^1.5)
Hp = **0.49** ft
Top of Weir = 1.5 ft
Design High Water Elevation = Weir + Hp
= 1.5 + 0.49
= 2.0
Top of Bioretention Berm Elevation = 2.5

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Date: 10/12/2017
Project:
Project No: 2867702

Calculated By: JC
Checked By:

Water Quality Volume Calculations for Drainage Area 5

Compute Water Quality Volumes (Drainage Area 5)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1
Rv:	0.6408	= 0.05 + 0.009(I)
I:	1.070	= Impervious coverage area in acres)
I:	65.6	= Impervious coverage percentage
A:	1.63	= Total Drainage Area (in acres)

Use Rv = 0.6408

WQv: 0.131 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

Water Quality Volume Required

Required WQv = 0.131 ac-ft

Pretreatment for Drainage Area 5

Provide 1 ft wide stone diaphragm for water quality pretreatment

Bioretention Design

Determine Size of Bioretention Filter Area

A_f = Surface area of filter bed (ft^2)

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

WQv =	0.131	ac-ft
WQv =	5687.3	ft^3

d_f:	2.5	= Filter bed depth in feet
k:	0.65	= Coefficient of permeability of filter media (ft/day)
h_f:	0.25	= Average height of water above filter bed (ft)
t_f:	2	= Design filter bed drain time (days) (2 days is recommended)

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

A_f = **3977.1** ft^2

Filter Area Provided = 4100 ft^2

Set Design Elevation and Dimensions

Filter Bed Elevation =	3 ft
Filter Bed Area =	4100 sq ft
Side Slope of Bioretention =	1 on 2
Top berm elevation =	4.2 ft

Overdrain Design to Convey Larger Storm

10-year Flow, Q10 = 6.85 cfs (from Rational method)

Weir to convery the larger storm

Width of weir =	15	ft.		
Q_{es} =	$CLH^{3/2}$			
6.85	= 3.1*L*(Hp^1.5)			
Hp =	**0.28**	ft		
Top of Weir =	3.5	ft		
Design High Water Elevation =	Catch Basin Elev. + Hp			
=	3.5		+	0.28
=	3.8			
Top of Bioretention Berm Elevation =	4.2			

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Date: 10/12/2017
Project:
Project No: 2867702

Calculated By: JC
Checked By:

Water Quality Volume Calculations for Drainage Area 6

Compute Water Quality Volumes (Drainage Area 6)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1
Rv:	0.5923	= 0.05 + 0.009(I)
I:	0.470	= Impervious coverage area in acres)
I:	60.3	= Impervious coverage percentage
A:	0.78	= Total Drainage Area (in acres)

Use Rv = 0.5923

WQv: 0.058 = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

Water Quality Volume Required

Required WQv = 0.058 ac-ft

Pretreatment for Drainage Area 6

Provide 1 ft wide stone diaphragm for water quality pretreatment

Bioretention Design

Determine Size of Bioretention Filter Area

A_f = Surface area of filter bed (ft^2)

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

WQv = 0.058 ac-ft

WQv = 2515.6 ft^3

d_f:	2.5	= Filter bed depth in feet
k:	0.65	= Coefficient of permeability of filter media (ft/day)
h_f:	0.25	= Average height of water above filter bed (ft)
t_f:	2	= Design filter bed drain time (days) (2 days is recommended)

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

A_f = **1759.2** ft^2

Filter Area Provided = 1800 ft^2

Set Design Elevation and Dimensions

Filter Bed Elevation =	3 ft
Filter Bed Area =	1800 sq ft
Side Slope of Bioretention =	1 on 2
Top berm elevation =	4.2 ft

Overdrain Design to Convey Larger Storm

10-year Flow, Q10 = 3.74 cfs (from Rational method)

Weir to convery the larger storm

Width of weir =	15	ft.		
Q_{es} =	$CLH^{3/2}$			
3.74	= 3.1*L*(Hp^1.5)			
Hp =	**0.19**	ft		
Top of Weir =	3.5	ft		
Design High Water Elevation =	Catch Basin Elev. + Hp			
=	3.5	+	0.19	
=	3.7			
Top of Bioretention Berm Elevation =	4.2			

Kimley»Horn of New York, P.C.

Kimley Horn of New York, P.C.
1 N Lexington Avenue, Suite 1575
White Plains, New York 10601

Date: 8/23/2018
Project:
Project No: 2867702

Calculated By: JC
Checked By:

Water Quality Volume Calculations for Drainage Area 7

Compute Water Quality Volumes (Drainage Area 7)

Required Water Quality Volume Calculations

P:	1.5	= 90% Rainfall Event Number from Figure #1
Rv:	0.4517	= 0.05 + 0.009(I)
I:	0.183	= Impervious coverage area in acres)
I:	44.6	= Impervious coverage percentage
A:	0.41	= Total Drainage Area (in acres)

Use Rv = 0.4517

WQv: 0.023 = Req'd Water Quality Volume (in ac-ft)

$= \frac{(P)(Rv)(A)}{12}$

Water Quality Volume Required

Required WQv = 0.023 ac-ft

Pretreatment for Drainage Area 6

Provide 1 ft wide stone diaphragm for water quality pretreatment

Bioretention Design

Determine Size of Bioretention Filter Area

A_f = Surface area of filter bed (ft^2)

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

WQv =	0.023	ac-ft
WQv =	1008.4	ft^3

d_f:	2.5	= Filter bed depth in feet
k:	0.65	= Coefficient of permeability of filter media (ft/day)
h_f:	0.25	= Average height of water above filter bed (ft)
t_f:	2	= Design filter bed drain time (days) (2 days is recommended)

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

A_f = **705.2** ft^2

Filter Area Provided = 710 ft^2

Set Design Elevation and Dimensions

Filter Bed Elevation =	2	ft
Filter Bed Area =	710	sq ft
Side Slope of Bioretention =	1 on 2	
Top berm elevation =	3.0	ft

Overdrain Design to Convey Larger Storm

10-year Flow, Q10 = 1.23 cfs (from Rational method)

Weir to convery the larger storm

Width of weir =	10	ft.		
Q_{es} =	$CLH^{3/2}$			
1.23	= 3.1*L*(Hp^1.5)			
Hp =	**0.12**	ft		
Top of Weir =	2.5	ft		
Design High Water Elevation =	Catch Basin Elev. + Hp			
=	2.5	+	0.12	
=	2.6			
Top of Bioretention Berm Elevation =	4.0			

Attachment E
CDS Inspection and Maintenance Manual

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

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CDS Inspection & Maintenance Log

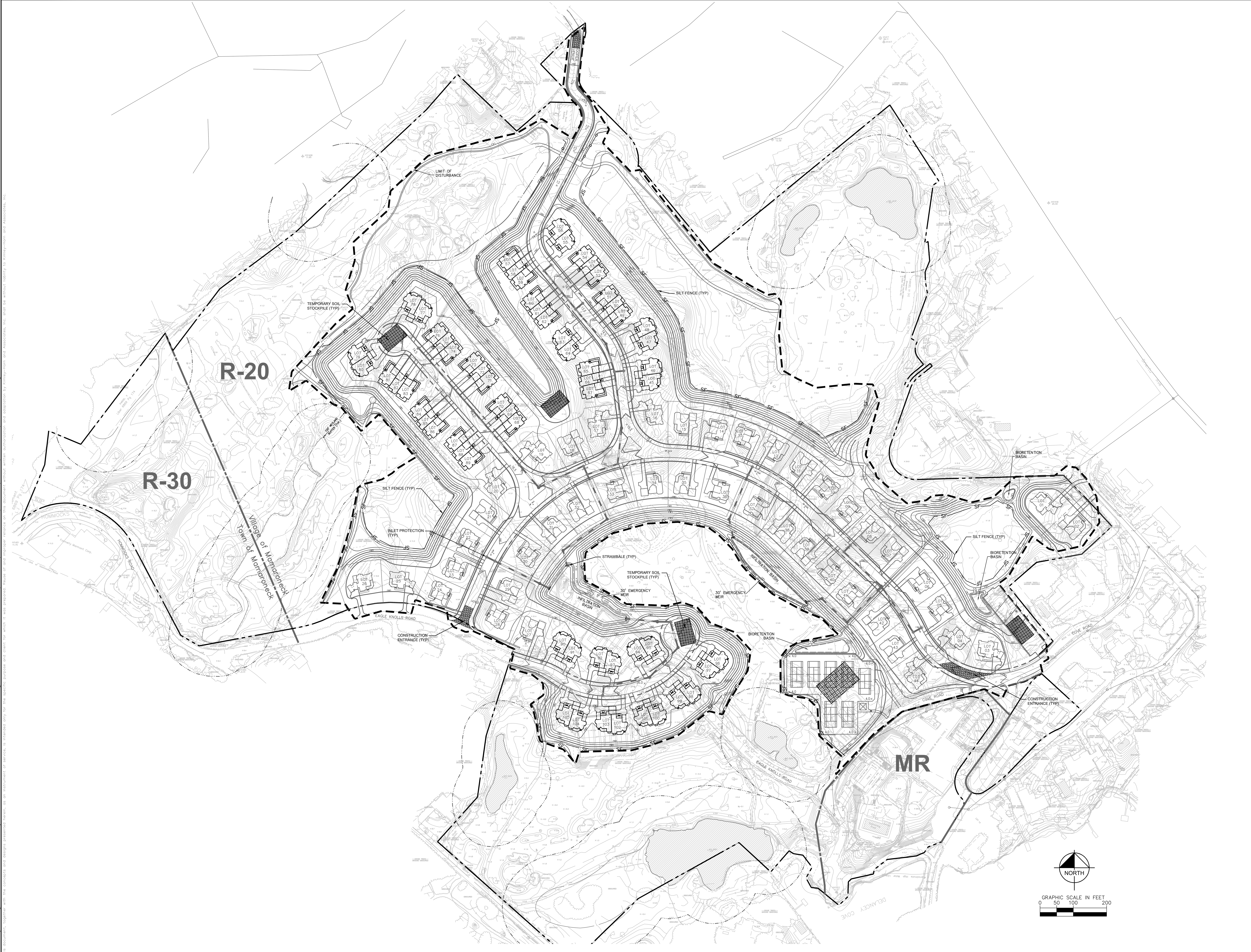
CDS Model: ______________________________ Location: ______________________________

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

Attachment F
Erosion and Sediment Control Plan



Plotted By: Cheong, Jason Sheet Set: Kha Layout: C-- Erosion & Sediment Control Plan August 27, 2018 11:09:53am K:\WHP_Civil\112056005_HampshireCC\6. CAD\Plansheets\28677.02_ER.dwg

No.	REVISIONS	DATE	BY
4	DEIS COMPLETENESS REVISION	08/23/18	MWJ
3	DEIS COMPLETENESS REVISION	10/20/17	MWJ
2	DEIS COMPLETENESS	8/04/17	MWJ
1	REVISED LAYOUT TO PRESERVE EXISTING GOLD COURSE	9/28/16	MWJ

Kimley»Horn
Kimley-Horn of New York, P.C.
1 N. Lexington Ave, Suite 1575
White Plains, NY 914-368-9200
Engineering, Planning, and Environmental Consultants

LICENSED PROFESSIONAL

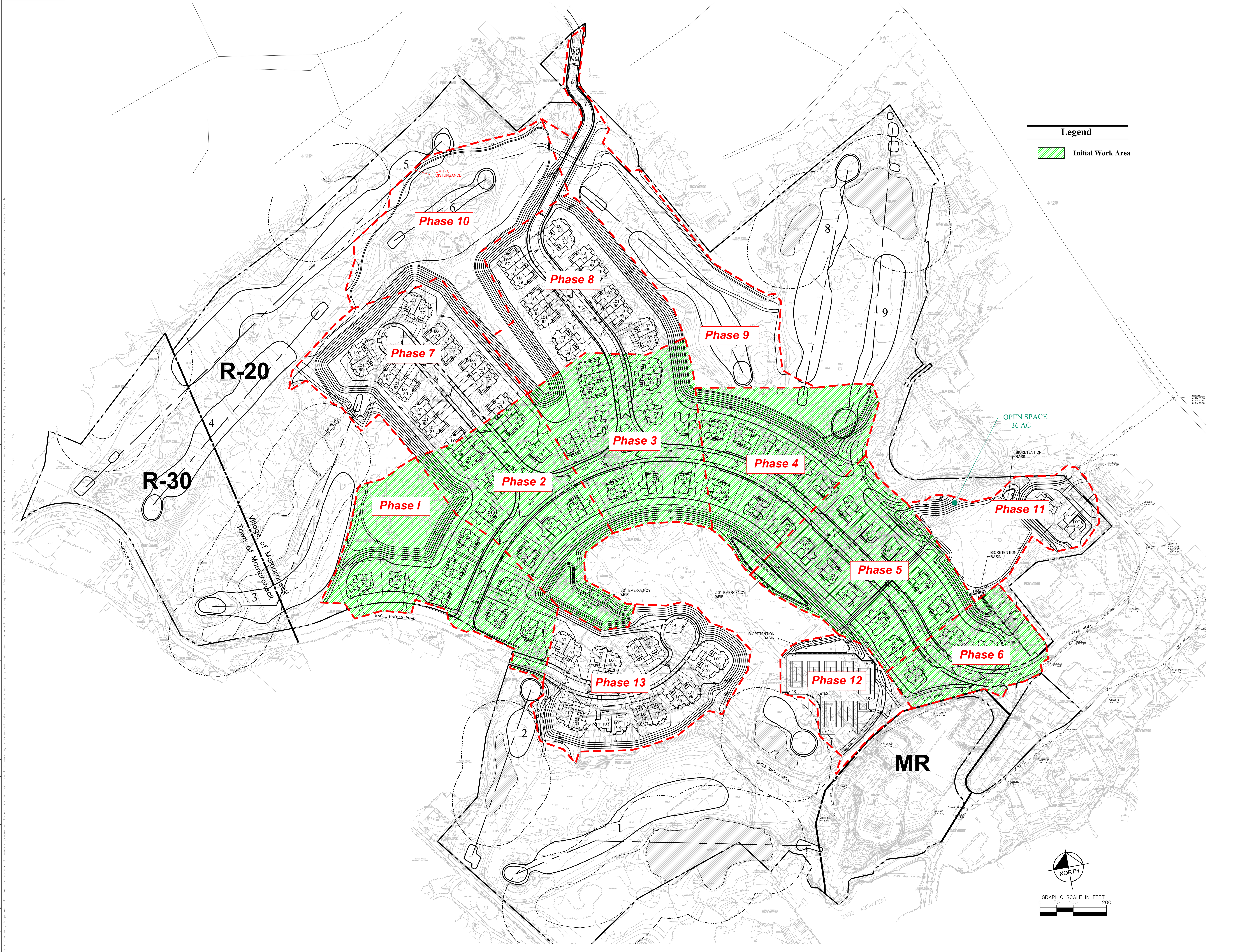
KHA PROJECT 112056005
JUNE 25, 2015
SCALE AS SHOWN
DESIGNED BY MWJ
DRAWN BY DAR
CHECKED BY MWJ

EROSION & SEDIMENT CONTROL PLAN

HAMPSHIRE COUNTRY CLUB
PLANNED RESIDENTIAL DEVELOPMENT (P.R.D)
PREPARED FOR
HAMPSHIRE RECREATION LLC
VILLAGE OF MAMARONECK NEW YORK

SHEET NUMBER
C-3

Attachment G
Phasing Plan



No.	REVISIONS	DATE	BY
4	DEIS COMPLETENESS REVISION	08/23/18	MWJ
3	DEIS COMPLETENESS REVISION	10/20/17	MWJ
2	DEIS COMPLETENESS	8/04/17	MWJ
1	REVISED LAYOUT TO PRESERVE EXISTING GOLD COURSE	9/28/16	MWJ

Kimley-Horn of New York, P.C.

Engineering, Planning, and Environmental Consultants
1 N Lexington Ave, Suite 1575
White Plains, NY 914-368-9200

LICENSED PROFESSIONAL

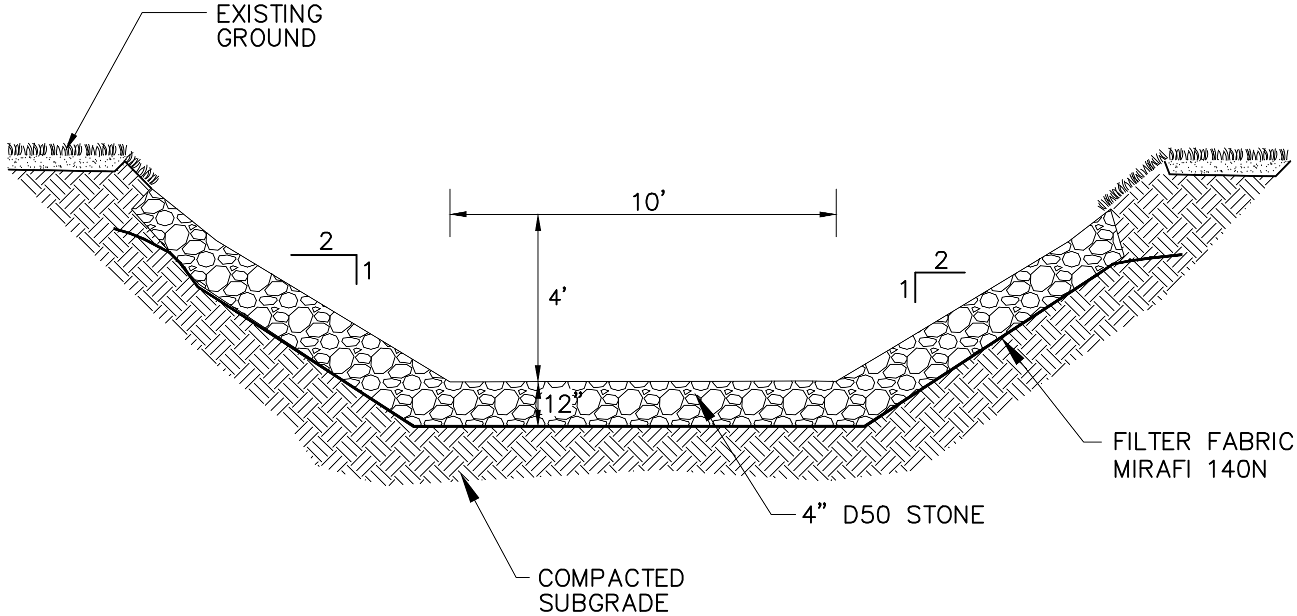
KHA PROJECT 112056005
JUNE 25, 2015
SCALE AS SHOWN
DESIGNED BY MWJ
DRAWN BY DAR
CHECKED BY MWJ

PHASING PLAN

HAMPSHIRE COUNTRY CLUB
PLANNED RESIDENTIAL DEVELOPMENT (P.R.D)
PREPARED FOR
HAMPSHIRE RECREATION LLC
VILLAGE OF MAMARONECK NEW YORK

SHEET NUMBER
C-7

Attachment H
Channel Improvement Details



REV

Channel Improvement Details

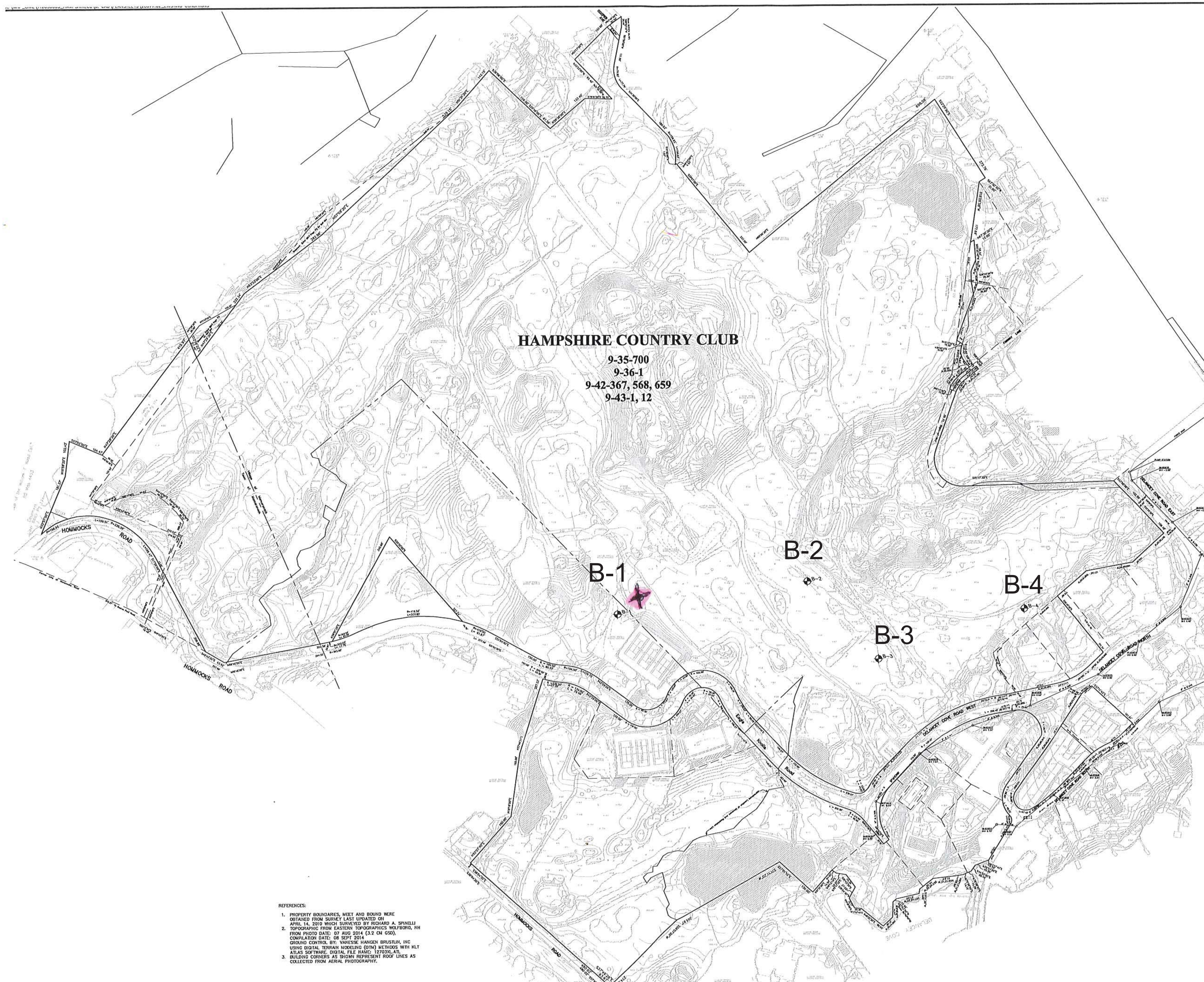
6/08

N.T.S.

Source:

LD_170

Attachment I
Percolation Test Data



REFERENCES:

1. PROPERTY BOUNDARIES, MEET AND BOUND WERE OBTAINED FROM SURVEY LAST UPDATED ON APRIL 14, 2010 WHICH SURVEYED BY RICHARD A. SPINELLI
2. TOPOGRAPHIC FROM EASTERN TOPOGRAPHICS WOLFBORO, NH FROM PHOTO DATE: 07 AUG 2014 (3.2 CM GSD), COMPILATION DATE: 08 SEPT 2014 GROUND CONTROL BY: VANESSE HANGEN BRUSTLIN, INC USING DIGITAL TERRAIN MODELING (DTM) METHODS WITH KLT ATLAS SOFTWARE. DIGITAL FILE NAME: 12703XL.ATL
3. BUILDING CORNERS AS SHOWN REPRESENT ROOF LINES AS COLLECTED FROM AERIAL PHOTOGRAPHY.

Vanasse Hangen Brustlin, Inc.
Transportation
Land Development
Environmental Services

50 Main Street - Suite 360
White Plains, NY 10606
914.467.6600 • FAX 914.761.3759

No.	Revision	Date	Appvd.

Designed by JC | Drawn by JC | Checked by MWJ
CAD checked by MWJ | Approved by MWJ
Scale 1"=100' | Date September 8, 2014

Project Title
Hampshire Country Club
Planned Residential Development (P.R.D.)

Village of Mamaroneck, NY

Issued for
VILLAGE REVIEW

NOT FOR CONSTRUCTION

Drawing Title
Existing Conditions Plan
(Percolation Test Location)

Drawing Number
EX-1

Sheet of

Michael W. Junghans
N.Y. Professional Engineer
NY Lic. No. 072072

Project Number
28677.02

28677.02_EXISTING CONDITIONS.DWG

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Percolation Test Data

(see instructions on reverse side)

Development Site: Hampshire Country Club (T/V/C): Village of Mamaroneck County: Westchester

Date: 10/4/17 Tests Conducted By: DR

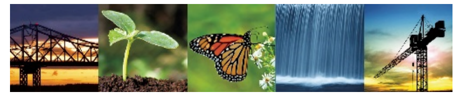
Weather Conditions: Sunny

Existing grade @ (Test Performed)	Test Hole No.	Test Hole Depth (inches)	Lot No.	Soil Profile Description and Groundwater Depth (if identified)	Presoaking Date & Time	Time	Percolation Test 1	2	3	4	5	6
0'	B-3	24"		Test / Start / Stop / Δ 1 12" 10:42 / 12" 11:42 / — 2 12" 11:43 / 12" 12:43 / — 3 12" 12:44 / 12" 1:44 / —	Deep T: 4.5' GW: 28"	End Begin Result	0-2.5 Grey Dark Black Clay 2.5-4.5 Grey Clay w/ trace of sand					
0'	B-2	24"		1 11.5" 10:45 / 11.5" 11:45 / — 2 11.5" 11:46 / 12" 12:47 / .5" 3 12" 12:48 / 12.75" 1:48 / .75"	Deep T: 4' GW: 3'	End Begin Result	0-2 Brown Sandy Loam 2-4 - Grey Clay w/ trace of sand					
2'	B-1	24"		1 12" 11:06 / 14.5" 12:07 / 2.5" 2 9.5" 12:06 / 13" 1:08 / 3.5" 3 10" 1:09 / 13" 2:09 / 3"	Deep T: 5' GW: None	End Begin Result	0-2 Brown Sandy Loam 2-5 Grey Clay w/ trace of sand					
1.5'	B-4	24"		1 11.5" 11:53 / 11.5" 12:53 / — 2 11.5" 12:54 / 11.5" 1:54 / — 3 11.5" 1:55 / 11.5" 2:55 / —	Deep T: 5' GW: 5'	End Begin Result	0-3 Sandy Loam Clay 3-5 Grey Clay w/ trace of silt					
						End Begin Result						
						End Begin Result						

Begin time, end time, and result in minutes for a water elevation change from 6" to 5" above the bottom of the test hole.

Files added to:

N Supplemental Geotechnical Data Collection



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GZA GeoEnvironmental of New York
104 West 29th Street
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New York, NY 10001
T: 212.594.8140
F: 212.279.8180
www.gza.com

March 27, 2019
File No. 41.0162548.10

Valerie Monastra, AICP
Director of Planning
Vanasse Hangen Brustlin, Inc. (VHB)
50 Main Street, Suite 360
White Plains, NY 10606

Re: Irrigation Wells Sampling
Hampshire Country Club Redevelopment
1025 Cove Road,
Mamaroneck, NY 10543

Dear Ms. Monastra:

As requested, GZA Environmental of New York (GZA) completed the irrigation well sampling at above-referenced Hampshire Country Club property (Site). This work was performed in accordance with GZA's additional service request dated March 1, 2019.

On March 18, 2019, GZA collected two water samples from bedrock irrigation wells identified as WELL 1 and WELL 2. A Site Plan showing the locations of the irrigation wells is provided as **Figure 1** and completed water quality measurement logs are provided in **Table 1**. Site photographs are provided in **Attachment A**. Water samples were collected at the outfall after turning on each of the two irrigation well pumps. The samples were sent to Alpha Analytical Laboratory of Westborough, Massachusetts for analysis for the following parameters:

- Target Compound List (TCL) volatile organic compounds (VOCs) by EPA Method 8260C (rev. 2006);
- TCL Semivolatile organic compounds (SVOCs) by EPA Method 8270D (rev. 2007);
- Target analyte list (TAL) metals by EPA Method 6010C (rev. 2007);
- Pesticides by EPA Method 8081B (rev. 2000);
- Polychlorinated biphenyls (PCBs) by EPA Method 8082A (rev. 2000);

The laboratory analytical results are summarized in **Tables 2 to 5** and a copy of the laboratory report is provided as **Attachment B**. For screening purposes, the groundwater samples were compared to the New York State Department of Environmental (NYSDEC) Technical Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS).

Please contact us should you have additional questions.

Very truly yours,
GZA GEOENVIRONMENTAL OF NEW YORK

Reinbill Maniquez
Project Manager

Stephen M. Kline, P.E.
Associate Principal

CC: Mike Junghans, Kimley-Horn

ATTACHMENTS:

Table 1 – Water Quality Parameters
Table 2 – Volatile Organic Compounds in Water
Table 3 – Semivolatile Organic Compounds in Water
Table 4 – Metals in Water
Table 5 – Pesticides and Polychlorinated Biphenyls in Water

Figure 1 – Site Plan

Attachment A – Site Photographs
Attachment B – Laboratory Report

TABLES

TABLE - 1

WATER QUALITY PARAMETERS

CLIENT: VHB
SITE: Hampshire Country Cl
WEATHER: High 30s - Low 40s °F, Sunny

PROJECT NO: 41.0162548.10
DATE: 03/18/2019
SAMPLER(S): Y. Xiao, G. Mena

WATER QUALITY:

WELL ID	Sample Time	pH (SU)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temp (^{0}C)	ORP	Notes
WELL - 1	10:10	6.77	0.789	10.6	9.4	8.94	98	Clear, no odor
WELL - 2	10:25	5.78	0.797	7.9	1.1	12.60	25	Clear, no odor

UNITS:

^{0}C - degrees Celsius
mg/l -milligrams per liter
mS/cm - millisiemens per centimeter
NTU -nephelometric turbidity units
SU - standard units
ORP - Oxygen Reduction Potential

ADDITIONAL NOTES AND OBSERVATIONS:

Table 2: Groundwater Sample Analytical Data - Volatile Organic Compounds

Hampshire Country Club
Mamaroneck, New York

SAMPLE LOCATION	Units	NYSDEC TOGS 1.1.1 AWQS	WELL 1		WELL 2		TRIP BLANK	
SAMPLING DATE			3/18/2019		3/18/2019		3/18/2019	
LABORATORY SAMPLE ID			L1910469-01		L1910469-02		L1910469-03	
SAMPLE TYPE			Water		Water		Water	
DILUTION			1		1		1	
			Results	Qual	Results	Qual	Results	Qual
Volatile Organics by 8260C								
1,1,1,2-Tetrachloroethane	ug/L	5	2.5	U	2.5	U	2.5	U
1,1,1-Trichloroethane	ug/L	5	2.5	U	2.5	U	2.5	U
1,1,2,2-Tetrachloroethane	ug/L	5	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	ug/L	1	*1.5*	*U*	*1.5*	*U*	*1.5*	*U*
1,1-Dichloroethane	ug/L	5	2.5	U	2.5	U	2.5	U
1,1-Dichloroethene	ug/L	5	0.5	U	0.5	U	0.5	U
1,1-Dichloropropene	ug/L	5	2.5	U	2.5	U	2.5	U
1,2,3-Trichlorobenzene	ug/L	5	2.5	U	2.5	U	2.5	U
1,2,3-Trichloropropane	ug/L	0.04	*2.5*	U	*2.5*	*U*	*2.5*	*U*
1,2,4,5-Tetramethylbenzene	ug/L	5	2	U	2	U	2	U
1,2,4-Trichlorobenzene	ug/L	5	2.5	U	2.5	U	2.5	U
1,2,4-Trimethylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
1,2-Dibromo-3-chloropropane	ug/L	0.04	*2.5*	*U*	*2.5*	*U*	*2.5*	*U*
1,2-Dibromoethane	ug/L	0.0006	*2*	*U*	*2*	*U*	*2*	*U*
1,2-Dichlorobenzene	ug/L	3	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	ug/L	0.6	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene, Total	ug/L	-	2.5	U	2.5	U	2.5	U
1,2-Dichloropropane	ug/L	1	1	U	1	U	1	U
1,3,5-Trimethylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
1,3-Dichlorobenzene	ug/L	3	2.5	U	2.5	U	2.5	U
1,3-Dichloropropane	ug/L	5	2.5	U	2.5	U	2.5	U
1,3-Dichloropropene, Total	ug/L	-	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	ug/L	3	2.5	U	2.5	U	2.5	U
1,4-Dioxane	ug/L	-	250	U	250	U	250	U
2,2-Dichloropropane	ug/L	5	2.5	U	2.5	U	2.5	U
2-Butanone	ug/L	50	5	U	5	U	5	U
2-Hexanone	ug/L	50	5	U	5	U	5	U
4-Methyl-2-pentanone	ug/L	-	5	U	5	U	5	U
Acetone	ug/L	50	2.9	J	4.1	J	5	U
Acrylonitrile	ug/L	5	*5*	U	5	U	5	U
Benzene	ug/L	1	0.5	U	0.5	U	0.5	U
Bromobenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Bromochloromethane	ug/L	5	2.5	U	2.5	U	2.5	U
Bromodichloromethane	ug/L	50	0.5	U	0.5	U	0.5	U
Bromoform	ug/L	50	2	U	2	U	2	U
Bromomethane	ug/L	5	2.5	U	2.5	U	2.5	U
Carbon disulfide	ug/L	60	5	U	5	U	5	U
Carbon tetrachloride	ug/L	5	0.5	U	0.5	U	0.5	U

TABLE NOTES:

NYSDEC TOGS 1.1.1 AWQS : New York State Department of Environmental Conservation Technical and Operational Guidance

Detected concentration exceeds NYSDEC TOGS 1.1.1 AWQS.

Italics : Non-Detect Value - with a Reporting Limit (RL) that exceeds NYSDEC TOGS 1.1.1 AWQS.

J : Estimated Value. The target analyte concentration is below the quantitative limit (RL), but above the method detection limit (MDL) or estimated detection limit (EDL) for SPME-related analyses.

U : Not detected at the reported detection limit for the sample.

-- : No Guidance Value.

ug/L : Micrograms per liter.

Table 2: Groundwater Sample Analytical Data - Volatile Organic Compounds

Hampshire Country Club
Mamaroneck, New York

SAMPLE LOCATION	Units	NYSDEC TOGS 1.1.1 AWQS	WELL 1		WELL 2		TRIP BLANK	
SAMPLING DATE			3/18/2019		3/18/2019		3/18/2019	
LABORATORY SAMPLE ID			L1910469-01		L1910469-02		L1910469-03	
SAMPLE TYPE			Water		Water		Water	
DILUTION			1		1		1	
			Results	Qual	Results	Qual	Results	Qual
Volatile Organics by 8260C								
Chlorobenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Chloroethane	ug/L	5	2.5	U	2.5	U	2.5	U
Chloroform	ug/L	7	2.5	U	2.5	U	2.5	U
Chloromethane	ug/L	-	2.5	U	2.5	U	2.5	U
cis-1,2-Dichloroethene	ug/L	5	2.5	U	2.5	U	2.5	U
cis-1,3-Dichloropropene	ug/L	0.4	*0.5*	*U*	*0.5*	*U*	*0.5*	*U*
Dibromochloromethane	ug/L	50	0.5	U	0.5	U	0.5	U
Dibromomethane	ug/L	5	5	U	5	U	5	U
Dichlorodifluoromethane	ug/L	5	5	U	5	U	5	U
Ethyl ether	ug/L	-	2.5	U	2.5	U	2.5	U
Ethylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Hexachlorobutadiene	ug/L	0.5	*2.5*	*U*	*2.5*	*U*	*2.5*	*U*
Isopropylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Methyl tert butyl ether	ug/L	10	2.5	U	2.5	U	2.5	U
Methylene chloride	ug/L	5	2.5	U	2.5	U	2.5	U
n-Butylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
n-Propylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Naphthalene	ug/L	10	2.5	U	2.5	U	2.5	U
o-Chlorotoluene	ug/L	5	2.5	U	2.5	U	2.5	U
o-Xylene	ug/L	5	2.5	U	2.5	U	2.5	U
p-Chlorotoluene	ug/L	5	2.5	U	2.5	U	2.5	U
p-Diethylbenzene	ug/L	-	2	U	2	U	2	U
p-Ethyltoluene	ug/L	-	2	U	2	U	2	U
p-Isopropyltoluene	ug/L	5	2.5	U	2.5	U	2.5	U
p/m-Xylene	ug/L	5	2.5	U	2.5	U	2.5	U
sec-Butylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Styrene	ug/L	5	2.5	U	2.5	U	2.5	U
tert-Butylbenzene	ug/L	5	2.5	U	2.5	U	2.5	U
Tetrachloroethene	ug/L	5	0.5	U	0.5	U	0.5	U
Toluene	ug/L	5	2.5	U	2.5	U	2.5	U
trans-1,2-Dichloroethene	ug/L	5	2.5	U	2.5	U	2.5	U
trans-1,3-Dichloropropene	ug/L	0.4	*0.5*	*U*	*0.5*	*U*	*0.5*	*U*
trans-1,4-Dichloro-2-butene	ug/L	5	2.5	U	2.5	U	2.5	U
Trichloroethene	ug/L	5	0.5	U	0.5	U	0.5	U
Trichlorofluoromethane	ug/L	5	2.5	U	2.5	U	2.5	U
Vinyl acetate	ug/L	-	5	U	5	U	5	U
Vinyl chloride	ug/L	2	1	U	1	U	1	U
Xylenes, Total	ug/L	5	2.5	U	2.5	U	2.5	U

TABLE NOTES:

NYSDEC TOGS 1.1.1 AWQS : New York State Department of Environmental Conservation Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards.

Detected concentration exceeds NYSDEC TOGS 1.1.1 AWQS.

Italics : Non-Detect Value - with a Reporting Limit (RL) that exceeds NYSDEC TOGS 1.1.1 AWQS.

J : Estimated Value. The target analyte concentration is below the quantitative limit (RL), but above the method detection limit (MDL) or estimated detection limit (EDL) for SPME-related analyses.

U : Not detected at the reported detection limit for the sample.

-- : No Guidance Value.

ug/L : Micrograms per liter.

Table 3 - Groundwater Sample Analytical Data - Semi-volatile Organic Compounds

Hampshire Country Club
Mamaroneck, New York

SAMPLING LOCATION	Units	NYSDEC TOGS 1.1.1 AWQS	WELL 1		WELL 2	
SAMPLING DATE			3/18/2019		3/18/2019	
LABORATORY SAMPLE ID			L1910469-01		L1910469-02	
SAMPLE TYPE			Water		Water	
DILUTION			1		1	
			Results	Qual	Results	Qual
Semivolatile Organics by 8270D						
1,2,4,5-Tetrachlorobenzene	ug/L	5	*10*	*U*	*10*	*U*
1,2,4-Trichlorobenzene	ug/L	5	5	U	5	U
1,2-Dichlorobenzene	ug/L	3	2	U	2	U
1,3-Dichlorobenzene	ug/L	3	2	U	2	U
1,4-Dichlorobenzene	ug/L	3	2	U	2	U
2,4,5-Trichlorophenol	ug/L	-	5	U	5	U
2,4,6-Trichlorophenol	ug/L	-	5	U	5	U
2,4-Dichlorophenol	ug/L	1	*5*	*U*	*5*	*U*
2,4-Dimethylphenol	ug/L	50	5	U	5	U
2,4-Dinitrophenol	ug/L	10	*20*	*U*	*20*	*U*
2,4-Dinitrotoluene	ug/L	5	5	U	5	U
2,6-Dinitrotoluene	ug/L	5	5	U	5	U
2-Chlorophenol	ug/L	-	2	U	2	U
2-Methylphenol	ug/L	-	5	U	5	U
2-Nitroaniline	ug/L	5	5	U	5	U
2-Nitrophenol	ug/L	-	10	U	10	U
3,3'-Dichlorobenzidine	ug/L	5	5	U	5	U
3-Methylphenol/4-Methylphenol	ug/L	-	5	U	5	U
3-Nitroaniline	ug/L	5	5	U	5	U
4,6-Dinitro-o-cresol	ug/L	-	10	U	10	U
4-Bromophenyl phenyl ether	ug/L	-	2	U	2	U
4-Chloroaniline	ug/L	5	5	U	5	U
4-Chlorophenyl phenyl ether	ug/L	-	2	U	2	U
4-Nitroaniline	ug/L	5	5	U	5	U
4-Nitrophenol	ug/L	-	10	U	10	U
Acetophenone	ug/L	-	5	U	5	U
Benzoic Acid	ug/L	-	50	U	50	U
Benzyl Alcohol	ug/L	-	0.75	J	2	U
Biphenyl	ug/L	-	2	U	2	U
Bis(2-chloroethoxy)methane	ug/L	5	5	U	5	U
Bis(2-chloroethyl)ether	ug/L	1	*2*	*U*	*2*	*U*
Bis(2-chloroisopropyl)ether	ug/L	5	2	U	2	U
Bis(2-ethylhexyl)phthalate	ug/L	5	2.8	J	2.6	J
Butyl benzyl phthalate	ug/L	50	5	U	5	U
Carbazole	ug/L	-	2	U	2	U
Di-n-butylphthalate	ug/L	50	5	U	5	U
Di-n-octylphthalate	ug/L	50	5	U	5	U
Dibenzofuran	ug/L	-	2	U	2	U
Diethyl phthalate	ug/L	50	5	U	5	U
Dimethyl phthalate	ug/L	50	5	U	5	U
Hexachlorocyclopentadiene	ug/L	5	*20*	*U*	*20*	*U*
Isophorone	ug/L	50	5	U	5	U
n-Nitrosodi-n-propylamine	ug/L	-	5	U	5	U
NDPA/DPA	ug/L	50	2	U	2	U
Nitrobenzene	ug/L	0.4	*2*	*U*	*2*	*U*
p-Chloro-m-cresol	ug/L	-	2	U	2	U
Phenol	ug/L	1	*5*	*U*	*5*	*U*

Table Notes:

NYSDEC TOGS 1.1.1 AWQS: New York State Department of Environmental Conservation Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards.

Exceeds NYSDEC TOGS 1.1.1 AWQS.

Italics : Non-Detect Value - with a Reporting Limit (RL) that exceeds NYSDEC TOGS 1.1.1

J : Estimated Value. The target analyte concentration is below the quantitative limit (RL), but above the method detection limit (MDL) or estimated detection limit (EDL)

U : Not detected at the reported detection limit for the sample.

- : No Guidance Value.

ug/L : Micrograms per liter.

Table 3 - Groundwater Sample Analytical Data - Semi-volatile Organic Compounds

Hampshire Country Club
Mamaroneck, New York

SAMPLING LOCATION	Units	NYSDEC TOGS 1.1.1 AWQS	WELL 1		WELL 2	
SAMPLING DATE			3/18/2019		3/18/2019	
LABORATORY SAMPLE ID			L1910469-01		L1910469-02	
SAMPLE TYPE			Water		Water	
DILUTION			1		1	
			Results	Qual	Results	Qual
Semivolatile Organics by 8270D-SIM						
2-Chloronaphthalene	ug/L	10	0.2	U	0.2	U
2-Methylnaphthalene	ug/L	-	0.1	U	0.1	U
Acenaphthene	ug/L	20	0.1	U	0.1	U
Acenaphthylene	ug/L	-	0.1	U	0.1	U
Anthracene	ug/L	50	0.1	U	0.1	U
Benzo(a)anthracene	ug/L	0.002	0.03	J	0.1	U
Benzo(a)pyrene	ug/L	0	*0.1*	*U*	*0.1*	*U*
Benzo(b)fluoranthene	ug/L	0.002	0.1	U	0.01	J
Benzo(ghi)perylene	ug/L	-	0.1	U	0.1	U
Benzo(k)fluoranthene	ug/L	0.002	*0.1*	*U*	0.01	J
Chrysene	ug/L	0.002	*0.1*	*U*	*0.1*	*U*
Dibenzo(a,h)anthracene	ug/L	-	0.1	U	0.1	U
Fluoranthene	ug/L	50	0.1	U	0.1	U
Fluorene	ug/L	50	0.1	U	0.1	U
Hexachlorobenzene	ug/L	0.04	*0.8*	*U*	*0.8*	*U*
Hexachlorobutadiene	ug/L	0.5	0.5	U	0.5	U
Hexachloroethane	ug/L	5	0.8	U	0.8	U
Indeno(1,2,3-cd)pyrene	ug/L	0.002	*0.1*	*U*	*0.1*	*U*
Naphthalene	ug/L	10	0.1	U	0.1	U
Pentachlorophenol	ug/L	1	0.19	J	0.14	J
Phenanthrene	ug/L	50	0.1	U	0.1	U
Pyrene	ug/L	50	0.1	U	0.1	U

Table Notes:

NYSDEC TOGS 1.1.1 AWQS: New York State Department of Environmental Conservation Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards.

(yellow highlight) Exceeds NYSDEC TOGS 1.1.1 AWQS.

Italics : Non-Detect Value - with a Reporting Limit (RL) that exceeds NYSDEC TOGS 1.1.1

J : Estimated Value. The target analyte concentration is below the quantitative limit (RL), but above the method detection limit (MDL) or estimated detection limit (EDL)

U : Not detected at the reported detection limit for the sample.

- : No Guidance Value.

ug/L : Micrograms per liter.

Table 4: Groundwater Sample Analytical Data - Metals

Hampshire Country Club
Mamaroneck, New York

SAMPLE LOCATION	Units	NYSDEC TOGS 1.1.1 AWQS	WELL 1		WELL 2	
SAMPLING DATE			3/18/2019		3/18/2019	
LABORATORY SAMPLE ID			L1910469-01		L1910469-02	
SAMPLE TYPE			Water		Water	
DILUTION			1		1	
			Results	Qual	Results	Qual
Total Metals by 6020/7470						
Aluminum	ug/L	-	109		6.24	J
Antimony	ug/L	3	0.54	J	*4*	*U*
Arsenic	ug/L	25	0.65		0.24	J
Barium	ug/L	1,000	53.81		152.9	
Beryllium	ug/L	3	0.5	U	0.5	U
Cadmium	ug/L	5	0.2	U	0.2	U
Calcium	ug/L	-	84,000		61,300	
Chromium	ug/L	50	0.67	J	0.22	J
Cobalt	ug/L	-	0.5		2.06	
Copper	ug/L	200	2.28		1	U
Iron	ug/L	300	2,190		9890	
Lead	ug/L	25	0.41	J	1	U
Magnesium	ug/L	35,000	27,700		19,900	
Manganese	ug/L	300	564.9		2,009	
Mercury	ug/L	0.7	0.2	U	0.2	U
Nickel	ug/L	100	2.41		9.36	
Potassium	ug/L	-	6,250		6,960	
Selenium	ug/L	10	5	U	5	U
Silver	ug/L	50	0.4	U	0.4	U
Sodium	ug/L	20,000	111,000		97,800	
Thallium	ug/L	0.5	*0.5*	*U*	*0.5*	*U*
Vanadium	ug/L	-	5	U	5	U
Zinc	ug/L	2,000	4.85	J	8.56	J
Dissolved Metals 6020/7470						
Aluminum	ug/L	-	10	U	46	
Antimony	ug/L	3	0.7	J	2.77	J
Arsenic	ug/L	25	0.5	U	0.57	
Barium	ug/L	1,000	73.59		87.3	
Beryllium	ug/L	3	0.5	U	0.5	U
Cadmium	ug/L	5	0.2	U	0.2	U
Calcium	ug/L	-	161,000		54,100	
Chromium	ug/L	50	1	U	0.46	J
Cobalt	ug/L	-	0.67		1.03	
Copper	ug/L	200	1	U	1.66	
Iron,	ug/L	300	1,420		3,980	
Lead	ug/L	25	1	U	1	U
Magnesium	ug/L	35,000	35,100		22,300	
Manganese	ug/L	300	1,389		875.7	
Mercury	ug/L	0.7	0.2	U	0.2	U
Nickel	ug/L	100	1.69	J	5.1	
Potassium	ug/L	-	8,390		5,840	
Selenium	ug/L	10	5	U	5	U
Silver	ug/L	50	0.4	U	0.4	U
Sodium	ug/L	20,000	190,000		83,800	
Thallium	ug/L	0.5	*0.5*	*U*	0.21	J
Vanadium	ug/L	-	5	U	5	U
Zinc	ug/L	2,000	10	U	6.44	J

Table Notes:

NYSDEC TOGS 1.1.1 AWQS: New York State Department of Environmental Conservation Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards.

(yellow highlight): Exceeds NYSDEC TOGS 1.1.1 AWQS.

Italics : Non-Detect Value - with a Reporting Limit (RL) that exceeds NYSDEC TOGS 1.1.1 AWQS.

J : Estimated Value. The target analyte concentration is below the quantitative limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses.

U : Not detected at the reported detection limit for the sample.

- : No Guidance Value.

ug/L : Micrograms per liter.

Table 5: Groundwater Sample Analytical Data - Pesticides and Polychlorinated Biphenyls

Hampshire Country Club
Mamaroneck, New York

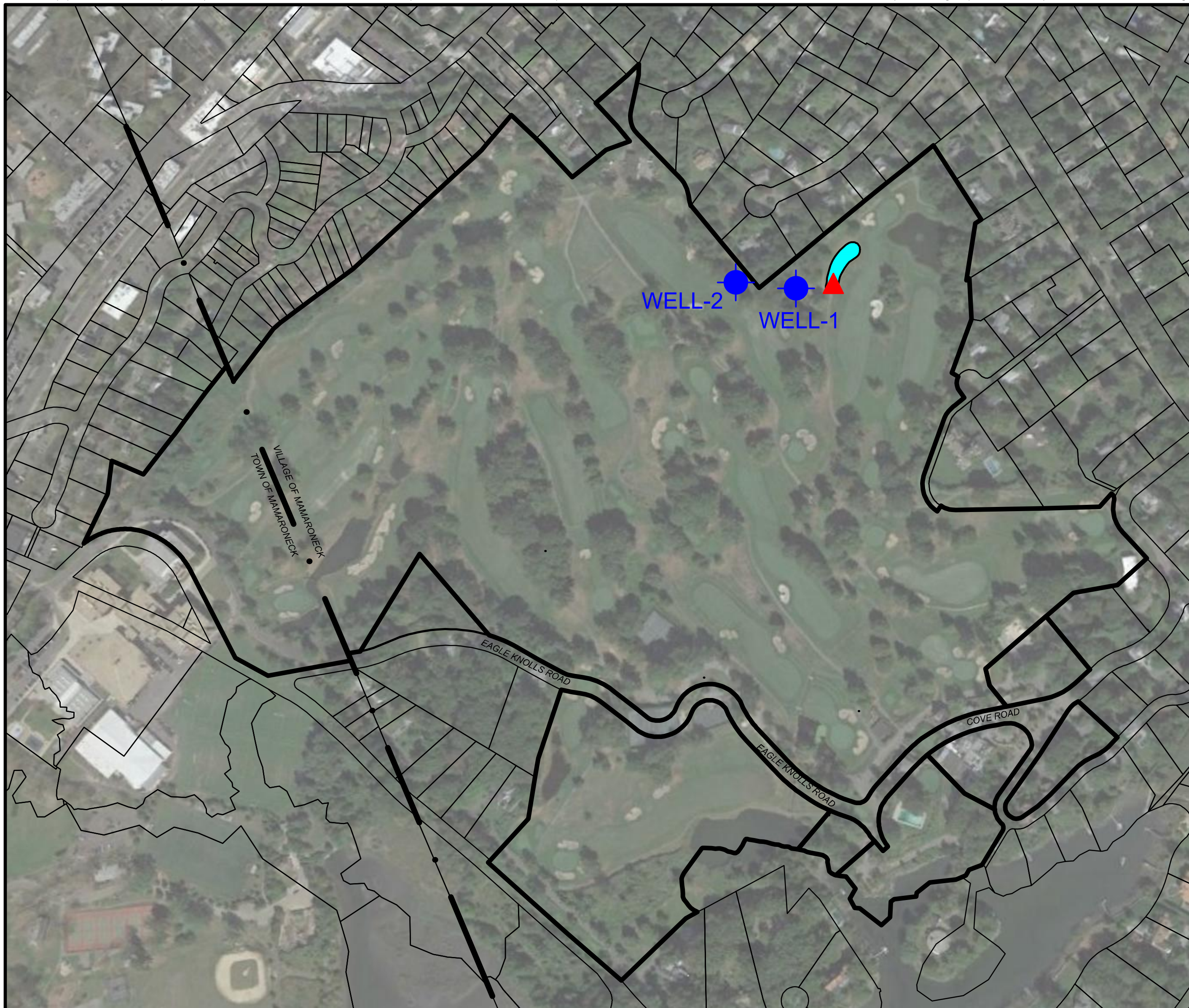
SAMPLE LOCATION	Units	NYSDEC TOGS 1.1.1 AWQS	WELL 1		WELL 2	
SAMPLING DATE			3/18/2019		3/18/2019	
LABORATORY SAMPLE ID			L1910469-01		L1910469-02	
SAMPLE TYPE			Water		Water	
DILUTION			1		1	
			Results	Qual	Results	Qual
Organochlorine Pesticides by 8081B						
4,4'-DDD	ug/L	0.3	0.029	U	0.029	U
4,4'-DDE	ug/L	0.2	0.029	U	0.029	U
4,4'-DDT	ug/L	0.2	0.029	U	0.029	U
Aldrin	ug/L	0	*0.014*	*U*	*0.014*	*U*
Alpha-BHC	ug/L	0.01	*0.014*	*U*	*0.014*	*U*
Beta-BHC	ug/L	0.04	0.014	U	0.014	U
Chlordane	ug/L	0.05	*0.143*	*U*	*0.143*	*U*
cis-Chlordane	ug/L	-	0.014	U	0.014	U
Delta-BHC	ug/L	0.04	0.014	U	0.014	U
Dieldrin	ug/L	0.004	*0.029*	*U*	*0.029*	*U*
Endosulfan I	ug/L	-	0.014	U	0.014	U
Endosulfan II	ug/L	-	0.029	U	0.029	U
Endosulfan sulfate	ug/L	-	0.029	U	0.029	U
Endrin	ug/L	0	*0.029*	*U*	*0.029*	*U*
Endrin aldehyde	ug/L	5	0.029	U	0.029	U
Endrin ketone	ug/L	5	0.029	U	0.029	U
Heptachlor	ug/L	0.04	0.014	U	0.014	U
Heptachlor epoxide	ug/L	0.03	0.014	U	0.014	U
Lindane	ug/L	0.05	0.014	U	0.014	U
Methoxychlor	ug/L	35	0.143	U	0.143	U
Toxaphene	ug/L	0.06	*0.143*	*U*	*0.143*	*U*
trans-Chlordane	ug/L	-	0.014	U	0.014	U
Polychlorinated Biphenyls by 8082A						
Aroclor 1016	ug/L	0.09	0.082	U	0.082	U
Aroclor 1221	ug/L	0.09	0.082	U	0.082	U
Aroclor 1232	ug/L	0.09	0.082	U	0.082	U
Aroclor 1242	ug/L	0.09	0.082	U	0.082	U
Aroclor 1248	ug/L	0.09	0.082	U	0.082	U
Aroclor 1254	ug/L	0.09	0.082	U	0.082	U
Aroclor 1260	ug/L	0.09	0.082	U	0.082	U
Aroclor 1262	ug/L	0.09	0.082	U	0.082	U
Aroclor 1268	ug/L	0.09	0.082	U	0.082	U
PCBs, Total	ug/L	-	0.082	U	0.082	U

TABLE NOTES:

NYSDEC TOGS 1.1.1 AWQS : New York State Department of Environmental Conservation Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards.
Italics : Non-Detect Value - with a Reporting Limit (RL) that exceeds NYSDEC TOGS 1.1.1 AWQS.
U : Not detected at the reported detection limit for the sample.
- : No Guidance Value.
ug/L : Micrograms per liter.

FIGURES

GZA–\\GZANYMan1\Jobs\Active 162500 to 162599\162548.10 – Hampshire CC Additional Environmental Services\Drawings\GZA CAD\162548.10.002.dwg [FIG 1 8.5x11–LAND] March 27, 2019 – 3:52pm yi.xiao



GENERAL NOTES

1. BASE MAP DEVELOPED FROM MUNICIPAL TAX PARCEL DATA PROVIDED ON WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEMS WEB SITE, DATED FEBRUARY 2017 AND GOOGLE MAP DATA IMAGERY, DATED 2019.
2. IRRIGATION WELL AND OUTFALL LOCATIONS WERE APPROXIMATED BY GZA FIELD REPRESENTATIVES DURING SITE VISIT, DATED MARCH 18, 2019.
3. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF SITE FEATURES IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND

WELL-# IRRIGATION WELL LOCATION

OUTFALL

POND

N
W E
S

0 250 500 1,000

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

HAMPSHIRE COUNTRY CLUB
1025 COVE ROADWEST
MAMARONECK, NY 10543

SITE PLAN

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
VHB ENGINEERING SURVEYING & LANDSCAPE ARCHITECTURE, P. C.

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE
DESIGNED BY: RM	DRAWN BY: YX	SCALE: 1" = 500'	1
DATE: MARCH 2019	PROJECT NO. 41.0162548.10	REVISION NO. -	SHEET NO.

ATTACHMENT A

SITE PHOTOGRAPHS

Site Photographs

Client Name: Vanasse Hangen Brustlin, Inc.	**Site Location:** 1025 Cove Road, Mamaroneck, NY 10543	**Project No.** 41.0162162548.10

Photo No. 1	**Date:** 3/18/19
Direction Photo Taken: Facing southwest.	
Description: Irrigation Well-1.	

Photo No. 2	**Date:** 3/18/19
Direction Photo Taken: NA.	
Description: A closer look into irrigation Well-1.	

Site Photographs

Client Name: Vanasse Hangen Brustlin, Inc.	Site Location: 1025 Cove Road, Mamaroneck, NY 10543	Project No. 41.0162162548.10

Photo No. 3	Date: 3/18/19
Direction Photo Taken: Facing east.	
Description: Irrigation Well-2.	

Photo No. 4	Date: 3/18/19
Direction Photo Taken: NA.	
Description: A closer look into irrigation Well-2.	

Site Photographs

Client Name: Vanasse Hangen Brustlin, Inc.	**Site Location:** 1025 Cove Road, Mamaroneck, NY 10543	**Project No.** 41.0162162548.10

Photo No. 5	**Date:** 3/18/19
Direction Photo Taken: Facing north.	
Description: The outfall discharge into a pond.	

Photo No. 6	**Date:** 3/18/19
Direction Photo Taken: Facing east.	
Description: The outfall.	

ATTACHMENT B

LABORATORY REPORT

ANALYTICAL REPORT

Lab Number:	L1910469
Client:	GZA GeoEnvironmental, Inc. 104 West 29th Street, 10th Floor New York, NY 10001
ATTN:	Reinbill Maniquez
Phone:	(212) 594-8140
Project Name:	HAMPSHIRE COUNTRY CLUB
Project Number:	41.0162548.10
Report Date:	03/25/19

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1910469-01	WELL 1	WATER	MAMORONECK	03/18/19 10:10	03/18/19
L1910469-02	WELL 2	WATER	MAMORONECK	03/18/19 10:25	03/18/19
L1910469-03	TRIP BLANK	WATER	MAMORONECK	03/15/19 00:00	03/18/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L1910469-01 and -02: The Client IDs were specified by the client.

L1910469-03: A sample identified as "TRIP BLANK" was received but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

Dissolved Metals

L1910469-01 and -02: The dissolved results are greater than the total results. The sample containers were verified as being labeled correctly by the laboratory.

The WG1217716-3 MS recovery, performed on L1910469-01, is outside the acceptance criteria for antimony (127%). A post digestion spike was performed and was within acceptance criteria.

The WG1217716-3 MS recoveries for calcium (0%) and sodium (0%), performed on L1910469-01, do not apply because the sample concentrations are greater than four times the spike amounts added.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Melissa Cripps Melissa Cripps

Title: Technical Director/Representative Date: 03/25/19

ORGANICS

VOLATILES

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-01
Client ID: WELL 1
Sample Location: MAMORONECK
Date Collected: 03/18/19 10:10
Date Received: 03/18/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 03/22/19 13:08
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-01	Date Collected:	03/18/19 10:10
Client ID:	WELL 1	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	2.9	J	ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-01 Date Collected: 03/18/19 10:10
Client ID: WELL 1 Date Received: 03/18/19
Sample Location: MAMORONECK Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	101		70-130

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 03/22/19 13:38
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	4.1	J	ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	99		70-130

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-03	Date Collected:	03/15/19 00:00
Client ID:	TRIP BLANK	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 03/22/19 14:08
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-03 Date Collected: 03/15/19 00:00

Client ID: TRIP BLANK Date Received: 03/18/19

Sample Location: MAMORONECK Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	ND		ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-03	Date Collected:	03/15/19 00:00
Client ID:	TRIP BLANK	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	61.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	100		70-130

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/22/19 08:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1218932-5					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.14
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.07
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.17
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.18

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/22/19 08:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1218932-5					
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.5
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.9
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/22/19 08:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-03 Batch: WG1218932-5					
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
1,4-Dioxane	ND		ug/l	250	61.
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	99		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1218932-3 WG1218932-4								
Methylene chloride	96		100		70-130	4		20
1,1-Dichloroethane	100		110		70-130	10		20
Chloroform	96		100		70-130	4		20
Carbon tetrachloride	90		96		63-132	6		20
1,2-Dichloropropane	110		110		70-130	0		20
Dibromochloromethane	96		100		63-130	4		20
1,1,2-Trichloroethane	96		100		70-130	4		20
Tetrachloroethene	94		98		70-130	4		20
Chlorobenzene	98		100		75-130	2		20
Trichlorofluoromethane	84		91		62-150	8		20
1,2-Dichloroethane	98		100		70-130	2		20
1,1,1-Trichloroethane	91		98		67-130	7		20
Bromodichloromethane	99		100		67-130	1		20
trans-1,3-Dichloropropene	90		95		70-130	5		20
cis-1,3-Dichloropropene	97		100		70-130	3		20
1,1-Dichloropropene	92		98		70-130	6		20
Bromoform	94		100		54-136	6		20
1,1,2,2-Tetrachloroethane	93		100		67-130	7		20
Benzene	95		100		70-130	5		20
Toluene	96		100		70-130	4		20
Ethylbenzene	96		100		70-130	4		20
Chloromethane	78		82		64-130	5		20
Bromomethane	**24**	Q	**31**	Q	39-139	**25**	Q	20

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB

Project Number: 41.0162548.10

Lab Number: L1910469

Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1218932-3 WG1218932-4								
Vinyl chloride	94		100		55-140	6		20
Chloroethane	81		90		55-138	11		20
1,1-Dichloroethene	87		94		61-145	8		20
trans-1,2-Dichloroethene	92		98		70-130	6		20
Trichloroethene	93		100		70-130	7		20
1,2-Dichlorobenzene	92		99		70-130	7		20
1,3-Dichlorobenzene	94		100		70-130	6		20
1,4-Dichlorobenzene	92		97		70-130	5		20
Methyl tert butyl ether	87		94		63-130	8		20
p/m-Xylene	100		100		70-130	0		20
o-Xylene	100		100		70-130	0		20
cis-1,2-Dichloroethene	97		100		70-130	3		20
Dibromomethane	93		98		70-130	5		20
1,2,3-Trichloropropane	97		100		64-130	3		20
Acrylonitrile	96		100		70-130	4		20
Styrene	100		100		70-130	0		20
Dichlorodifluoromethane	110		120		36-147	9		20
Acetone	110		100		58-148	10		20
Carbon disulfide	100		100		51-130	0		20
2-Butanone	73		82		63-138	12		20
Vinyl acetate	91		98		70-130	7		20
4-Methyl-2-pentanone	100		110		59-130	10		20
2-Hexanone	94		98		57-130	4		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1218932-3 WG1218932-4								
Bromochloromethane	110		120		70-130	9		20
2,2-Dichloropropane	92		98		63-133	6		20
1,2-Dibromoethane	97		100		70-130	3		20
1,3-Dichloropropane	95		100		70-130	5		20
1,1,1,2-Tetrachloroethane	98		100		64-130	2		20
Bromobenzene	98		100		70-130	2		20
n-Butylbenzene	100		100		53-136	0		20
sec-Butylbenzene	100		100		70-130	0		20
tert-Butylbenzene	100		110		70-130	10		20
o-Chlorotoluene	94		98		70-130	4		20
p-Chlorotoluene	98		100		70-130	2		20
1,2-Dibromo-3-chloropropane	88		98		41-144	11		20
Hexachlorobutadiene	98		100		63-130	2		20
Isopropylbenzene	98		100		70-130	2		20
p-Isopropyltoluene	100		110		70-130	10		20
Naphthalene	85		100		70-130	16		20
n-Propylbenzene	97		100		69-130	3		20
1,2,3-Trichlorobenzene	86		99		70-130	14		20
1,2,4-Trichlorobenzene	92		100		70-130	8		20
1,3,5-Trimethylbenzene	100		100		64-130	0		20
1,2,4-Trimethylbenzene	100		110		70-130	10		20
1,4-Dioxane	130		130		56-162	0		20
p-Diethylbenzene	100		110		70-130	10		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03 Batch: WG1218932-3 WG1218932-4								
p-Ethyltoluene	100		100		70-130	0		20
1,2,4,5-Tetramethylbenzene	100		110		70-130	10		20
Ethyl ether	85		92		59-134	8		20
trans-1,4-Dichloro-2-butene	95		100		70-130	5		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		102		70-130
Toluene-d8	98		98		70-130
4-Bromofluorobenzene	100		100		70-130
Dibromofluoromethane	99		100		70-130

SEMIVOLATILES

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-01
Client ID: WELL 1
Sample Location: MAMORONECK
Date Collected: 03/18/19 10:10
Date Received: 03/18/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 03/21/19 09:04
Analyst: JG
Extraction Method: EPA 3510C
Extraction Date: 03/19/19 23:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50	1
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50	1
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45	1
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40	1
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6	1
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2	1
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50	1
Hexachlorocyclopentadiene	ND		ug/l	20	0.69	1
Isophorone	ND		ug/l	5.0	1.2	1
Nitrobenzene	ND		ug/l	2.0	0.77	1
NDPA/DPA	ND		ug/l	2.0	0.42	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64	1
Bis(2-ethylhexyl)phthalate	2.8	J	ug/l	3.0	1.5	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.2	1
Di-n-butylphthalate	ND		ug/l	5.0	0.39	1
Di-n-octylphthalate	ND		ug/l	5.0	1.3	1
Diethyl phthalate	ND		ug/l	5.0	0.38	1
Dimethyl phthalate	ND		ug/l	5.0	1.8	1
Biphenyl	ND		ug/l	2.0	0.46	1
4-Chloroaniline	ND		ug/l	5.0	1.1	1
2-Nitroaniline	ND		ug/l	5.0	0.50	1
3-Nitroaniline	ND		ug/l	5.0	0.81	1
4-Nitroaniline	ND		ug/l	5.0	0.80	1

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-01	Date Collected:	03/18/19 10:10
Client ID:	WELL 1	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dibenzofuran	ND		ug/l	2.0	0.50	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44	1
Acetophenone	ND		ug/l	5.0	0.53	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.35	1
2-Chlorophenol	ND		ug/l	2.0	0.48	1
2,4-Dichlorophenol	ND		ug/l	5.0	0.41	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.8	1
2-Nitrophenol	ND		ug/l	10	0.85	1
4-Nitrophenol	ND		ug/l	10	0.67	1
2,4-Dinitrophenol	ND		ug/l	20	6.6	1
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8	1
Phenol	ND		ug/l	5.0	0.57	1
2-Methylphenol	ND		ug/l	5.0	0.49	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77	1
Benzoic Acid	ND		ug/l	50	2.6	1
Benzyl Alcohol	0.75	J	ug/l	2.0	0.59	1
Carbazole	ND		ug/l	2.0	0.49	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	45		21-120
Phenol-d6	43		10-120
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	75		15-120
2,4,6-Tribromophenol	69		10-120
4-Terphenyl-d14	105		41-149

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-01	Date Collected:	03/18/19 10:10
Client ID:	WELL 1	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	1,8270D-SIM	Extraction Date:	03/20/19 00:04
Analytical Date:	03/22/19 20:03		
Analyst:	JJW		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	0.01	1
2-Chloronaphthalene	ND		ug/l	0.20	0.02	1
Fluoranthene	ND		ug/l	0.10	0.02	1
Hexachlorobutadiene	ND		ug/l	0.50	0.05	1
Naphthalene	ND		ug/l	0.10	0.05	1
Benzo(a)anthracene	0.03	J	ug/l	0.10	0.02	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(b)fluoranthene	ND		ug/l	0.10	0.01	1
Benzo(k)fluoranthene	ND		ug/l	0.10	0.01	1
Chrysene	ND		ug/l	0.10	0.01	1
Acenaphthylene	ND		ug/l	0.10	0.01	1
Anthracene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
2-Methylnaphthalene	ND		ug/l	0.10	0.02	1
Pentachlorophenol	0.19	J	ug/l	0.80	0.01	1
Hexachlorobenzene	ND		ug/l	0.80	0.01	1
Hexachloroethane	ND		ug/l	0.80	0.06	1

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-01	Date Collected:	03/18/19 10:10
Client ID:	WELL 1	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Semivolatile Organics by GC/MS-SIM - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	37		21-120
Phenol-d6	36		10-120
Nitrobenzene-d5	59		23-120
2-Fluorobiphenyl	70		15-120
2,4,6-Tribromophenol	67		10-120
4-Terphenyl-d14	107		41-149

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	1,8270D	Extraction Date:	03/19/19 23:55
Analytical Date:	03/21/19 09:29		
Analyst:	JG		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50	1
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50	1
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45	1
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40	1
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6	1
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2	1
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50	1
Hexachlorocyclopentadiene	ND		ug/l	20	0.69	1
Isophorone	ND		ug/l	5.0	1.2	1
Nitrobenzene	ND		ug/l	2.0	0.77	1
NDPA/DPA	ND		ug/l	2.0	0.42	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64	1
Bis(2-ethylhexyl)phthalate	2.6	J	ug/l	3.0	1.5	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.2	1
Di-n-butylphthalate	ND		ug/l	5.0	0.39	1
Di-n-octylphthalate	ND		ug/l	5.0	1.3	1
Diethyl phthalate	ND		ug/l	5.0	0.38	1
Dimethyl phthalate	ND		ug/l	5.0	1.8	1
Biphenyl	ND		ug/l	2.0	0.46	1
4-Chloroaniline	ND		ug/l	5.0	1.1	1
2-Nitroaniline	ND		ug/l	5.0	0.50	1
3-Nitroaniline	ND		ug/l	5.0	0.81	1
4-Nitroaniline	ND		ug/l	5.0	0.80	1

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dibenzofuran	ND		ug/l	2.0	0.50	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44	1
Acetophenone	ND		ug/l	5.0	0.53	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.35	1
2-Chlorophenol	ND		ug/l	2.0	0.48	1
2,4-Dichlorophenol	ND		ug/l	5.0	0.41	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.8	1
2-Nitrophenol	ND		ug/l	10	0.85	1
4-Nitrophenol	ND		ug/l	10	0.67	1
2,4-Dinitrophenol	ND		ug/l	20	6.6	1
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8	1
Phenol	ND		ug/l	5.0	0.57	1
2-Methylphenol	ND		ug/l	5.0	0.49	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77	1
Benzoic Acid	ND		ug/l	50	2.6	1
Benzyl Alcohol	ND		ug/l	2.0	0.59	1
Carbazole	ND		ug/l	2.0	0.49	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	62		21-120
Phenol-d6	55		10-120
Nitrobenzene-d5	96		23-120
2-Fluorobiphenyl	91		15-120
2,4,6-Tribromophenol	71		10-120
4-Terphenyl-d14	106		41-149

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-02
Client ID: WELL 2
Sample Location: MAMORONECK
Date Collected: 03/18/19 10:25
Date Received: 03/18/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D-SIM
Analytical Date: 03/22/19 20:29
Analyst: JJW
Extraction Method: EPA 3510C
Extraction Date: 03/20/19 00:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	0.01	1
2-Chloronaphthalene	ND		ug/l	0.20	0.02	1
Fluoranthene	ND		ug/l	0.10	0.02	1
Hexachlorobutadiene	ND		ug/l	0.50	0.05	1
Naphthalene	ND		ug/l	0.10	0.05	1
Benzo(a)anthracene	ND		ug/l	0.10	0.02	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(b)fluoranthene	0.01	J	ug/l	0.10	0.01	1
Benzo(k)fluoranthene	0.01	J	ug/l	0.10	0.01	1
Chrysene	ND		ug/l	0.10	0.01	1
Acenaphthylene	ND		ug/l	0.10	0.01	1
Anthracene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
2-Methylnaphthalene	ND		ug/l	0.10	0.02	1
Pentachlorophenol	0.14	J	ug/l	0.80	0.01	1
Hexachlorobenzene	ND		ug/l	0.80	0.01	1
Hexachloroethane	ND		ug/l	0.80	0.06	1

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Semivolatile Organics by GC/MS-SIM - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	52		21-120
Phenol-d6	46		10-120
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	86		15-120
2,4,6-Tribromophenol	71		10-120
4-Terphenyl-d14	107		41-149

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/21/19 00:39
Analyst: JG

Extraction Method: EPA 3510C
Extraction Date: 03/19/19 23:55

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1217386-1					
Acenaphthene	ND		ug/l	2.0	0.44
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50
Hexachlorobenzene	ND		ug/l	2.0	0.46
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50
2-Chloronaphthalene	ND		ug/l	2.0	0.44
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93
Fluoranthene	ND		ug/l	2.0	0.26
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50
Hexachlorobutadiene	ND		ug/l	2.0	0.66
Hexachlorocyclopentadiene	ND		ug/l	20	0.69
Hexachloroethane	ND		ug/l	2.0	0.58
Isophorone	ND		ug/l	5.0	1.2
Naphthalene	ND		ug/l	2.0	0.46
Nitrobenzene	ND		ug/l	2.0	0.77
NDPA/DPA	ND		ug/l	2.0	0.42
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64
Bis(2-ethylhexyl)phthalate	2.2	J	ug/l	3.0	1.5
Butyl benzyl phthalate	ND		ug/l	5.0	1.2
Di-n-butylphthalate	ND		ug/l	5.0	0.39
Di-n-octylphthalate	ND		ug/l	5.0	1.3
Diethyl phthalate	ND		ug/l	5.0	0.38

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/21/19 00:39
Analyst: JG

Extraction Method: EPA 3510C
Extraction Date: 03/19/19 23:55

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1217386-1					
Dimethyl phthalate	ND		ug/l	5.0	1.8
Benzo(a)anthracene	ND		ug/l	2.0	0.32
Benzo(a)pyrene	ND		ug/l	2.0	0.41
Benzo(b)fluoranthene	ND		ug/l	2.0	0.35
Benzo(k)fluoranthene	ND		ug/l	2.0	0.37
Chrysene	ND		ug/l	2.0	0.34
Acenaphthylene	ND		ug/l	2.0	0.46
Anthracene	ND		ug/l	2.0	0.33
Benzo(ghi)perylene	ND		ug/l	2.0	0.30
Fluorene	ND		ug/l	2.0	0.41
Phenanthrene	ND		ug/l	2.0	0.33
Dibenzo(a,h)anthracene	ND		ug/l	2.0	0.32
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.0	0.40
Pyrene	ND		ug/l	2.0	0.28
Biphenyl	ND		ug/l	2.0	0.46
4-Chloroaniline	ND		ug/l	5.0	1.1
2-Nitroaniline	ND		ug/l	5.0	0.50
3-Nitroaniline	ND		ug/l	5.0	0.81
4-Nitroaniline	ND		ug/l	5.0	0.80
Dibenzofuran	ND		ug/l	2.0	0.50
2-Methylnaphthalene	ND		ug/l	2.0	0.45
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44
Acetophenone	ND		ug/l	5.0	0.53
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61
p-Chloro-m-cresol	ND		ug/l	2.0	0.35
2-Chlorophenol	ND		ug/l	2.0	0.48
2,4-Dichlorophenol	ND		ug/l	5.0	0.41
2,4-Dimethylphenol	ND		ug/l	5.0	1.8
2-Nitrophenol	ND		ug/l	10	0.85

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/21/19 00:39
Analyst: JG

Extraction Method: EPA 3510C
Extraction Date: 03/19/19 23:55

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1217386-1					
4-Nitrophenol	ND		ug/l	10	0.67
2,4-Dinitrophenol	ND		ug/l	20	6.6
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8
Pentachlorophenol	ND		ug/l	10	1.8
Phenol	ND		ug/l	5.0	0.57
2-Methylphenol	ND		ug/l	5.0	0.49
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77
Benzoic Acid	ND		ug/l	50	2.6
Benzyl Alcohol	ND		ug/l	2.0	0.59
Carbazole	ND		ug/l	2.0	0.49

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	49		21-120
Phenol-d6	43		10-120
Nitrobenzene-d5	77		23-120
2-Fluorobiphenyl	83		15-120
2,4,6-Tribromophenol	48		10-120
4-Terphenyl-d14	102		41-149

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 03/21/19 16:29
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 03/20/19 00:04

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-02 Batch: WG1217387-1					
Acenaphthene	ND		ug/l	0.10	0.01
2-Chloronaphthalene	ND		ug/l	0.20	0.02
Fluoranthene	ND		ug/l	0.10	0.02
Hexachlorobutadiene	ND		ug/l	0.50	0.05
Naphthalene	0.07	J	ug/l	0.10	0.05
Benzo(a)anthracene	ND		ug/l	0.10	0.02
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(b)fluoranthene	ND		ug/l	0.10	0.01
Benzo(k)fluoranthene	ND		ug/l	0.10	0.01
Chrysene	ND		ug/l	0.10	0.01
Acenaphthylene	ND		ug/l	0.10	0.01
Anthracene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.10	0.02
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
2-Methylnaphthalene	ND		ug/l	0.10	0.02
Pentachlorophenol	ND		ug/l	0.80	0.01
Hexachlorobenzene	ND		ug/l	0.80	0.01
Hexachloroethane	ND		ug/l	0.80	0.06

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 03/21/19 16:29
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 03/20/19 00:04

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-02 Batch: WG1217387-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	47		21-120
Phenol-d6	42		10-120
Nitrobenzene-d5	75		23-120
2-Fluorobiphenyl	76		15-120
2,4,6-Tribromophenol	66		10-120
4-Terphenyl-d14	101		41-149

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1217386-2 WG1217386-3								
Acenaphthene	86		88		37-111	2		30
1,2,4-Trichlorobenzene	74		73		39-98	1		30
Hexachlorobenzene	92		92		40-140	0		30
Bis(2-chloroethyl)ether	75		76		40-140	1		30
2-Chloronaphthalene	84		84		40-140	0		30
1,2-Dichlorobenzene	69		70		40-140	1		30
1,3-Dichlorobenzene	66		67		40-140	2		30
1,4-Dichlorobenzene	67		68		36-97	1		30
3,3'-Dichlorobenzidine	89		90		40-140	1		30
2,4-Dinitrotoluene	105		106		48-143	1		30
2,6-Dinitrotoluene	102		100		40-140	2		30
Fluoranthene	108		107		40-140	1		30
4-Chlorophenyl phenyl ether	90		92		40-140	2		30
4-Bromophenyl phenyl ether	98		99		40-140	1		30
Bis(2-chloroisopropyl)ether	71		73		40-140	3		30
Bis(2-chloroethoxy)methane	84		85		40-140	1		30
Hexachlorobutadiene	72		73		40-140	1		30
Hexachlorocyclopentadiene	88		90		40-140	2		30
Hexachloroethane	70		71		40-140	1		30
Isophorone	82		83		40-140	1		30
Naphthalene	78		79		40-140	1		30
Nitrobenzene	84		86		40-140	2		30
NDPA/DPA	96		98		40-140	2		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1217386-2 WG1217386-3								
n-Nitrosodi-n-propylamine	85		87		29-132	2		30
Bis(2-ethylhexyl)phthalate	106		97		40-140	9		30
Butyl benzyl phthalate	102		93		40-140	9		30
Di-n-butylphthalate	102		102		40-140	0		30
Di-n-octylphthalate	106		98		40-140	8		30
Diethyl phthalate	100		100		40-140	0		30
Dimethyl phthalate	99		97		40-140	2		30
Benzo(a)anthracene	109		109		40-140	0		30
Benzo(a)pyrene	116		118		40-140	2		30
Benzo(b)fluoranthene	111		118		40-140	6		30
Benzo(k)fluoranthene	113		110		40-140	3		30
Chrysene	98		99		40-140	1		30
Acenaphthylene	92		92		45-123	0		30
Anthracene	100		101		40-140	1		30
Benzo(ghi)perylene	109		109		40-140	0		30
Fluorene	92		95		40-140	3		30
Phenanthrene	94		94		40-140	0		30
Dibenzo(a,h)anthracene	111		112		40-140	1		30
Indeno(1,2,3-cd)pyrene	115		112		40-140	3		30
Pyrene	104		102		26-127	2		30
Biphenyl	88		89		40-140	1		30
4-Chloroaniline	70		72		40-140	3		30
2-Nitroaniline	91		91		52-143	0		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1217386-2 WG1217386-3								
3-Nitroaniline	87		90		25-145	3		30
4-Nitroaniline	79		84		51-143	6		30
Dibenzofuran	89		92		40-140	3		30
2-Methylnaphthalene	83		84		40-140	1		30
1,2,4,5-Tetrachlorobenzene	82		83		2-134	1		30
Acetophenone	85		88		39-129	3		30
2,4,6-Trichlorophenol	102		101		30-130	1		30
p-Chloro-m-cresol	**99**	Q	97		23-97	2		30
2-Chlorophenol	81		82		27-123	1		30
2,4-Dichlorophenol	92		94		30-130	2		30
2,4-Dimethylphenol	58		58		30-130	0		30
2-Nitrophenol	98		102		30-130	4		30
4-Nitrophenol	**89**	Q	**90**	Q	10-80	1		30
2,4-Dinitrophenol	119		115		20-130	3		30
4,6-Dinitro-o-cresol	128		128		20-164	0		30
Pentachlorophenol	**104**	Q	**107**	Q	9-103	3		30
Phenol	57		56		12-110	2		30
2-Methylphenol	76		77		30-130	1		30
3-Methylphenol/4-Methylphenol	82		82		30-130	0		30
2,4,5-Trichlorophenol	104		102		30-130	2		30
Benzoic Acid	70		68		10-164	3		30
Benzyl Alcohol	79		81		26-116	3		30
Carbazole	102		102		55-144	0		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1217386-2 WG1217386-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	66		65		21-120
Phenol-d6	57		56		10-120
Nitrobenzene-d5	86		90		23-120
2-Fluorobiphenyl	88		88		15-120
2,4,6-Tribromophenol	108		108		10-120
4-Terphenyl-d14	107		104		41-149

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-02 Batch: WG1217387-2 WG1217387-3								
Acenaphthene	81		75		40-140	8		40
2-Chloronaphthalene	81		74		40-140	9		40
Fluoranthene	100		97		40-140	3		40
Hexachlorobutadiene	67		58		40-140	14		40
Naphthalene	78		69		40-140	12		40
Benzo(a)anthracene	86		85		40-140	1		40
Benzo(a)pyrene	105		104		40-140	1		40
Benzo(b)fluoranthene	99		98		40-140	1		40
Benzo(k)fluoranthene	97		97		40-140	0		40
Chrysene	89		87		40-140	2		40
Acenaphthylene	90		83		40-140	8		40
Anthracene	91		88		40-140	3		40
Benzo(ghi)perylene	76		71		40-140	7		40
Fluorene	88		83		40-140	6		40
Phenanthrene	86		83		40-140	4		40
Dibenzo(a,h)anthracene	88		83		40-140	6		40
Indeno(1,2,3-cd)pyrene	88		84		40-140	5		40
Pyrene	99		98		40-140	1		40
2-Methylnaphthalene	81		73		40-140	10		40
Pentachlorophenol	90		87		40-140	3		40
Hexachlorobenzene	78		75		40-140	4		40
Hexachloroethane	70		60		40-140	15		40

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-02 Batch: WG1217387-2 WG1217387-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	65		56		21-120
Phenol-d6	53		46		10-120
Nitrobenzene-d5	82		72		23-120
2-Fluorobiphenyl	80		74		15-120
2,4,6-Tribromophenol	106		101		10-120
4-Terphenyl-d14	103		101		41-149

PCBS

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-01
Client ID: WELL 1
Sample Location: MAMORONECK
Date Collected: 03/18/19 10:10
Date Received: 03/18/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8082A
Analytical Date: 03/20/19 13:08
Analyst: WR

Extraction Method: EPA 3510C
Extraction Date: 03/20/19 00:08
Cleanup Method: EPA 3665A
Cleanup Date: 03/20/19
Cleanup Method: EPA 3660B
Cleanup Date: 03/20/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.082	0.034	1	A
Aroclor 1221	ND		ug/l	0.082	0.066	1	A
Aroclor 1232	ND		ug/l	0.082	0.045	1	A
Aroclor 1242	ND		ug/l	0.082	0.038	1	A
Aroclor 1248	ND		ug/l	0.082	0.048	1	A
Aroclor 1254	ND		ug/l	0.082	0.039	1	A
Aroclor 1260	ND		ug/l	0.082	0.032	1	A
Aroclor 1262	ND		ug/l	0.082	0.034	1	A
Aroclor 1268	ND		ug/l	0.082	0.033	1	A
PCBs, Total	ND		ug/l	0.082	0.032	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		30-150	A
Decachlorobiphenyl	88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	83		30-150	B

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	1,8082A	Extraction Date:	03/20/19 00:08
Analytical Date:	03/20/19 13:22	Cleanup Method:	EPA 3665A
Analyst:	WR	Cleanup Date:	03/20/19
		Cleanup Method:	EPA 3660B
		Cleanup Date:	03/20/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.082	0.034	1	A
Aroclor 1221	ND		ug/l	0.082	0.066	1	A
Aroclor 1232	ND		ug/l	0.082	0.045	1	A
Aroclor 1242	ND		ug/l	0.082	0.038	1	A
Aroclor 1248	ND		ug/l	0.082	0.048	1	A
Aroclor 1254	ND		ug/l	0.082	0.039	1	A
Aroclor 1260	ND		ug/l	0.082	0.032	1	A
Aroclor 1262	ND		ug/l	0.082	0.034	1	A
Aroclor 1268	ND		ug/l	0.082	0.033	1	A
PCBs, Total	ND		ug/l	0.082	0.032	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	84		30-150	A
Decachlorobiphenyl	107		30-150	A
2,4,5,6-Tetrachloro-m-xylene	87		30-150	B
Decachlorobiphenyl	101		30-150	B

Project Name: HAMPSHIRE COUNTRY CLUB　　**Lab Number:** L1910469
Project Number: 41.0162548.10　　**Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8082A
Analytical Date: 03/20/19 12:14
Analyst: WR

Extraction Method: EPA 3510C
Extraction Date: 03/20/19 00:08
Cleanup Method: EPA 3665A
Cleanup Date: 03/20/19
Cleanup Method: EPA 3660B
Cleanup Date: 03/20/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-02 Batch: WG1217388-1						
Aroclor 1016	ND		ug/l	0.082	0.034	A
Aroclor 1221	ND		ug/l	0.082	0.066	A
Aroclor 1232	ND		ug/l	0.082	0.045	A
Aroclor 1242	ND		ug/l	0.082	0.038	A
Aroclor 1248	ND		ug/l	0.082	0.048	A
Aroclor 1254	ND		ug/l	0.082	0.039	A
Aroclor 1260	ND		ug/l	0.082	0.032	A
Aroclor 1262	ND		ug/l	0.082	0.034	A
Aroclor 1268	ND		ug/l	0.082	0.033	A
PCBs, Total	ND		ug/l	0.082	0.032	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76		30-150	A
Decachlorobiphenyl	130		30-150	A
2,4,5,6-Tetrachloro-m-xylene	78		30-150	B
Decachlorobiphenyl	94		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB

Lab Number: L1910469

Project Number: 41.0162548.10

Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-02 Batch: WG1217388-2 WG1217388-3									
Aroclor 1016	74		69		40-140	6		50	A
Aroclor 1260	87		72		40-140	19		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	83		77		30-150	A
Decachlorobiphenyl	117		101		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		83		30-150	B
Decachlorobiphenyl	103		107		30-150	B

PESTICIDES

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-01
Client ID: WELL 1
Sample Location: MAMORONECK

Date Collected: 03/18/19 10:10
Date Received: 03/18/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 03/23/19 13:28
Analyst: KEG

Extraction Method: EPA 3510C
Extraction Date: 03/21/19 07:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/l	0.014	0.003	1	A
Lindane	ND		ug/l	0.014	0.003	1	A
Alpha-BHC	ND		ug/l	0.014	0.003	1	A
Beta-BHC	ND		ug/l	0.014	0.004	1	A
Heptachlor	ND		ug/l	0.014	0.002	1	A
Aldrin	ND		ug/l	0.014	0.002	1	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	1	A
Endrin	ND		ug/l	0.029	0.003	1	A
Endrin aldehyde	ND		ug/l	0.029	0.006	1	A
Endrin ketone	ND		ug/l	0.029	0.003	1	A
Dieldrin	ND	IP	ug/l	0.029	0.003	1	B
4,4'-DDE	ND		ug/l	0.029	0.003	1	A
4,4'-DDD	ND		ug/l	0.029	0.003	1	A
4,4'-DDT	ND		ug/l	0.029	0.003	1	A
Endosulfan I	ND		ug/l	0.014	0.002	1	A
Endosulfan II	ND		ug/l	0.029	0.004	1	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	1	A
Methoxychlor	ND		ug/l	0.143	0.005	1	A
Toxaphene	ND		ug/l	0.143	0.045	1	A
cis-Chlordane	ND		ug/l	0.014	0.005	1	A
trans-Chlordane	ND		ug/l	0.014	0.004	1	A
Chlordane	ND		ug/l	0.143	0.033	1	A

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-01	Date Collected:	03/18/19 10:10
Client ID:	WELL 1	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	58		30-150	A
Decachlorobiphenyl	50		30-150	A
2,4,5,6-Tetrachloro-m-xylene	59		30-150	B
Decachlorobiphenyl	51		30-150	B

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	1,8081B	Extraction Date:	03/21/19 07:56
Analytical Date:	03/23/19 13:41		
Analyst:	KEG		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/l	0.014	0.003	1	A
Lindane	ND		ug/l	0.014	0.003	1	A
Alpha-BHC	ND		ug/l	0.014	0.003	1	A
Beta-BHC	ND		ug/l	0.014	0.004	1	A
Heptachlor	ND		ug/l	0.014	0.002	1	A
Aldrin	ND		ug/l	0.014	0.002	1	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	1	A
Endrin	ND		ug/l	0.029	0.003	1	A
Endrin aldehyde	ND		ug/l	0.029	0.006	1	A
Endrin ketone	ND		ug/l	0.029	0.003	1	A
Dieldrin	ND		ug/l	0.029	0.003	1	A
4,4'-DDE	ND	IP	ug/l	0.029	0.003	1	B
4,4'-DDD	ND		ug/l	0.029	0.003	1	A
4,4'-DDT	ND		ug/l	0.029	0.003	1	A
Endosulfan I	ND		ug/l	0.014	0.002	1	A
Endosulfan II	ND		ug/l	0.029	0.004	1	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	1	A
Methoxychlor	ND		ug/l	0.143	0.005	1	A
Toxaphene	ND		ug/l	0.143	0.045	1	A
cis-Chlordane	ND		ug/l	0.014	0.005	1	A
trans-Chlordane	ND		ug/l	0.014	0.004	1	A
Chlordane	ND		ug/l	0.143	0.033	1	A

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	47		30-150	A
Decachlorobiphenyl	42		30-150	A
2,4,5,6-Tetrachloro-m-xylene	46		30-150	B
Decachlorobiphenyl	41		30-150	B

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 03/23/19 12:50
Analyst: KEG

Extraction Method: EPA 3510C
Extraction Date: 03/21/19 07:56

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01-02 Batch: WG1217898-1						
Delta-BHC	ND		ug/l	0.014	0.003	A
Lindane	ND		ug/l	0.014	0.003	A
Alpha-BHC	ND		ug/l	0.014	0.003	A
Beta-BHC	ND		ug/l	0.014	0.004	A
Heptachlor	ND		ug/l	0.014	0.002	A
Aldrin	ND		ug/l	0.014	0.002	A
Heptachlor epoxide	ND		ug/l	0.014	0.003	A
Endrin	ND		ug/l	0.029	0.003	A
Endrin aldehyde	ND		ug/l	0.029	0.006	A
Endrin ketone	ND		ug/l	0.029	0.003	A
Dieldrin	ND		ug/l	0.029	0.003	A
4,4'-DDE	ND		ug/l	0.029	0.003	A
4,4'-DDD	ND		ug/l	0.029	0.003	A
4,4'-DDT	ND		ug/l	0.029	0.003	A
Endosulfan I	ND		ug/l	0.014	0.002	A
Endosulfan II	ND		ug/l	0.029	0.004	A
Endosulfan sulfate	ND		ug/l	0.029	0.003	A
Methoxychlor	ND		ug/l	0.143	0.005	A
Toxaphene	ND		ug/l	0.143	0.045	A
cis-Chlordane	ND		ug/l	0.014	0.005	A
trans-Chlordane	ND		ug/l	0.014	0.004	A
Chlordane	ND		ug/l	0.143	0.033	A

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 03/23/19 12:50
Analyst: KEG

Extraction Method: EPA 3510C
Extraction Date: 03/21/19 07:56

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01-02 Batch: WG1217898-1						

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	52		30-150	A
Decachlorobiphenyl	51		30-150	A
2,4,5,6-Tetrachloro-m-xylene	49		30-150	B
Decachlorobiphenyl	49		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01-02 Batch: WG1217898-2 WG1217898-3									
Delta-BHC	63		41		30-150	**42**	Q	20	A
Lindane	75		51		30-150	**37**	Q	20	A
Alpha-BHC	76		53		30-150	**37**	Q	20	A
Beta-BHC	70		50		30-150	**34**	Q	20	A
Heptachlor	72		50		30-150	**35**	Q	20	A
Aldrin	73		51		30-150	**36**	Q	20	A
Heptachlor epoxide	75		52		30-150	**36**	Q	20	A
Endrin	77		53		30-150	**37**	Q	20	A
Endrin aldehyde	65		44		30-150	**39**	Q	20	A
Endrin ketone	77		53		30-150	**37**	Q	20	A
Dieldrin	78		54		30-150	**37**	Q	20	A
4,4'-DDE	72		50		30-150	**36**	Q	20	A
4,4'-DDD	71		49		30-150	**37**	Q	20	A
4,4'-DDT	78		53		30-150	**38**	Q	20	A
Endosulfan I	68		48		30-150	**35**	Q	20	A
Endosulfan II	71		49		30-150	**36**	Q	20	A
Endosulfan sulfate	71		47		30-150	**40**	Q	20	A
Methoxychlor	71		50		30-150	**36**	Q	20	A
cis-Chlordane	66		47		30-150	**34**	Q	20	A
trans-Chlordane	67		48		30-150	**33**	Q	20	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469

Project Number: 41.0162548.10 **Report Date:** 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01-02 Batch: WG1217898-2 WG1217898-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	66		46		30-150	A
Decachlorobiphenyl	58		40		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		45		30-150	B
Decachlorobiphenyl	56		39		30-150	B

METALS

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

SAMPLE RESULTS

Lab ID: L1910469-01 Date Collected: 03/18/19 10:10
Client ID: WELL 1 Date Received: 03/18/19
Sample Location: MAMORONECK Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	0.109		mg/l	0.0100	0.00327	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Antimony, Total	0.00054	J	mg/l	0.00400	0.00042	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Arsenic, Total	0.00065		mg/l	0.00050	0.00016	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Barium, Total	0.05381		mg/l	0.00050	0.00017	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Calcium, Total	84.0		mg/l	0.100	0.0394	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Chromium, Total	0.00067	J	mg/l	0.00100	0.00017	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Cobalt, Total	0.00050		mg/l	0.00050	0.00016	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Copper, Total	0.00228		mg/l	0.00100	0.00038	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Iron, Total	2.19		mg/l	0.0500	0.0191	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Lead, Total	0.00041	J	mg/l	0.00100	0.00034	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Magnesium, Total	27.7		mg/l	0.0700	0.0242	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Manganese, Total	0.5649		mg/l	0.00150	0.00044	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00020	0.00006	1	03/20/19 15:23	03/22/19 19:19	EPA 7470A	1,7470A	EA
Nickel, Total	0.00241		mg/l	0.00200	0.00055	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Potassium, Total	6.25		mg/l	0.100	0.0309	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Sodium, Total	111.		mg/l	0.100	0.0293	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Thallium, Total	ND		mg/l	0.00050	0.00014	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Zinc, Total	0.00485	J	mg/l	0.01000	0.00341	1	03/19/19 17:25	03/20/19 02:03	EPA 3005A	1,6020B	AM
Dissolved Metals - Mansfield Lab											
Aluminum, Dissolved	ND		mg/l	0.0100	0.00327	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Antimony, Dissolved	0.00070	J	mg/l	0.00400	0.00042	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Arsenic, Dissolved	ND		mg/l	0.00050	0.00016	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Barium, Dissolved	0.07359		mg/l	0.00050	0.00017	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Beryllium, Dissolved	ND		mg/l	0.00050	0.00010	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-01	Date Collected:	03/18/19 10:10
Client ID:	WELL 1	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Cadmium, Dissolved	ND		mg/l	0.00020	0.00005	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Calcium, Dissolved	161.		mg/l	0.100	0.0394	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Chromium, Dissolved	ND		mg/l	0.00100	0.00017	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Cobalt, Dissolved	0.00067		mg/l	0.00050	0.00016	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Copper, Dissolved	ND		mg/l	0.00100	0.00038	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Iron, Dissolved	1.42		mg/l	0.0500	0.0191	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Magnesium, Dissolved	35.1		mg/l	0.0700	0.0242	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Manganese, Dissolved	1.389		mg/l	0.00100	0.00044	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Mercury, Dissolved	ND		mg/l	0.00020	0.00006	1	03/21/19 14:45	03/22/19 20:49	EPA 7470A	1,7470A	EA
Nickel, Dissolved	0.00169	J	mg/l	0.00200	0.00055	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Potassium, Dissolved	8.39		mg/l	0.100	0.0309	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Selenium, Dissolved	ND		mg/l	0.00500	0.00173	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Silver, Dissolved	ND		mg/l	0.00040	0.00016	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Sodium, Dissolved	190.		mg/l	0.100	0.0293	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Thallium, Dissolved	ND		mg/l	0.00050	0.00014	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Vanadium, Dissolved	ND		mg/l	0.00500	0.00157	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM
Zinc, Dissolved	ND		mg/l	0.01000	0.00341	1	03/20/19 17:40	03/21/19 14:49	EPA 3005A	1,6020B	AM

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	0.00624	J	mg/l	0.0100	0.00327	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Antimony, Total	ND		mg/l	0.00400	0.00042	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Arsenic, Total	0.00024	J	mg/l	0.00050	0.00016	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Barium, Total	0.1529		mg/l	0.00050	0.00017	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Calcium, Total	61.3		mg/l	0.100	0.0394	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Chromium, Total	0.00022	J	mg/l	0.00100	0.00017	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Cobalt, Total	0.00206		mg/l	0.00050	0.00016	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Iron, Total	9.89		mg/l	0.0500	0.0191	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Magnesium, Total	19.9		mg/l	0.0700	0.0242	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Manganese, Total	2.009		mg/l	0.00150	0.00044	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00020	0.00006	1	03/20/19 15:23	03/22/19 19:24	EPA 7470A	1,7470A	EA
Nickel, Total	0.00936		mg/l	0.00200	0.00055	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Potassium, Total	6.96		mg/l	0.100	0.0309	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Sodium, Total	97.8		mg/l	0.100	0.0293	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Thallium, Total	ND		mg/l	0.00050	0.00014	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Zinc, Total	0.00856	J	mg/l	0.01000	0.00341	1	03/19/19 17:25	03/20/19 02:08	EPA 3005A	1,6020B	AM
Dissolved Metals - Mansfield Lab											
Aluminum, Dissolved	0.0460		mg/l	0.0100	0.00327	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Antimony, Dissolved	0.00277	J	mg/l	0.00400	0.00042	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Arsenic, Dissolved	0.00057		mg/l	0.00050	0.00016	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Barium, Dissolved	0.08730		mg/l	0.00050	0.00017	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Beryllium, Dissolved	ND		mg/l	0.00050	0.00010	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM

Project Name:	HAMPSHIRE COUNTRY CLUB	**Lab Number:**	L1910469
Project Number:	41.0162548.10	**Report Date:**	03/25/19

SAMPLE RESULTS

Lab ID:	L1910469-02	Date Collected:	03/18/19 10:25
Client ID:	WELL 2	Date Received:	03/18/19
Sample Location:	MAMORONECK	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Cadmium, Dissolved	ND		mg/l	0.00020	0.00005	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Calcium, Dissolved	54.1		mg/l	0.100	0.0394	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Chromium, Dissolved	0.00046	J	mg/l	0.00100	0.00017	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Cobalt, Dissolved	0.00103		mg/l	0.00050	0.00016	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Copper, Dissolved	0.00166		mg/l	0.00100	0.00038	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Iron, Dissolved	3.98		mg/l	0.0500	0.0191	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Magnesium, Dissolved	22.3		mg/l	0.0700	0.0242	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Manganese, Dissolved	0.8757		mg/l	0.00100	0.00044	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Mercury, Dissolved	ND		mg/l	0.00020	0.00006	1	03/21/19 14:45	03/22/19 20:58	EPA 7470A	1,7470A	EA
Nickel, Dissolved	0.00510		mg/l	0.00200	0.00055	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Potassium, Dissolved	5.84		mg/l	0.100	0.0309	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Selenium, Dissolved	ND		mg/l	0.00500	0.00173	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Silver, Dissolved	ND		mg/l	0.00040	0.00016	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Sodium, Dissolved	83.8		mg/l	0.100	0.0293	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Thallium, Dissolved	0.00021	J	mg/l	0.00050	0.00014	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Vanadium, Dissolved	ND		mg/l	0.00500	0.00157	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM
Zinc, Dissolved	0.00644	J	mg/l	0.01000	0.00341	1	03/20/19 17:40	03/21/19 15:28	EPA 3005A	1,6020B	AM

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1217291-1										
Aluminum, Total	ND		mg/l	0.0100	0.00327	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Antimony, Total	0.00078	J	mg/l	0.00400	0.00042	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Barium, Total	ND		mg/l	0.00050	0.00017	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Calcium, Total	ND		mg/l	0.100	0.0394	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Chromium, Total	ND		mg/l	0.00100	0.00017	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Cobalt, Total	ND		mg/l	0.00050	0.00016	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Iron, Total	ND		mg/l	0.0500	0.0191	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Manganese, Total	0.00138	J	mg/l	0.00150	0.00044	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Nickel, Total	ND		mg/l	0.00200	0.00055	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Potassium, Total	ND		mg/l	0.100	0.0309	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Sodium, Total	ND		mg/l	0.100	0.0293	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Thallium, Total	ND		mg/l	0.00050	0.00014	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM
Zinc, Total	ND		mg/l	0.01000	0.00341	1	03/19/19 17:25	03/19/19 23:45	1,6020B	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1217716-1										
Aluminum, Dissolved	ND		mg/l	0.0100	0.00327	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Antimony, Dissolved	0.00095	J	mg/l	0.00400	0.00042	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Arsenic, Dissolved	ND		mg/l	0.00050	0.00016	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Barium, Dissolved	ND		mg/l	0.00050	0.00017	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Beryllium, Dissolved	ND		mg/l	0.00050	0.00010	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Cadmium, Dissolved	ND		mg/l	0.00020	0.00005	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Calcium, Dissolved	ND		mg/l	0.100	0.0394	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Chromium, Dissolved	ND		mg/l	0.00100	0.00017	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Cobalt, Dissolved	ND		mg/l	0.00050	0.00016	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Copper, Dissolved	ND		mg/l	0.00100	0.00038	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Iron, Dissolved	0.0426	J	mg/l	0.0500	0.0191	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Magnesium, Dissolved	ND		mg/l	0.0700	0.0242	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Manganese, Dissolved	ND		mg/l	0.00100	0.00044	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Nickel, Dissolved	ND		mg/l	0.00200	0.00055	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Potassium, Dissolved	ND		mg/l	0.100	0.0309	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Selenium, Dissolved	ND		mg/l	0.00500	0.00173	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Silver, Dissolved	ND		mg/l	0.00040	0.00016	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Sodium, Dissolved	0.0835	J	mg/l	0.100	0.0293	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Thallium, Dissolved	0.00015	J	mg/l	0.00050	0.00014	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Vanadium, Dissolved	ND		mg/l	0.00500	0.00157	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM
Zinc, Dissolved	ND		mg/l	0.01000	0.00341	1	03/20/19 17:40	03/21/19 13:21	1,6020B	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1218130-1										
Mercury, Dissolved	ND		mg/l	0.00020	0.00006	1	03/21/19 14:45	03/22/19 20:45	1,7470A	EA

Prep Information

Digestion Method: EPA 7470A

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1218877-1										
Mercury, Total	ND		mg/l	0.00020	0.00006	1	03/20/19 15:23	03/22/19 19:09	1,7470A	EA

Prep Information

Digestion Method: EPA 7470A

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1217291-2								
Aluminum, Total	104		-		80-120	-		
Antimony, Total	101		-		80-120	-		
Arsenic, Total	104		-		80-120	-		
Barium, Total	102		-		80-120	-		
Beryllium, Total	114		-		80-120	-		
Cadmium, Total	110		-		80-120	-		
Calcium, Total	94		-		80-120	-		
Chromium, Total	98		-		80-120	-		
Cobalt, Total	100		-		80-120	-		
Copper, Total	98		-		80-120	-		
Iron, Total	93		-		80-120	-		
Lead, Total	116		-		80-120	-		
Magnesium, Total	105		-		80-120	-		
Manganese, Total	99		-		80-120	-		
Nickel, Total	100		-		80-120	-		
Potassium, Total	102		-		80-120	-		
Selenium, Total	108		-		80-120	-		
Silver, Total	98		-		80-120	-		
Sodium, Total	98		-		80-120	-		
Thallium, Total	107		-		80-120	-		
Vanadium, Total	96		-		80-120	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Lab Number: L1910469
Project Number: 41.0162548.10
Report Date: 03/25/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1217291-2					
Zinc, Total	110	-	80-120	-	

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1217716-2					
Aluminum, Dissolved	116	-	80-120	-	
Antimony, Dissolved	116	-	80-120	-	
Arsenic, Dissolved	106	-	80-120	-	
Barium, Dissolved	109	-	80-120	-	
Beryllium, Dissolved	116	-	80-120	-	
Cadmium, Dissolved	117	-	80-120	-	
Calcium, Dissolved	113	-	80-120	-	
Chromium, Dissolved	108	-	80-120	-	
Cobalt, Dissolved	110	-	80-120	-	
Copper, Dissolved	104	-	80-120	-	
Iron, Dissolved	112	-	80-120	-	
Lead, Dissolved	112	-	80-120	-	
Magnesium, Dissolved	112	-	80-120	-	
Manganese, Dissolved	108	-	80-120	-	
Nickel, Dissolved	108	-	80-120	-	
Potassium, Dissolved	111	-	80-120	-	
Selenium, Dissolved	109	-	80-120	-	
Silver, Dissolved	102	-	80-120	-	
Sodium, Dissolved	109	-	80-120	-	
Thallium, Dissolved	103	-	80-120	-	
Vanadium, Dissolved	108	-	80-120	-	

Lab Control Sample Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1217716-2					
Zinc, Dissolved	116	-	80-120	-	
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1218130-2					
Mercury, Dissolved	113	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1218877-2					
Mercury, Total	115	-	80-120	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217291-3 QC Sample: L1910318-01 Client ID: MS Sample												
Aluminum, Total	0.050	2	2.26	110		-	-		75-125	-		20
Antimony, Total	0.0013J	0.5	0.6997	**140**	Q	-	-		75-125	-		20
Arsenic, Total	0.00037J	0.12	0.1228	102		-	-		75-125	-		20
Barium, Total	0.1177	2	2.346	111		-	-		75-125	-		20
Beryllium, Total	ND	0.05	0.06015	120		-	-		75-125	-		20
Cadmium, Total	0.00007J	0.051	0.05936	116		-	-		75-125	-		20
Calcium, Total	496	10	499	**30**	Q	-	-		75-125	-		20
Chromium, Total	0.0015	0.2	0.2095	104		-	-		75-125	-		20
Cobalt, Total	0.0008	0.5	0.5362	107		-	-		75-125	-		20
Copper, Total	0.0007J	0.25	0.2616	105		-	-		75-125	-		20
Iron, Total	1.34	1	2.30	96		-	-		75-125	-		20
Lead, Total	0.00155	0.51	0.5740	112		-	-		75-125	-		20
Magnesium, Total	75.7	10	89.6	**139**	Q	-	-		75-125	-		20
Manganese, Total	1.282	0.5	1.770	98		-	-		75-125	-		20
Nickel, Total	0.0013J	0.5	0.5224	104		-	-		75-125	-		20
Potassium, Total	28.5	10	37.9	94		-	-		75-125	-		20
Selenium, Total	ND	0.12	0.0447J	**37**	Q	-	-		75-125	-		20
Silver, Total	ND	0.05	0.05285	106		-	-		75-125	-		20
Sodium, Total	141.	10	152	110		-	-		75-125	-		20
Thallium, Total	0.0002J	0.12	0.1271	106		-	-		75-125	-		20
Vanadium, Total	0.0035J	0.5	0.5293	106		-	-		75-125	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217291-3 QC Sample: L1910318-01 Client ID: MS Sample									
Zinc, Total	ND	0.5	0.5695	114	-	-	75-125	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10
Lab Number: L1910469
Report Date: 03/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery		MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217716-3 QC Sample: L1910469-01 Client ID: WELL 1										
Aluminum, Dissolved	ND	2	2.26	113		-	-	75-125	-	20
Antimony, Dissolved	0.00070J	0.5	0.6352	**127**	Q	-	-	75-125	-	20
Arsenic, Dissolved	ND	0.12	0.1286	107		-	-	75-125	-	20
Barium, Dissolved	0.07359	2	2.219	107		-	-	75-125	-	20
Beryllium, Dissolved	ND	0.05	0.05703	114		-	-	75-125	-	20
Cadmium, Dissolved	ND	0.051	0.05477	107		-	-	75-125	-	20
Calcium, Dissolved	161.	10	160	**0**	Q	-	-	75-125	-	20
Chromium, Dissolved	ND	0.2	0.1980	99		-	-	75-125	-	20
Cobalt, Dissolved	0.00067	0.5	0.4930	98		-	-	75-125	-	20
Copper, Dissolved	ND	0.25	0.2464	98		-	-	75-125	-	20
Iron, Dissolved	1.42	1	2.58	116		-	-	75-125	-	20
Lead, Dissolved	ND	0.51	0.5380	105		-	-	75-125	-	20
Magnesium, Dissolved	35.1	10	46.1	110		-	-	75-125	-	20
Manganese, Dissolved	1.389	0.5	1.845	91		-	-	75-125	-	20
Nickel, Dissolved	0.00169J	0.5	0.4869	97		-	-	75-125	-	20
Potassium, Dissolved	8.39	10	18.4	100		-	-	75-125	-	20
Selenium, Dissolved	ND	0.12	0.132	110		-	-	75-125	-	20
Silver, Dissolved	ND	0.05	0.04862	97		-	-	75-125	-	20
Sodium, Dissolved	190.	10	182	**0**	Q	-	-	75-125	-	20
Thallium, Dissolved	ND	0.12	0.1167	97		-	-	75-125	-	20
Vanadium, Dissolved	ND	0.5	0.5045	101		-	-	75-125	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB **Lab Number:** L1910469
Project Number: 41.0162548.10 **Report Date:** 03/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217716-3 QC Sample: L1910469-01 Client ID: WELL 1									
Zinc, Dissolved	ND	0.5	0.5662	113	-	-	75-125	-	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1218130-3 QC Sample: L1910469-01 Client ID: WELL 1									
Mercury, Dissolved	ND	0.005	0.00552	110	-	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1218877-3 QC Sample: L1900003-111 Client ID: MS Sample									
Mercury, Total	ND	0.005	0.00528	106	-	-	75-125	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB

Project Number: 41.0162548.10

Lab Number: L1910469

Report Date: 03/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217291-4 QC Sample: L1910318-01 Client ID: DUP Sample						
Arsenic, Total	0.00037J	0.00030J	mg/l	NC		20
Cadmium, Total	0.00007J	ND	mg/l	NC		20
Iron, Total	1.34	1.36	mg/l	1		20
Lead, Total	0.00155	0.00096J	mg/l	NC		20
Manganese, Total	1.282	1.287	mg/l	0		20
Potassium, Total	28.5	28.1	mg/l	1		20
Sodium, Total	141.	144	mg/l	2		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217716-4 QC Sample: L1910469-01 Client ID: WELL 1					
Aluminum, Dissolved	ND	ND	mg/l	NC	20
Antimony, Dissolved	0.00070J	0.00162J	mg/l	NC	20
Arsenic, Dissolved	ND	0.00016J	mg/l	NC	20
Barium, Dissolved	0.07359	0.07170	mg/l	3	20
Beryllium, Dissolved	ND	ND	mg/l	NC	20
Cadmium, Dissolved	ND	ND	mg/l	NC	20
Calcium, Dissolved	161.	150	mg/l	7	20
Chromium, Dissolved	ND	ND	mg/l	NC	20
Cobalt, Dissolved	0.00067	0.00061	mg/l	10	20
Copper, Dissolved	ND	ND	mg/l	NC	20
Iron, Dissolved	1.42	1.35	mg/l	5	20
Lead, Dissolved	ND	ND	mg/l	NC	20
Magnesium, Dissolved	35.1	34.2	mg/l	3	20
Manganese, Dissolved	1.389	1.314	mg/l	6	20
Nickel, Dissolved	0.00169J	0.00148J	mg/l	NC	20
Potassium, Dissolved	8.39	8.00	mg/l	5	20
Selenium, Dissolved	ND	ND	mg/l	NC	20
Silver, Dissolved	ND	ND	mg/l	NC	20
Sodium, Dissolved	190.	184	mg/l	3	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1217716-4 QC Sample: L1910469-01 Client ID: WELL 1					
Thallium, Dissolved	ND	0.00021J	mg/l	NC	20
Vanadium, Dissolved	ND	ND	mg/l	NC	20
Zinc, Dissolved	ND	ND	mg/l	NC	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1218130-4 QC Sample: L1910469-01 Client ID: WELL 1					
Mercury, Dissolved	ND	ND	mg/l	NC	20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1218877-4 QC Sample: L1900003-111 Client ID: DUP Sample					
Mercury, Total	ND	ND	mg/l	NC	20

Project Name: HAMPSHIRE COUNTRY CLUB
Project Number: 41.0162548.10

Lab Number: L1910469
Report Date: 03/25/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1910469-01A	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)
L1910469-01B	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)
L1910469-01C	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)
L1910469-01D	Plastic 250ml unpreserved	A	<2	<2	3.2	Y	Absent		-
L1910469-01E	Plastic 250ml HNO3 preserved	A	<2	<2	3.2	Y	Absent		BA-6020T(180),FE-6020T(180),SE-6020T(180),TL-6020T(180),CA-6020T(180),CR-6020T(180),K-6020T(180),NI-6020T(180),CU-6020T(180),NA-6020T(180),ZN-6020T(180),PB-6020T(180),BE-6020T(180),MN-6020T(180),AS-6020T(180),SB-6020T(180),V-6020T(180),AG-6020T(180),AL-6020T(180),CD-6020T(180),HG-T(28),MG-6020T(180),CO-6020T(180)
L1910469-01F	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8082-LVI(7)
L1910469-01G	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8082-LVI(7)
L1910469-01H	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8081(7)
L1910469-01I	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8081(7)
L1910469-01J	Amber 250ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L1910469-01K	Amber 250ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L1910469-01W	Plastic 120ml HNO3 preserved Filtrates	A	<2	<2	3.2	Y	Absent		CU-6020S(180),K-6020S(180),SE-6020S(180),V-6020S(180),MN-6020S(180),BE-6020S(180),CO-6020S(180),MG-6020S(180),ZN-6020S(180),CA-6020S(180),CR-6020S(180),FE-6020S(180),BA-6020S(180),NA-6020S(180),NI-6020S(180),PB-6020S(180),TL-6020S(180),AG-6020S(180),AS-6020S(180),SB-6020S(180),AL-6020S(180),CD-6020S(180),HG-S(28)
L1910469-02A	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)
L1910469-02B	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)
L1910469-02C	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1910469-02D	Plastic 250ml unpreserved	A	<2	<2	3.2	Y	Absent		-
L1910469-02E	Plastic 250ml HNO3 preserved	A	<2	<2	3.2	Y	Absent		BA-6020T(180),FE-6020T(180),SE-6020T(180),TL-6020T(180),CA-6020T(180),CR-6020T(180),K-6020T(180),NI-6020T(180),CU-6020T(180),NA-6020T(180),ZN-6020T(180),PB-6020T(180),BE-6020T(180),MN-6020T(180),AS-6020T(180),SB-6020T(180),V-6020T(180),AG-6020T(180),AL-6020T(180),CD-6020T(180),HG-T(28),MG-6020T(180),CO-6020T(180)
L1910469-02F	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8082-LVI(7)
L1910469-02G	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8082-LVI(7)
L1910469-02H	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8081(7)
L1910469-02I	Amber 120ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8081(7)
L1910469-02J	Amber 250ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L1910469-02K	Amber 250ml unpreserved	A	7	7	3.2	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L1910469-02W	Plastic 120ml HNO3 preserved Filtrates	A	<2	<2	3.2	Y	Absent		CU-6020S(180),K-6020S(180),SE-6020S(180),V-6020S(180),MN-6020S(180),BE-6020S(180),CO-6020S(180),MG-6020S(180),ZN-6020S(180),CA-6020S(180),CR-6020S(180),FE-6020S(180),BA-6020S(180),NA-6020S(180),NI-6020S(180),PB-6020S(180),TL-6020S(180),AG-6020S(180),AS-6020S(180),SB-6020S(180),AL-6020S(180),CD-6020S(180),HG-S(28)
L1910469-03A	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)
L1910469-03B	Vial HCl preserved	A	NA		3.2	Y	Absent		NYTCL-8260(14)

*Values in parentheses indicate holding time in days

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the

original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

LIMITATION OF LIABILITIES

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page
of

Date Rec'd in Lab: 3/18/19

ALPHA Job #: L1910469

Project Information
Project Name: Hamsphire Country Club
Project Location: Mamoroneck
Project #: 41.0162548.10
(Use Project name as Project #) ☐
Project Manager: Bill Marriquez
ALPHAQuote #:

Turn-Around Time
Standard ☒
Rush (only if pre approved) ☐
Due Date:
# of Days: 5

Client Information
Client: GZA GeoEnvironmental
Address: 104 W 29th Street
10 Floor New York, NY 1001
Phone: (212) 594-8140
Fax:
Email: Reinbill.marriquez@gza.com

Deliverables
☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement
☐ NY TOGS ☐ NY Part 375
☒ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information
☐ Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TCL Volatiles EPA 8260	NYTCL SVOCs EPA 8270	TCL Pesticides EPA 8081	TCL PCB 8082A	Dissolved Target Analyte List Metals	Total Target Analyte Metals			Sample Specific Comments	Total Bottles
10469-01	Pump 1	3/18/19	10:10	Water	YX	X	X	X	X	X	X				
-02	Pump 2	3/18/19	10:25	water	YX	X	X	X	X	X	X				

Preservative Code	Container Code
A = None	P = Plastic
B = HCl	A = Amber Glass
C = HNO_3	V = Vial
D = H_2SO_4	G = Glass
E = NaOH	B = Bacteria Cup
F = MeOH	C = Cube
G = $NaHSO_4$	O = Other
H = $Na_2S_2O_3$	E = Encore
K/E = Zn Ac/NaOH	D = BOD Bottle
O = Other	

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type
Preservative

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	3/18/19 12:00 PM	[signature]	3/18/19 12:06
[signature]	3/18/19 17:47	D. Santos AAL	3/18/19 1900
D. Santos AAL	3/18/19 2200	Windy Moraney	3/18/19 2200

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

Hampshire Country Club Planned Residential Development
Village of Mamaroneck,
Westchester County, New York
Final Environmental Impact Statement

P

Natural Resources Conservation Service Hydric Soil Report

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
Federal Register. September 18, 2002. Hydric soils of the United States.
Federal Register. July 13, 1994. Changes in hydric soils of the United States.
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
National Research Council. 1995. Wetlands: Characteristics and boundaries.
Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.
Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.
Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.
Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

Report—Hydric Soils

Hydric Soils–Westchester County, New York				
Map symbol and map unit name	**Component**	**Percent of map unit**	**Landform**	**Hydric criteria**
CrC—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky				
	Leicester, very stony	5	Depressions, drainageways	2
CsD—Chatfield-Charlton complex, 15 to 35 percent slopes, very rocky				
	Leicester, very stony	6	Depressions, ground moraines, drainageways, hills	2
CtC—Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes				
	Leicester, extremely stony	1	Depressions, ground moraines, drainageways, hills	2
Uc—Udorthents, wet substratum				
	Fredon	2	Depressions	2
	Ipswich	2	Tidal marshes	1, 3
	Raynham	2	—	2
UlC—Urban land-Charlton-Chatfield complex, rolling, very rocky				
	Sun	2	Depressions	2, 3
	Palms	1	Marshes, swamps	1, 3

Data Source Information

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 13, Oct 8, 2017

Soil Data Access (SDA) Hydric Soils List

An SDA-populated select list is used to pick a state and SSA which enables creation of a "Hydric Soils Report" based upon those selections. The data is not static; it hits Soil Data Access Live. To reset the table hit F5 on the keyboard. Once a survey is selected and table appears, if a new survey is selected it will append to the table at the bottom. For more information about the table,

New York ▼

selected stateId = NY

Westchester County, New York ▼

selected SSA areasymbol = NY119

State_Sym	Area_Symbol	Area_Name	mukey	Mapunit_SYM	Mapunit_Name	Comp_Name_phase	muacres	Comp_RV_Pct	majcompflag	Comp_Acres	Comp_Landform	microfeature	Hydric_Rating	hydric_criteria
NY	NY119	Westchester County, New York	309693	Ce	Catden muck, 0 to 2 percent slopes	Catden	3054	80	Yes	2443.2	depressions	null	Yes	1, 3
NY	NY119	Westchester County, New York	309693	Ce	Catden muck, 0 to 2 percent slopes	Timakwa	3054	5	No	152.7	swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309693	Ce	Catden muck, 0 to 2 percent slopes	Natchaug	3054	5	No	152.7	depressions	null	Yes	1, 3
NY	NY119	Westchester County, New York	309693	Ce	Catden muck, 0 to 2 percent slopes	Canandaigua	3054	5	No	152.7	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309693	Ce	Catden muck, 0 to 2 percent slopes	Alden	3054	5	No	152.7	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309694	ChB	Charlton fine sandy loam, 3 to 8 percent slopes	Leicester	7863	1	No	78.6	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309698	ClB	Charlton fine sandy loam, 3 to 8 percent slopes, very stony	Leicester, very stony	689	2	No	13.8	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309699	ClC	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	Leicester, very stony	1256	2	No	25.1	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309703	CrC	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	Leicester, very stony	42635	5	No	2131.8	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309704	CsD	Chatfield-Charlton complex, 15 to 35 percent slopes, very rocky	Leicester, very stony	25384	6	No	1523.0	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309705	CtC	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	Leicester, extremely stony	9186	1	No	91.9	depressions	null	Yes	2
NY	NY119	Westchester	309706	CuD	Chatfield-	Leicester, extremely	10901	4	No	436.0	depressions	null	Yes	2

		County, New York			Hollis-Rock outcrop complex, 15 to 35 percent slopes	stony								
NY	NY119	Westchester County, New York	309707	Ff	Fluvaquents-Udifluvents complex, frequently flooded	Fluvaquents	4410	50	Yes	2205.0	flood plains	null	Yes	2, 3, 4
NY	NY119	Westchester County, New York	309707	Ff	Fluvaquents-Udifluvents complex, frequently flooded	Sun	4410	3	No	132.3	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309707	Ff	Fluvaquents-Udifluvents complex, frequently flooded	Leicester	4410	2	No	88.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309707	Ff	Fluvaquents-Udifluvents complex, frequently flooded	Ridgebury	4410	2	No	88.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309707	Ff	Fluvaquents-Udifluvents complex, frequently flooded	Carlisle	4410	1	No	44.1	marshes, swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309707	Ff	Fluvaquents-Udifluvents complex, frequently flooded	Palms	4410	1	No	44.1	marshes, swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309708	Fr	Fredon silt loam	Fredon, poorly drained	514	50	Yes	257.0	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309708	Fr	Fredon silt loam	Leicester	514	3	No	15.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309708	Fr	Fredon silt loam	Fluvaquents	514	2	No	10.3	flood plains	null	Yes	2, 4
NY	NY119	Westchester County, New York	309708	Fr	Fredon silt loam	Palms	514	1	No	5.1	marshes, swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309712	HrF	Hollis-Rock outcrop complex, 35 to 60 percent slopes	Leicester, very stony	6160	4	No	246.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309713	Ip	Ipswich mucky peat, 0 to 2 percent slopes, very frequently flooded	Ipswich	221	90	Yes	198.9	tidal marshes	null	Yes	1
NY	NY119	Westchester	309713	Ip	Ipswich mucky	Westbrook	221	5	No	11.1	tidal marshes	null	Yes	1

		County, New York			peat, 0 to 2 percent slopes, very frequently flooded								
NY	NY119	Westchester County, New York	309713	Ip	Ipswich mucky peat, 0 to 2 percent slopes, very frequently flooded	Pawcatuck	221	5	No	11.1	tidal marshes	null	Yes	1
NY	NY119	Westchester County, New York	309716	LcA	Leicester loam, 0 to 3 percent slopes, stony	Leicester, poorly drained	1484	50	Yes	742.0	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309716	LcA	Leicester loam, 0 to 3 percent slopes, stony	Sun	1484	7	No	103.9	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309716	LcA	Leicester loam, 0 to 3 percent slopes, stony	Leicester, very stony	1484	3	No	44.5	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309717	LcB	Leicester loam, 3 to 8 percent slopes, stony	Leicester, poorly drained	3580	35	Yes	1253.0	hills, ridges, till plains	null	Yes	2
NY	NY119	Westchester County, New York	309717	LcB	Leicester loam, 3 to 8 percent slopes, stony	Sun	3580	7	No	250.6	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309718	LeB	Leicester loam, 2 to 8 percent slopes, very stony	Leicester, poorly drained	1912	25	Yes	478.0	hills, ridges, till plains	null	Yes	2
NY	NY119	Westchester County, New York	309718	LeB	Leicester loam, 2 to 8 percent slopes, very stony	Sun	1912	10	No	191.2	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309719	Pa	Natchaug muck, 0 to 2 percent slopes	Natchaug	2034	80	Yes	1627.2	depressions	null	Yes	1, 3
NY	NY119	Westchester County, New York	309719	Pa	Natchaug muck, 0 to 2 percent slopes	Catden	2034	8	No	162.7	depressions	null	Yes	1, 3
NY	NY119	Westchester County, New York	309719	Pa	Natchaug muck, 0 to 2 percent slopes	Limerick	2034	5	No	101.7	flood plains	null	Yes	2
NY	NY119	Westchester County, New York	309719	Pa	Natchaug muck, 0 to 2 percent slopes	Sun	2034	4	No	81.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309719	Pa	Natchaug muck, 0 to 2 percent slopes	Halsey	2034	3	No	61.0	terraces	null	Yes	2
NY	NY119	Westchester County, New York	309720	Pc	Natchaug and Catden mucks, ponded, 0 to 2 percent slopes	Natchaug	337	45	Yes	151.7	depressions	null	Yes	1, 3
NY	NY119	Westchester County, New York	309720	Pc	Natchaug and Catden mucks, ponded, 0 to 2 percent slopes	Catden	337	40	Yes	134.8	depressions	null	Yes	1, 3
NY	NY119	Westchester County, New York	309720	Pc	Natchaug and Catden mucks,	Fredon	337	5	No	16.9	depressions	null	Yes	2

					ponded, 0 to 2 percent slopes								
NY	NY119	Westchester County, New York	309720	Pc	Natchaug and Catden mucks, ponded, 0 to 2 percent slopes	Sun	337	5	No	16.9	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309720	Pc	Natchaug and Catden mucks, ponded, 0 to 2 percent slopes	Fluvaquents	337	3	No	10.1	flood plains	null	Yes	2, 3, 4
NY	NY119	Westchester County, New York	309721	PnB	Paxton fine sandy loam, 3 to 8 percent slopes	Ridgebury	15192	6	No	911.5	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309722	PnC	Paxton fine sandy loam, 8 to 15 percent slopes	Ridgebury	13496	2	No	269.9	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309723	PnD	Paxton fine sandy loam, 15 to 25 percent slopes	Ridgebury	4898	1	No	49.0	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309724	PoB	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	Ridgebury, very stony	164	4	No	6.6	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309725	PoC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	Ridgebury, very stony	570	2	No	11.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309726	PoD	Paxton fine sandy loam, 15 to 25 percent slopes, very stony	Ridgebury, very stony	670	1	No	6.7	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309727	Pt	Pits, gravel	Fredon	475	2	No	9.5	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309728	Pv	Pits, quarry	Sun	217	3	No	6.5	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309729	Pw	Pompton silt loam, loamy substratum	Fluvaquents	569	2	No	11.4	flood plains	null	Yes	2, 4
NY	NY119	Westchester County, New York	309729	Pw	Pompton silt loam, loamy substratum	Fredon	569	2	No	11.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309730	Ra	Raynham silt loam	Raynham	431	85	Yes	366.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309730	Ra	Raynham silt loam	Sun	431	4	No	17.2	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309730	Ra	Raynham silt loam	Unnamed soils, occasionally flooded	431	2	No	8.6	null	null	Yes	2, 4
NY	NY119	Westchester County,	309731	RdA	Ridgebury loam, 0 to 3 percent	Ridgebury, poorly drained	1616	50	Yes	808.0	depressions	null	Yes	2

		New York			slopes									
NY	NY119	Westchester County, New York	309731	RdA	Ridgebury loam, 0 to 3 percent slopes	Sun	1616	5	No	80.8	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309731	RdA	Ridgebury loam, 0 to 3 percent slopes	Leicester	1616	3	No	48.5	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309731	RdA	Ridgebury loam, 0 to 3 percent slopes	Ridgebury, very stony	1616	2	No	32.3	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309732	RdB	Ridgebury loam, 3 to 8 percent slopes	Ridgebury, poorly drained	3385	35	Yes	1184.8	drumlinoid ridges, hills, till plains	null	Yes	2
NY	NY119	Westchester County, New York	309732	RdB	Ridgebury loam, 3 to 8 percent slopes	Sun	3385	5	No	169.3	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309733	RgB	Ridgebury loam, 2 to 8 percent slopes, very stony	Ridgebury, poorly drained	913	35	Yes	319.6	drumlinoid ridges, hills, till plains	null	Yes	2
NY	NY119	Westchester County, New York	309733	RgB	Ridgebury loam, 2 to 8 percent slopes, very stony	Sun	913	5	No	45.7	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309743	Sh	Sun loam	Sun	3323	85	Yes	2824.6	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309743	Sh	Sun loam	Ridgebury	3323	5	No	166.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309743	Sh	Sun loam	Leicester	3323	5	No	166.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309743	Sh	Sun loam	Palms	3323	3	No	99.7	marshes, swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309743	Sh	Sun loam	Sun, stony	3323	2	No	66.5	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309744	Sm	Sun loam, extremely stony	Sun	964	85	Yes	819.4	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309744	Sm	Sun loam, extremely stony	Leicester	964	5	No	48.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309744	Sm	Sun loam, extremely stony	Ridgebury	964	5	No	48.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309744	Sm	Sun loam, extremely stony	Palms	964	3	No	28.9	marshes, swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309744	Sm	Sun loam, extremely stony	Sun, non-stony	964	2	No	19.3	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309670	SuA	Sutton loam, 0 to 3 percent slopes	Leicester	394	5	No	19.7	depressions	null	Yes	2

NY	NY119	Westchester County, New York	309672	Ub	Udorthents, smoothed	Sun	6928	2	No	138.6	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309673	Uc	Udorthents, wet substratum	Fredon	3920	2	No	78.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309673	Uc	Udorthents, wet substratum	Ipswich	3920	2	No	78.4	tidal marshes	null	Yes	1, 3
NY	NY119	Westchester County, New York	309673	Uc	Udorthents, wet substratum	Raynham	3920	2	No	78.4	null	null	Yes	2
NY	NY119	Westchester County, New York	309676	UhB	Urban land-Charlton complex, 2 to 8 percent slopes	Sun	2744	3	No	82.3	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309677	UhC	Urban land-Charlton complex, 8 to 15 percent slopes	Sun	1485	3	No	44.6	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309678	UhD	Urban land-Charlton complex, 15 to 25 percent slopes	Sun	612	3	No	18.4	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309679	UlC	Urban land-Charlton-Chatfield complex, rolling, very rocky	Sun	11596	2	No	231.9	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309679	UlC	Urban land-Charlton-Chatfield complex, rolling, very rocky	Palms	11596	1	No	116.0	marshes, swamps	null	Yes	1, 3
NY	NY119	Westchester County, New York	309680	UlD	Urban land-Charlton-Chatfield complex, hilly, very rocky	Sun	2242	1	No	22.4	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309681	UmC	Urban land-Chatfield-Rock outcrop complex, rolling	Sun	849	1	No	8.5	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309682	UpB	Urban land-Paxton complex, 3 to 8 percent slopes	Ridgebury	8081	5	No	404.1	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309683	UpC	Urban land-Paxton complex, 8 to 15 percent slopes	Ridgebury	3441	5	No	172.1	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309684	UpD	Urban land-Paxton complex, 15 to 25 percent slopes	Ridgebury	695	5	No	34.8	depressions	null	Yes	2

NY	NY119	Westchester County, New York	309685	UrB	Urban land-Ridgebury complex, 1 to 8 percent slopes	Ridgebury, poorly drained	571	10	Yes	57.1	drumlinoid ridges, hills, till plains	null	Yes	2
NY	NY119	Westchester County, New York	309685	UrB	Urban land-Ridgebury complex, 1 to 8 percent slopes	Sun	571	5	No	28.6	depressions	null	Yes	2, 3
NY	NY119	Westchester County, New York	309686	UvB	Urban land-Riverhead complex, 2 to 8 percent slopes	Fluvaquents	1103	1	No	11.0	flood plains	null	Yes	2, 4
NY	NY119	Westchester County, New York	309687	UvC	Urban land-Riverhead complex, 8 to 15 percent slopes	Fluvaquents	293	1	No	2.9	flood plains	null	Yes	2, 4
NY	NY119	Westchester County, New York	309688	UwB	Urban land-Woodbridge complex, 3 to 8 percent slopes	Ridgebury	3198	10	No	319.8	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309690	WdA	Woodbridge loam, 0 to 3 percent slopes	Ridgebury	934	7	No	65.4	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309691	WdB	Woodbridge loam, 3 to 8 percent slopes	Ridgebury	8003	7	No	560.2	depressions	null	Yes	2
NY	NY119	Westchester County, New York	309692	WdC	Woodbridge loam, 8 to 15 percent slopes	Ridgebury	1610	7	No	112.7	depressions	null	Yes	2

Report Metadata: Back to top

- **Area_Symbol:** A symbol that uniquely identifies a single occurrence of a particular type of area (e.g. Dane Co., Wisconsin is WI025).
- **Area_Name:** The name given to the specified geographic area.
- **mukey:** A non-connotative string of characters used to uniquely identify a record in the Mapunit table.
- **Mapunit_SYM:** The symbol used to uniquely identify the soil mapunit in the soil survey.
- **Mapunit_Name:** Correlated name of the mapunit (recommended name or field name for surveys in progress).
- **Comp_Name_phase:** Component name - Name assigned to a component based on its range of properties. Local Phase - Phase criterion to be used at a local level, in conjunction with "component name" to help identify a soil component.
- **muacres:** The number of acres of a particular mapunit.
- **Comp_RV_Pct:** The percentage of the component of the mapunit.
- **majcompflag:** Indicates whether or not a component is a major component in the mapunit.
- **Comp_Acres:** The number of acres of a particular component in a mapunit. ((muacres*comppct_r)/100)
- **Comp_Landform:** A word or group of words used to name a feature on the earth's surface, expressed in the plural form. Column Physical
- **Hydric_Rating:** A yes/no field that indicates whether or not a map unit component is classified as a "hydric soil". If rated as hydric, the specific criteria met are listed in the Component Hydric Criteria table.
- **Hydric_criteria:** Criterion code for the soil characteristic(s) and/or feature(s) that cause the map unit component to be classified as a "hydric soil." These codes are the paragraph numbers in the hydric soil criteria publication.

Criteria:

1. All Histels except Folistels and Histosols except Folists; or
2. Map unit components in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that:
   a. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   b. Show evidence that the soil meets the definition of a hydric soil;
3. Map unit components that are frequently ponded for long duration or very long duration during the growing season that:
   a. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   b. Show evidence that the soil meets the definition of a hydric soil; or
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   a. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or

b. Show evidence that the soils meet the definition of a hydric soil.

Files added to:

Q

Requests for Jurisdictional Determination and Responses, NYSDEC and USACE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 3
21 South Putt Corners Road, New Paltz, NY 12561-1620
P: (845) 256-3054 I F: (845) 255-4659
www.dec.ny.gov

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

February 15, 2019

Mr. David Kennedy, VHB
100 Motor Parkway, Suite 135
Hauppauge, NY 11788-5120

Re: Hampshire Country Club, 1025 Cove Road
Village of Mamaroneck, Westchester County
CH#: 7840
Article 25 Tidal Wetlands Jurisdictional Determination

Dear Mr. Kennedy:

The New York State Department of Environmental Conservation (DEC) has reviewed your request for a jurisdictional determination for a permit pursuant to Article 25, of the Environmental Conservation Law (ECL), Tidal Wetlands that was submitted on behalf of the Hampshire Country Club, and received by this office on September 10, 2018. Additional information was received on January 3, 2019, January 11, 2019, February 3, 2019 and February 14, 2019. The project involves the consists of constructing 105 single-family units on 94.5-acres, comprising 44 single-family residences and 61 semi-detached carriage residences, reducing the existing golf course from 18-holes to 9-holes, and preserving 36 acres for open space. Delancey Cove contains DEC-regulated tidal wetlands, mapped as littoral zone and intertidal marsh. The adjacent area can extend as much as 300 feet from the tidal wetland boundary. The extent can be constricted by several factors:

- The seaward edge of the closest lawfully and presently existing (i.e. as of August 20, 1977), functional and substantial fabricated structure generally parallel to the wetland boundary and 100 feet of greater in length;
- The elevation contour of 10 feet above mean sea level, as shown on the most recent United States geological survey topographical map prior to the effective date of the regulations (August 20, 1977); and
- The crest of a bluff or cliff, where the 10-foot contour crosses the bluff or cliff.

The Department has determined that the presence of a riprapped gabion wall, Hommocks Road, Cove Road and Eagle Knolls Road represents "presently existing (as of August 20, 1977), functional and substantial fabricated structures," pursuant to the tidal wetland regulations §661.4(b)(ii), and therefore limits the adjacent area on the property. Therefore, the 10-foot contour line is the landward extent of the regulated adjacent area on this property as shown on the survey (attached), received by this office on February 14, 2019.

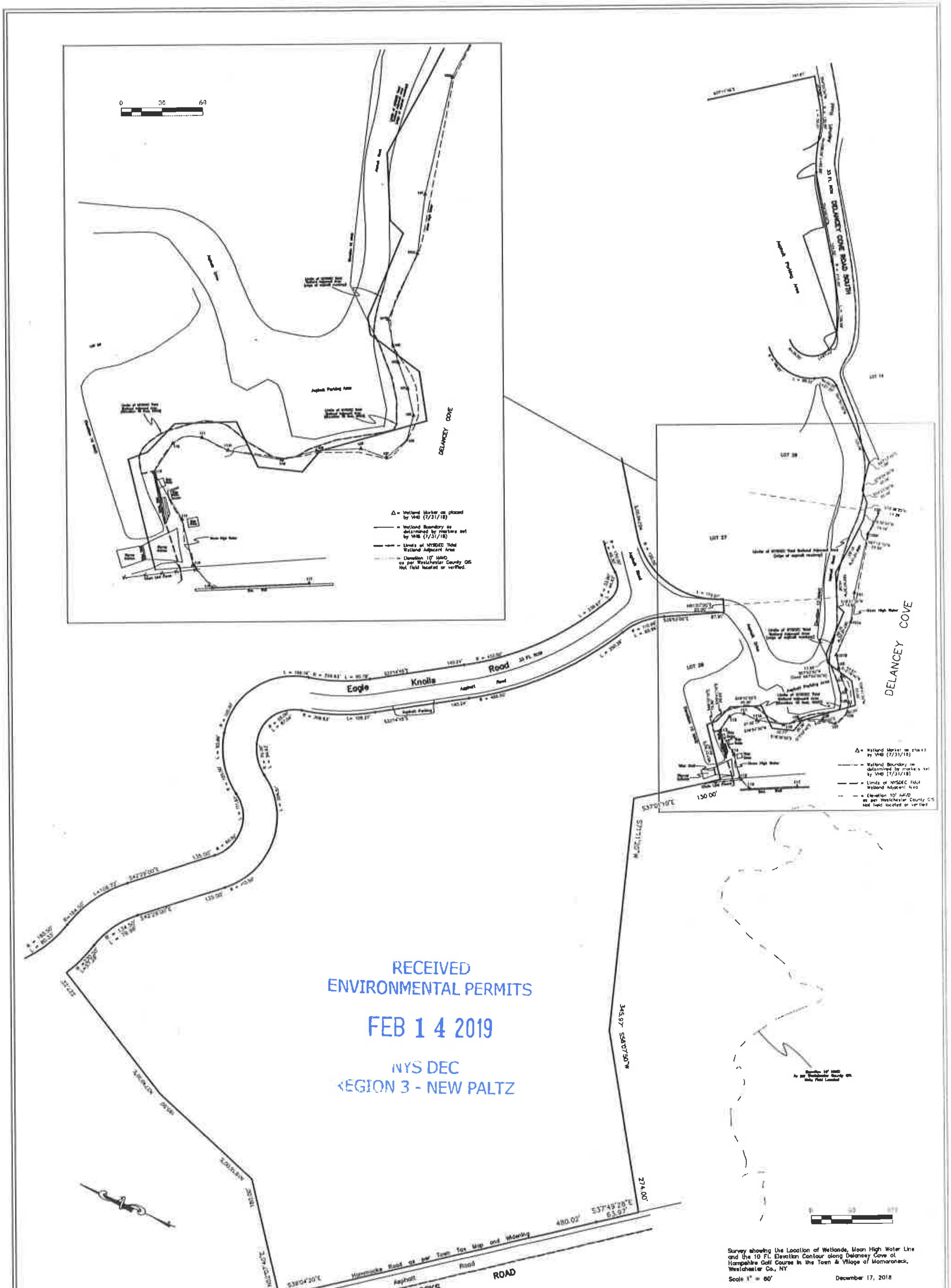
If there are any questions, please feel free to contact me at 845-256-3050 or by email at sarah.pawliczak@dec.ny.gov.

Respectfully,

Sarah Pawliczak
Division of Environmental Permits

Encl: Survey from VHB

cc: Angela Schimizzi, NYSDEC Division of Marine Resources
Village of Mamaroneck Planning Department
Mamaroneck Harbor and Coastal Zone Management Commission



Survey showing the Location of Wetlands, Mean High Water Line and the 10 Ft. Elevation Contour along Delancey Cove at Hampshire Golf Course in the Town & Village of Mamaroneck, Westchester Co., NY

Scale 1" = 60'

December 17, 2018

Notes:

1. Elevations are in the NAVD 1988 System.
2. Mean sea level is 3.4 Ft (NAVD)
3. Tidal wetland boundary as delineated by VHB on July 31, 2018

Richard A. Spinelli
660 Halstead Avenue
Mamaroneck, NY
(914) 381-2367
N.Y.S. Lic. Land Surveyor
No. 49240

RECEIVED
ENVIRONMENTAL PERMITS
FEB 14 2019
NYS DEC
REGION 3 - NEW PALTZ

Files added to:

R Flood Extent Diagrams; Mamaroneck Evacuation Notices

Mamaroneck emergency and evacuation notice for Long Island Sound Shore areas

Printer-Friendly Version

This is an emergency message related to the status of Hurricane Sandy in the Village of Mamaroneck.

The Village has declared a state of emergency related to Hurricane Sandy, through and until Wednesday morning, October 31, 2012. On that morning we will reassess the situation and provide a public update.

Based on National Weather Service rainfall predictions of a maximum of 2 to 3 inches, we do not anticipate river-based flooding. Therefore, there is not presently an evacuation in place for neighborhoods prone to river-flooding.

There is a mandatory evacuation in place for the Orienta and Shore Acres neighborhoods that are at-risk for coastal storm-surge flooding. Residents who stay will not be reachable by emergency crews. At the present time, Flagler Drive and Rushmore Avenue are under water.

The National Weather Service has projected coastal tidal surges as high as 6 to 11 feet above normal tides Monday night into Tuesday. Extreme wave action is projected to reach as high as 15-feet in some areas.

This danger and evacuation especially applies to the following streets:

Shore Acres Drive
Orienta Avenue
Rushmore Avenue
The Crescent
Cove Road
Flagler Drive
Greacen Point
Bleeker Avenue

The Town of Mamaroneck has opened the emergency evacuation shelter at the Mamaroneck High School. If you need to go to the shelter, please bring at least 3 days worth of clothes, medicine and food to address any special dietary needs. The Shelter will also assist with any pets that need to be relocated, but pets will not be allowed in the shelter.

For more information, please visit the Village website at villageofmamaroneck.org

Richard Slingerland, Village Manager

Mamaroneck Daily Voice serves Larchmont & Mamaroneck
News 08/27/2011

Mamaroneck Governments Specify Evacuation Areas

by Brian Donnelly

https://dailyvoice.com/new-york/mamaroneck/news/mamaroneck-governments-specify-evacuation-areas/437258/

MAMARONECK, N.Y. -- The Village and Town of Mamaroneck both declared a state of emergency Friday afternoon and issed a mandatory evacuation of low-lying and coastal areas. The following is a list of the specific neighborhoods and streets that have to evacuate by 5 p.m. Saturday.

Village of Mamaroneck:- Taylors Lane- Colonial Court- Barrymore Lane- Shore Acres- Flagler Drive- Rushmore Ave- Greacen Pt- Skibo- Nine Acres- Orienta- The Crescent- Seven Oaks- Seahaven- Nautilus- Constable- Bay Head- Pirates Cove - adjacent to the Mamaroneck and Sheldrake Rivers or near where flooding occurred in 2007 - along Mamaroneck Ave and Fenimore Road.

Village Trustee John Hofstetter urges anyone living in these areas, or people who know of anyone living in these areas, to evacuate by 5 p.m. Assistant village manager Dan Sarnoff warned that emergency responders may not be able to access these areas in the event a tree blocks the road or flooding.

Town of Mamaroneck:- Hommocks Road- Pryer Manor Road- Pheasant Run- Wildwood Circle- Premium Point

A temporary shelter at the Mamaroneck High School's Post Road gym will be available to residents in all three municipalities at 5 p.m. Saturday.

The Town of Mamaroneck, which closed the Hommocks pool Saturday at 12 p.m., will provide transportation to the shelter. Beginning at 4:30 p.m., busses will be available at the Strait Gate Church parking lot on the corner of Madison Street and Old White Plains Road.

Those who don't live near the church parking lot are adviced to call their local police department's non-emergency number, which are as follows:

Village Police - 914-777-1122Town Police - 914-381-6100Larchmont Police - 914-834-1000

Click here to sign up for Daily Voice's free daily emails and news alerts.

V Traffic Analyses and Backup

Kimley»Horn
of New York, P.C.

FEIS Chapter M
Appendix

Kimley»Horn
of New York, P.C.

FEIS Chapter M
Appendix

Response to Comments
M1, M2, M3, M18

- Construction Traffic Activity
- Synchro Analysis during construction (Hommocks Rd/ US1)
- Accident Projections

Comment M.1

Fill Assumptions In-Situ Fill (CY)	Expansion Factor	Uncompacted Fill	Truck Capacity CY	Trucks
84,104	1.33333333	112139	16	7009

Fill Truck Trip Calculations

	Phases	Mobilization	Main Platform Fill	Demobilization	Structure/Foundation/Roads/Utilities/Fitout/Spurs Fill				Demobilization	Total
						Initial Period	Middle Period	Completion Period		
	Duration	0.5 Months	9 Months	0.25 Months		12 Months	24 Months	6 Months	0.5 Months	52.25 Months
1	Full Work Days (months x 20.5)	10.25	184.44	5.12		245.91	491.83	92.22	10.25	1040
2	Uncompacted Fill (from engineer)	0	70823	0	0	13771	27542	0	0	112137
3	Compacted Fill (2/1.333)	0	53118	0	0	10328	20657	0	0	84103
4	Fill Trucks (Uncompacted Fill or 2/16)	0	4426	0	0	861	1721	0	0	7009
5	Truck Trips Per Day (4/1)	0	24	0	0	4	4	0	0	7

Comment M.1

Average Daily and Peak Hour Truck and Non-Truck Visits to the Hampshire Country Club Site during Construction

(with projected peak-hour trips)

		Mobilization	**Main Platform Fill**	**Demobilization**	**Structure/Foundation/Roads/Utilities/Fitout/Spurs Fill**				**Demobilization**
						Initial Period	**Middle Period**	**Completion Period**	
	Duration	**0.5 Months**	**9 Months**	**0.25 Months**		**12 Months**	**24 Months**	**6 Months**	**0.5 Months**
	Vehicle Type								
1	Single Unit 5-Axle	2 Misc.	24 Fill	2 Misc.		3.5 Fill 0.5 Concrete 0 Topsoil 0 Paving 0 Driveway 0 Tennis/Parking	3.5 Fill 0.5 Concrete 0.2 Topsoil 1 Paving 0.5 Driveway 0 Tennis/Parking	0 Fill 0 Concrete 0.2 Topsoil 1 Paving 0.5 Driveway 2 Tennis/Parking	1 Misc.
					Subtotal	4	5.7	3.7	
2	Tractor Trailer	0.2 Misc.	0.2 Misc.	0.2 Misc.		0.2 General 0.0 Wood 0.0 Materials/Fitout	0.2 General 0.6 Wood 0.5 Materials/Fitout	0.1 General 0.0 Wood 0.5 Materials/Fitout	0.2 Misc.
					Subtotal	0.2	1.3	0.6	
3	Over Sized (carrying heavy equipment)	1	0	0.5		0	0	0	0.75
4	Single Unit 3-Axle	1 General Delivery	2 General Delivery	2 General Delivery		4 General Delivery	0.5 Mechanical/Electrical 5 - General Delivery	0.5 Mechanical/Electrical 4 - General Delivery	2 General Delivery
					Subtotal	4	5.5	4.5	
5	Total Trucks	4.2	26.2	4.7		8.2	12.5	8.8	3.95
6	Total Truck Trips (5 x 2)	8	52	9		16	25	18	8
7	Estimate of % of daily Truck Trips in the Peak Hour	33%	25%	33%		33%	30%	33%	33%
8	Max Truck Trips Per Hour (6*7)	3	13	3		5	8	6	3
9	Private Auto/Pickup Vehicles per Day (employees)	15	25	20		40	50	40	15
10	Estimate of % of Employees In/Out in Peak Hour	67%	67%	67%		67%	67%	67%	67%
11	Max Car Trips Per Hour (9*10)	10	17	13		27	33	27	10
	Max Per-hour Trips								
12	Truck (8)	3	13	3		5	8	6	3
13	Car (11)	10	17	13		27	33	27	10
14	Total (12+13)	13	30	16		32	41	33	13

Comment M.2

PM Peak Hour
Synchro Analysis Comparison
US Route 1 & Hommocks Rd/Weaver St

Intersection	Approach	Lane Group	DEIS Build LOS/Delay	No-Build with Construction Trips LOS/Delay	Change in Delay
Boston Post Rd & Hommocks Rd/Weaver St	EB	L	D/49.2	D/49.4	**0.2**
		TR	D/47.7	D/47.5	**-0.2**
	WB	L	D/48.0	D/48.2	**0.2**
		TR	D/44.8	D/45.1	**0.3**
	NB	L	E/56.4	E/56.4	**0**
		TR	C/31.4	C/31.1	**-0.3**
	SB	L	C/27.5	C/28.3	**0.8**
		TR	D/41.1	D/41.1	**0**
	Intersection		**D/39.7**	**D/39.7**	**0**

Volume Calculation Worksheet

	DEIS No-Build		Maximum Truck Phase: Add Construction traffic (1)				
			13	*16.75* (1)			
	Vol	**HV %**	**Trucks**	**Workers**	**Total Const Traffic**	**No-Build + ALL Const Vehs**	**Combined HV %**
Weaver St							
EB							
L	116	0.02			**0**	116	0.02
T	81	0.01		1	**1**	82	0.01
R	91	0.06			**0**	91	0.06
Hommocks Rd							
WB							
L	54	0.02	3	3	**6**	60	0.07
T	78	0.01		1	**1**	79	0.01
R	34	0.01	4	0	**4**	38	0.10
US Rt 1							
NB							
L	147	0.01			**0**	147	0.01
T	704	0.02			**0**	704	0.02
R	51	0.02	3	3	**6**	57	0.07
SB							
L	61	0.01	3	0	**3**	64	0.06
T	783	0.03			**0**	783	0.03
R	106	0.02			**0**	106	0.02

(1) 100% of trucks and 50% of workers use Hommocks Rd to access the site.

Comment M.2

No-Build_During Construction-Max Trucks — PM Peak Hour

6: US 1/Boston Post Rd & Weaver Street/Hommocks Road — 03/23/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	82	91	60	79	38	147	704	57	64	783	106
Future Volume (vph)	116	82	91	60	79	38	147	704	57	64	783	106
Satd. Flow (prot)	1770	1589	0	1574	1583	0	1745	3394	0	1589	3299	0
Flt Permitted	0.631			0.532			0.132			0.192		
Satd. Flow (perm)	1113	1589	0	863	1583	0	240	3394	0	319	3299	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	42		20	20		42	44		22	22		44
Confl. Bikes (#/hr)			6									6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	1%	6%	7%	1%	10%	1%	2%	7%	6%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	192	0	67	130	0	163	845	0	71	988	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		18.0	63.0		13.0	58.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	39.6	39.6		39.6	39.6		68.4	59.1		59.4	53.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.50	0.43		0.44	0.39	
v/c Ratio	0.40	0.41		0.27	0.28		0.69	0.57		0.36	0.77	
Control Delay	49.4	47.5		48.2	45.1		56.4	31.1		28.3	41.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.4	47.5		48.2	45.1		56.4	31.1		28.3	41.1	
LOS	D	D		D	D		E	C		C	D	
Approach Delay		48.3			46.1			35.2			40.2	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	104	156		52	101		76	296		32	396	
Queue Length 95th (ft)	181	246		104	170		118	363		57	483	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	324	463		251	461		269	1474		217	1285	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.41		0.27	0.28		0.61	0.57		0.33	0.77	

Intersection Summary

Cycle Length: 136

Actuated Cycle Length: 136

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Control Type: Actuated-Coordinated

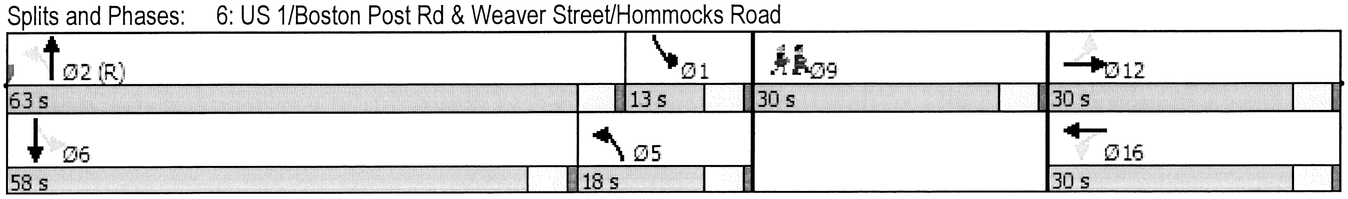
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 39.7 — Intersection LOS: D

Intersection Capacity Utilization 64.5% — ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road



Comment M.3

Accident projections for the Intersection of Hommocks Road at Boston Post Road

	Accidents 2013 through 2015	AM and PM Peak-Hour Volume	Pk Hr as a % of Weekly Volume	Weekly Volume	Weeks Per Year	Annual Traffic	3-years of Traffic (MEV)	Accident Rate (per MEV)
Historical	17	4287	3.27%	131074	52.14	6834583	20.50	0.83

Construction Traffic	0.5 Months	9 Months	0.25 Months	24 Months	6 Months	0.5 Months	52.25 Months (MEV)	Accident Rate (per MEV)	Accidents
Work Days	10.25	184.50	5.12	491.85	92.20	10.25			
Trucks	4.2	26.2	4.7	12.5	8.8	3.95			
Employees	15	25	20	50	40	15			
Employees via Hommocks (60%)	9	15	12	30	24	9			
Trips	203	5772	137	30028	4535	203	0.0409	0.83	0.034

Post Construction		AM and PM Peak-Hour Volume	Pk Hr as a % of Weekly Volume	Weekly Volume	Weeks Per Year	Annual Traffic (MEV)	Accident Rate (per MEV)	Additional Accidents per year	Years for 1 Accident
		69	3.27%	2110	52.14	0.11000379	0.83	0.091	11.0

Kimley»Horn of New York, P.C.

FEIS Chapter M
Appendix

Response to Comment M9, M42

Revised Intersection Analyses & Summary Table with twice the counted level of Pedestrian Activity and with Cooper Avenue Closed

Revised Table M8 and M9 reflecting twice the counted level of pedestrian activity and Cooper Avenue as an emergency access only.

Build Levels of Service - High Pedestrian Analysis (LOS/Delay)								
Intersection	Approach	Lane Group	AM Peak Hour		PM Peak Hour		Sat Peak Hour	
			No-Build	Build	No-Build	Build	No-Build	Build
Boston Post Rd & Hommocks Rd/Weaver St	EB	L	E/62.7	E/64.0	D/49.1	D/49.2	D/45.8	D/45.9
		TR	D/52.7	D/52.8	D/47.5	D/47.7	D/44.1	D/44.2
	WB	L	E/56.7	E/66.7	D/47.2	D/48	D/43.1	D/43.6
		TR	D/51.5	D/52.2	D/44.6	D/44.8	D/41.1	D/41.2
	NB	L	D/42.0	D/42.0	E/56.4	E/56.4	D/50.0	D/50
		TR	E/72.0	E/73.8	C/31.0	C/31.4	C/33.2	C/33.5
	SB	L	E/76.2	E/76.2	C/26.4	C/27.5	C/28.3	C/29.3
		TR	D/38.1	D/38.1	D/41.1	D/41.1	D/42.4	D/42.4
	Intersection		**E/57.3**	**E/58.4**	**D/39.5**	**D/39.7**	**D/39.6**	**D/39.8**
Boston Post Rd & Orienta Ave/ Delancey Ave	EB	L	D/43.6	D/43.6	D/43.7	D/43.4	D/45.3	D/45.2
		R	B/10.4	B/10.4	B/12.8	B/12.5	B/13.0	B/12.8
	WB	L	D/44.8	D/44.8	D/42.3	D/42.6	D/40.4	D/40.5
		R	A/9.0	A/9.0	A/8.6	A/8.7	A/8.5	A/8.4
	NB	TR	D/42.3	D/42.4	D/39.1	D/39.2	D/41.1	D/41.2
	SB	TR	C/23.3	C/23.4	C/23.4	C/23.7	C/21.2	C/21.4
	Intersection		**C/27.8**	**C/28.1**	**C/23.1**	**C/23.4**	**C/24.8**	**C/24.8**
Boston Post Rd & Old Boston Post Rd/ Richbell Rd	EB	L	D/49.8	D/49.9	D/44.5	D/44.6	D/41.8	D/42.1
		R	D/41.9	D/41.7	D/40.1	D/39.9	A/9.7	A/9.6
	WB	L	D/40.5	D/40.4	D/40.1	D/39.8	D/36.3	D/36.2
		TR	D/43.5	D/43.4	D/39.7	D/39.4	C/26.8	C/27.0
	NB	L	B/18.9	B/18.1	B/14.2	B/14.5	B/14.7	B/14.8
		T	B/18.8	B/19	B/13.5	B/13.7	B/14.8	B/14.9
	SB	TR	C/28.7	C/28.8	C/24.5	C/24.8	C/24.8	C/24.9
	Intersection		**C/27.4**	**C/27.5**	**C/23.1**	**C/23.3**	**C/21.4**	**C/21.5**

A new analysis has been performed to address the stated concerns. The traffic volumes used in the DEIS analysis were compared to ATR data collected over the course of a week, March 14-20, 2016. The data confirmed that the counts used in the DEIS are representative of typical vehicular volumes. The ATR data showed higher volumes than the DEIS counts for the northbound approach of Boston Post Road at Orienta Avenue, so the volumes in the new analysis were increased by the difference. Volumes at the intersection of Boston Post Road were revised to reflect that Cooper Avenue is now proposed to be an emergency-only access.

The pedestrian counts were collected when there was activity at the school, including the ice rink and pool. A substantial number of pedestrians and bicyclists were recorded. To present a conservative analysis representative of times of higher pedestrian activity, all pedestrian and bicyclist volumes were doubled for the new analysis.

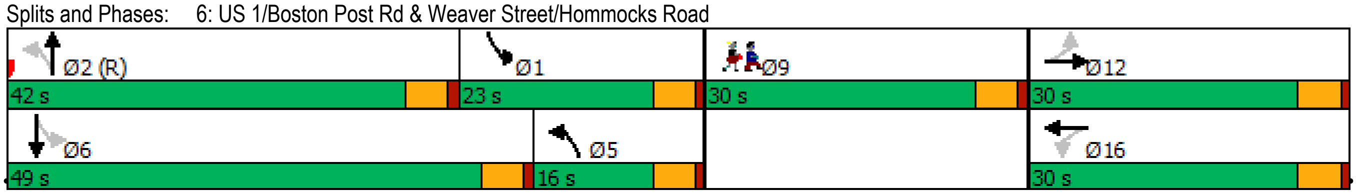
The new analysis shows that the pedestrian volumes have only a very minor impact on vehicular delay. There is no significant difference between the delays reported in the DEIS and the new analysis, which is provided in the table. The intersection of Boston Post Road at Hommocks Road/Weaver Street operates with an exclusive pedestrian signal phase, therefore it is not expected that an increase in pedestrian volumes would significantly affect vehicular delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	152	52	56	145	33	84	584	136	177	507	65
Future Volume (vph)	73	152	52	56	145	33	84	584	136	177	507	65
Satd. Flow (prot)	1687	1650	0	1652	1549	0	1602	3258	0	1604	3208	0
Flt Permitted	0.439			0.380			0.176			0.098		
Satd. Flow (perm)	632	1650	0	610	1549	0	290	3258	0	165	3208	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	300		100	100		300	64		26	26		64
Confl. Bikes (#/hr)									4			4
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	7%	3%	2%	2%	4%	6%	10%	4%	3%	5%	6%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	272	0	75	237	0	112	960	0	236	763	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		16.0	42.0		23.0	49.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	32.2	32.2		32.2	32.2		46.8	37.0		58.8	44.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.37	0.30		0.47	0.35	
v/c Ratio	0.60	0.64		0.48	0.60		0.53	1.00		0.87	0.68	
Control Delay	62.7	52.7		56.7	51.5		42.0	72.0		76.2	38.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	62.7	52.7		56.7	51.5		42.0	72.0		76.2	38.1	
LOS	E	D		E	D		D	E		E	D	
Approach Delay		55.3			52.8			68.9			47.1	
Approach LOS		E			D			E			D	
Queue Length 50th (ft)	75	213		56	183		49	407		138	274	
Queue Length 95th (ft)	#126	253		91	223		70	387		179	271	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	162	425		157	398		226	964		286	1129	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.60	0.64		0.48	0.60		0.50	1.00		0.83	0.68	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 57.3 Intersection LOS: E
Intersection Capacity Utilization 63.4% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road

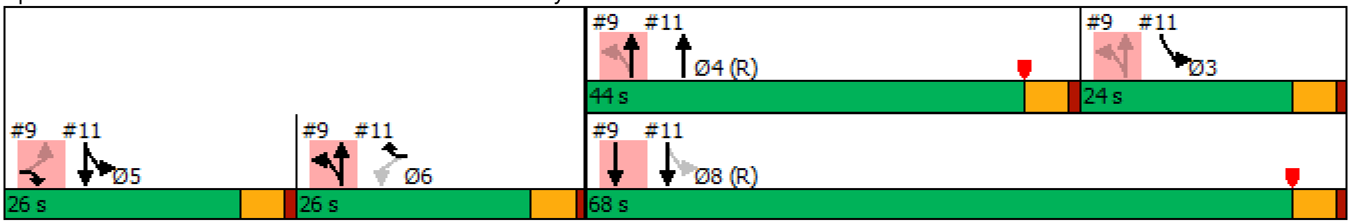


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	27	168	81	772	877	14		
Future Volume (vph)	27	168	81	772	877	14		
Satd. Flow (prot)	1736	1599	0	3487	3025	0		
Flt Permitted	0.950			0.835				
Satd. Flow (perm)	1730	1599	0	2922	3025	0		
Satd. Flow (RTOR)		189						
Confl. Peds. (#/hr)	2		22			22		
Confl. Bikes (#/hr)						10		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Heavy Vehicles (%)	4%	1%	3%	3%	4%	8%		
Parking (#/hr)					5			
Shared Lane Traffic (%)								
Lane Group Flow (vph)	30	189	0	958	1001	0		
Turn Type	Perm	Prot	custom	NA	NA			
Protected Phases		5	6	6 4	8		3	4
Permitted Phases	5		3 4	3				
Total Split (s)	26.0	26.0	26.0		68.0		24.0	44.0
Total Lost Time (s)	5.0	5.0			5.0			
Act Effct Green (s)	17.8	17.8		87.2	63.0			
Actuated g/C Ratio	0.15	0.15		0.73	0.52			
v/c Ratio	0.12	0.48		0.39	0.63			
Control Delay	43.6	10.3		1.3	22.5			
Queue Delay	0.0	0.1		0.4	0.8			
Total Delay	43.6	10.4		1.7	23.3			
LOS	D	B		A	C			
Approach Delay	15.0			1.7	23.3			
Approach LOS	B			A	C			
Queue Length 50th (ft)	20	0		22	278			
Queue Length 95th (ft)	47	62		18	343			
Internal Link Dist (ft)	246			90	543			
Turn Bay Length (ft)		70						
Base Capacity (vph)	302	435		2444	1588			
Starvation Cap Reductn	0	0		863	211			
Spillback Cap Reductn	0	17		0	295			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.10	0.45		0.61	0.77			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 64.2% ICU Level of Service C
Analysis Period (min) 15

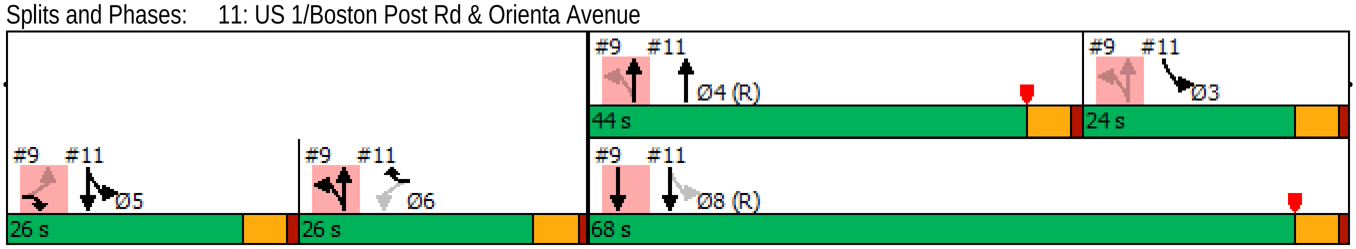
Splits and Phases: 9: US 1/Boston Post Rd & Delancey Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø3	Ø5	Ø8
Lane Configurations									
Traffic Volume (vph)	79	220	633	123	362	682			
Future Volume (vph)	79	220	633	123	362	682			
Satd. Flow (prot)	1601	1501	3375	0	1648	1757			
Flt Permitted	0.950				0.168				
Satd. Flow (perm)	1579	1501	3375	0	291	1757			
Satd. Flow (RTOR)		247							
Confl. Peds. (#/hr)	8			16	16				
Confl. Bikes (#/hr)				2					
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89			
Heavy Vehicles (%)	9%	4%	3%	11%	9%	4%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	89	247	849	0	407	766			
Turn Type	Perm	Prot	NA		custom	NA			
Protected Phases		6	4		3 5	5 8	3	5	8
Permitted Phases	6				8				
Total Split (s)	26.0	26.0	44.0				24.0	26.0	68.0
Total Lost Time (s)	5.0	5.0	5.0						
Act Effct Green (s)	24.2	24.2	39.0		85.8	85.8			
Actuated g/C Ratio	0.20	0.20	0.32		0.72	0.72			
v/c Ratio	0.28	0.49	0.77		0.60	0.61			
Control Delay	44.8	9.0	42.3		22.4	4.5			
Queue Delay	0.0	0.0	0.0		26.1	0.5			
Total Delay	44.8	9.0	42.3		48.4	4.9			
LOS	D	A	D		D	A			
Approach Delay	18.5		42.3			20.0			
Approach LOS	B		D			C			
Queue Length 50th (ft)	60	0	311		212	58			
Queue Length 95th (ft)	111	70	384		310	56			
Internal Link Dist (ft)	450		2270			90			
Turn Bay Length (ft)									
Base Capacity (vph)	318	500	1096		724	1303			
Starvation Cap Reductn	0	0	0		321	185			
Spillback Cap Reductn	0	0	0		0	0			
Storage Cap Reductn	0	0	0		0	0			
Reduced v/c Ratio	0.28	0.49	0.77		1.01	0.69			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

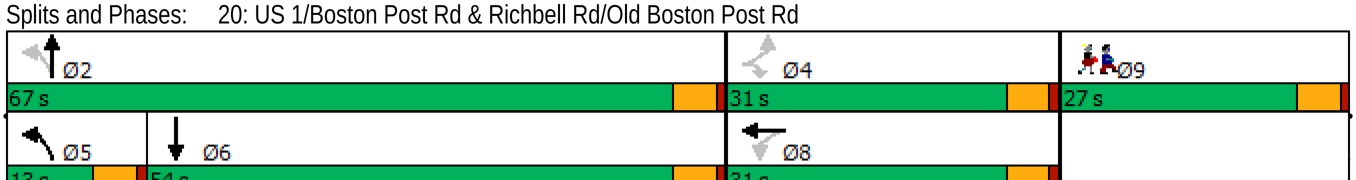
Splits and Phases: 11: US 1/Boston Post Rd & Orienta Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	0	93	86	65	68	96	813	0	0	675	65
Future Volume (vph)	96	0	93	86	65	68	96	813	0	0	675	65
Satd. Flow (prot)	1736	0	1568	1678	1667	0	1646	3271	0	0	3266	0
Flt Permitted	0.596			0.950			0.172					
Satd. Flow (perm)	1066	0	1500	1624	1667	0	290	3271	0	0	3266	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	20		22	22		20	120					120
Confl. Bikes (#/hr)												8
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	4%	2%	3%	4%	3%	3%	6%	3%	2%	2%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	0	109	101	156	0	113	956	0	0	870	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Total Split (s)	31.0		31.0	31.0	31.0		13.0	67.0			54.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Act Effct Green (s)	17.0		17.0	17.0	17.0		43.4	43.4			33.5	
Actuated g/C Ratio	0.20		0.20	0.20	0.20		0.51	0.51			0.39	
v/c Ratio	0.54		0.37	0.31	0.47		0.38	0.58			0.68	
Control Delay	49.8		41.9	40.5	43.5		18.9	18.8			28.7	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	49.8		41.9	40.5	43.5		18.9	18.8			28.7	
LOS	D		D	D	D		B	B			C	
Approach Delay		45.9			42.3			18.8			28.7	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	69		64	59	94		41	237			264	
Queue Length 95th (ft)	136		125	116	169		78	320			348	
Internal Link Dist (ft)		483			489			1683			2270	
Turn Bay Length (ft)			140	100			175					
Base Capacity (vph)	412		579	627	644		308	2395			2090	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.27		0.19	0.16	0.24		0.37	0.40			0.42	

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 85.5	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 20: US 1/Boston Post Rd & Richbell Rd/Old Boston Post Rd

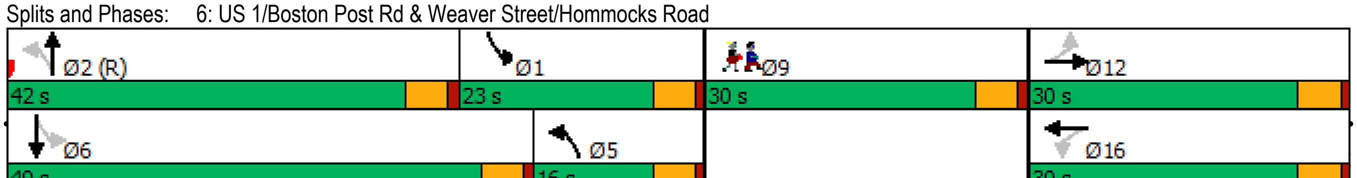


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	153	52	76	150	34	84	584	140	177	507	65
Future Volume (vph)	73	153	52	76	150	34	84	584	140	177	507	65
Satd. Flow (prot)	1687	1651	0	1652	1550	0	1602	3254	0	1604	3208	0
Flt Permitted	0.425			0.379			0.176			0.098		
Satd. Flow (perm)	616	1651	0	609	1550	0	290	3254	0	165	3208	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	300		100	100		300	64		26	26		64
Confl. Bikes (#/hr)									4			4
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	7%	3%	2%	2%	4%	6%	10%	4%	3%	5%	6%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	273	0	101	245	0	112	966	0	236	763	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		16.0	42.0		23.0	49.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	32.2	32.2		32.2	32.2		46.8	37.0		58.8	44.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.37	0.30		0.47	0.35	
v/c Ratio	0.61	0.64		0.65	0.61		0.53	1.00		0.87	0.68	
Control Delay	64.0	52.8		66.7	52.2		42.0	73.8		76.2	38.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	64.0	52.8		66.7	52.2		42.0	73.8		76.2	38.1	
LOS	E	D		E	D		D	E		E	D	
Approach Delay		55.7			56.5			70.5			47.1	
Approach LOS		E			E			E			D	
Queue Length 50th (ft)	75	214		79	190		49	~413		138	274	
Queue Length 95th (ft)	#128	253		#138	230		70	390		179	271	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	158	425		156	399		226	963		286	1129	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.61	0.64		0.65	0.61		0.50	1.00		0.83	0.68	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 125
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 58.4 Intersection LOS: E
Intersection Capacity Utilization 64.5% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road

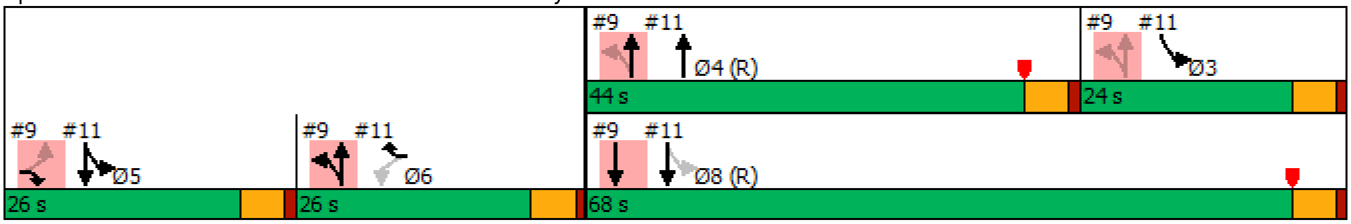


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	27	169	86	787	880	14		
Future Volume (vph)	27	169	86	787	880	14		
Satd. Flow (prot)	1736	1599	0	3487	3025	0		
Flt Permitted	0.950			0.818				
Satd. Flow (perm)	1730	1599	0	2863	3025	0		
Satd. Flow (RTOR)		190						
Confl. Peds. (#/hr)	2		22			22		
Confl. Bikes (#/hr)						10		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Heavy Vehicles (%)	4%	1%	3%	3%	4%	8%		
Parking (#/hr)					5			
Shared Lane Traffic (%)								
Lane Group Flow (vph)	30	190	0	981	1005	0		
Turn Type	Perm	Prot	custom	NA	NA			
Protected Phases		5	6	6 4	8		3	4
Permitted Phases	5		3 4	3				
Total Split (s)	26.0	26.0	26.0		68.0		24.0	44.0
Total Lost Time (s)	5.0	5.0			5.0			
Act Effct Green (s)	17.8	17.8		87.2	63.0			
Actuated g/C Ratio	0.15	0.15		0.73	0.52			
v/c Ratio	0.12	0.48		0.40	0.63			
Control Delay	43.6	10.3		1.4	22.5			
Queue Delay	0.0	0.1		0.4	0.9			
Total Delay	43.6	10.4		1.8	23.4			
LOS	D	B		A	C			
Approach Delay	14.9			1.8	23.4			
Approach LOS	B			A	C			
Queue Length 50th (ft)	20	0		24	281			
Queue Length 95th (ft)	47	61		21	345			
Internal Link Dist (ft)	246			90	543			
Turn Bay Length (ft)		70						
Base Capacity (vph)	302	436		2435	1588			
Starvation Cap Reductn	0	0		846	210			
Spillback Cap Reductn	0	18		0	298			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.10	0.45		0.62	0.78			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 12.9 Intersection LOS: B
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

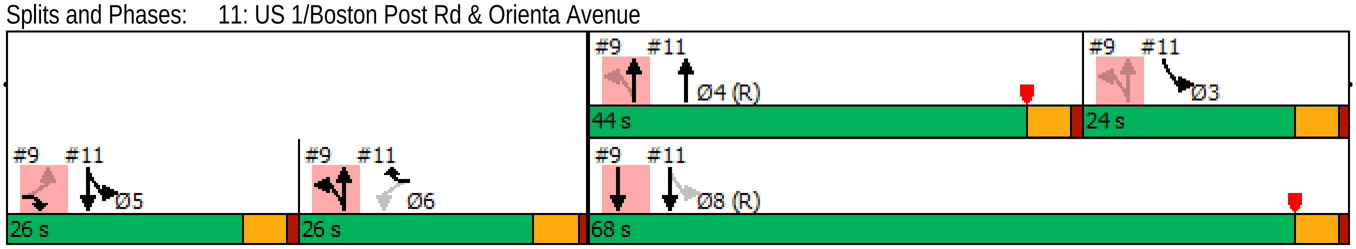
Splits and Phases: 9: US 1/Boston Post Rd & Delancey Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø3	Ø5	Ø8
Lane Configurations									
Traffic Volume (vph)	79	239	634	123	367	682			
Future Volume (vph)	79	239	634	123	367	682			
Satd. Flow (prot)	1601	1501	3375	0	1648	1757			
Flt Permitted	0.950				0.168				
Satd. Flow (perm)	1579	1501	3375	0	291	1757			
Satd. Flow (RTOR)		269							
Confl. Peds. (#/hr)	8			16	16				
Confl. Bikes (#/hr)				2					
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89			
Heavy Vehicles (%)	9%	4%	3%	11%	9%	4%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	89	269	850	0	412	766			
Turn Type	Perm	Prot	NA		custom	NA			
Protected Phases		6	4		3 5	5 8	3	5	8
Permitted Phases	6				8				
Total Split (s)	26.0	26.0	44.0				24.0	26.0	68.0
Total Lost Time (s)	5.0	5.0	5.0						
Act Effct Green (s)	24.2	24.2	39.0		85.8	85.8			
Actuated g/C Ratio	0.20	0.20	0.32		0.72	0.72			
v/c Ratio	0.28	0.52	0.78		0.61	0.61			
Control Delay	44.8	9.0	42.4		22.6	4.4			
Queue Delay	0.0	0.0	0.0		27.9	0.5			
Total Delay	44.8	9.0	42.4		50.5	4.9			
LOS	D	A	D		D	A			
Approach Delay	17.9		42.4			20.8			
Approach LOS	B		D			C			
Queue Length 50th (ft)	60	0	311		216	57			
Queue Length 95th (ft)	111	73	384		317	54			
Internal Link Dist (ft)	450		2270			90			
Turn Bay Length (ft)									
Base Capacity (vph)	318	517	1096		724	1303			
Starvation Cap Reductn	0	0	0		319	185			
Spillback Cap Reductn	0	0	0		0	0			
Storage Cap Reductn	0	0	0		0	0			
Reduced v/c Ratio	0.28	0.52	0.78		1.02	0.69			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 28.1	Intersection LOS: C
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: US 1/Boston Post Rd & Orienta Avenue

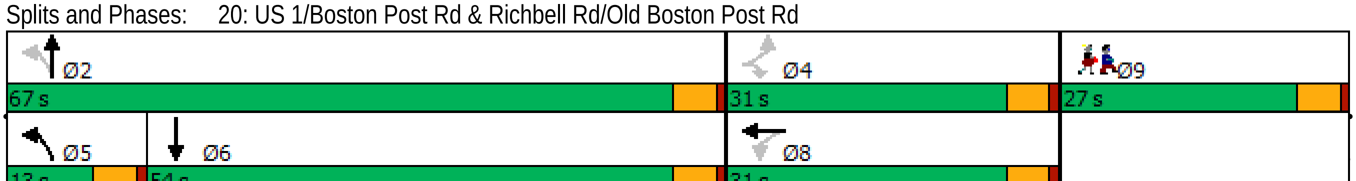


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	93	86	67	68	79	814	0	0	675	65
Future Volume (vph)	97	0	93	86	67	68	79	814	0	0	675	65
Satd. Flow (prot)	1736	0	1568	1678	1672	0	1646	3271	0	0	3266	0
Flt Permitted	0.589			0.950			0.172					
Satd. Flow (perm)	1053	0	1500	1624	1672	0	290	3271	0	0	3266	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	20		22	22		20	120					120
Confl. Bikes (#/hr)												8
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	4%	2%	3%	4%	3%	3%	6%	3%	2%	2%	4%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	0	109	101	159	0	93	958	0	0	870	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Total Split (s)	31.0		31.0	31.0	31.0		13.0	67.0			54.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Act Effct Green (s)	17.2		17.2	17.2	17.2		43.4	43.4			33.5	
Actuated g/C Ratio	0.20		0.20	0.20	0.20		0.51	0.51			0.39	
v/c Ratio	0.54		0.36	0.31	0.47		0.32	0.58			0.68	
Control Delay	49.9		41.7	40.4	43.4		18.1	19.0			28.8	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	49.9		41.7	40.4	43.4		18.1	19.0			28.8	
LOS	D		D	D	D		B	B			C	
Approach Delay		45.9			42.2			18.9			28.8	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	70		64	59	96		33	240			265	
Queue Length 95th (ft)	137		125	116	172		66	320			348	
Internal Link Dist (ft)		483			489			1683			2270	
Turn Bay Length (ft)			140	100			175					
Base Capacity (vph)	406		579	627	645		307	2392			2089	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.28		0.19	0.16	0.25		0.30	0.40			0.42	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 85.7
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 27.5 Intersection LOS: C
Intersection Capacity Utilization 56.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 20: US 1/Boston Post Rd & Richbell Rd/Old Boston Post Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	81	91	54	78	34	147	704	51	61	783	106
Future Volume (vph)	116	81	91	54	78	34	147	704	51	61	783	106
Satd. Flow (prot)	1770	1588	0	1652	1635	0	1745	3410	0	1668	3299	0
Flt Permitted	0.640			0.534			0.132			0.195		
Satd. Flow (perm)	1128	1588	0	909	1635	0	240	3410	0	340	3299	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	42		20	20		42	44		22	22		44
Confl. Bikes (#/hr)			6									6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	1%	6%	2%	1%	1%	1%	2%	2%	1%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	191	0	60	125	0	163	839	0	68	988	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		18.0	63.0		13.0	58.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	39.7	39.7		39.7	39.7		68.3	59.1		59.3	53.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.50	0.43		0.44	0.39	
v/c Ratio	0.39	0.41		0.23	0.26		0.69	0.57		0.32	0.77	
Control Delay	49.1	47.5		47.2	44.6		56.4	31.0		26.4	41.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.1	47.5		47.2	44.6		56.4	31.0		26.4	41.1	
LOS	D	D		D	D		E	C		C	D	
Approach Delay		48.1			45.5			35.1			40.1	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	104	155		46	97		76	293		30	396	
Queue Length 95th (ft)	181	245		94	164		118	360		55	483	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	328	463		265	476		269	1482		230	1285	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.39	0.41		0.23	0.26		0.61	0.57		0.30	0.77	

Intersection Summary

Cycle Length: 136

Actuated Cycle Length: 136

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Control Type: Actuated-Coordinated

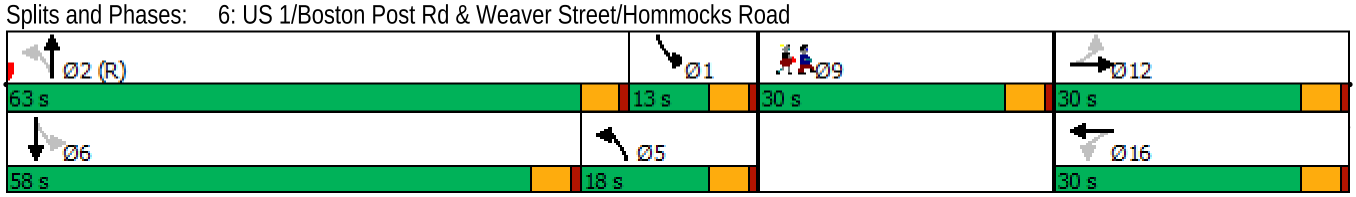
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 39.5 Intersection LOS: D

Intersection Capacity Utilization 64.5% ICU Level of Service C

Analysis Period (min) 15

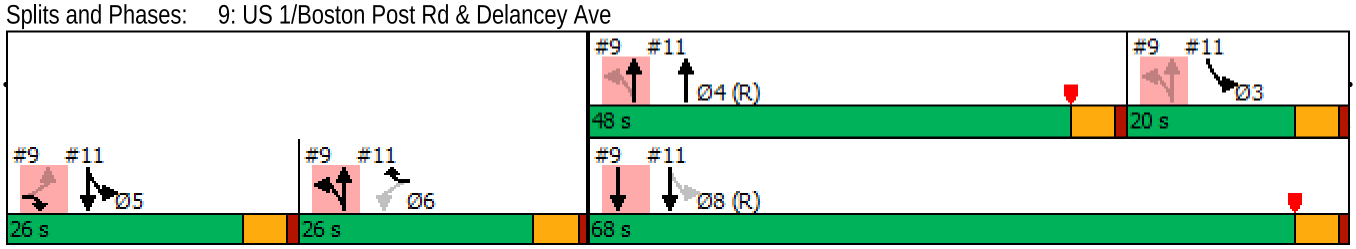
Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	14	57	93	881	919	25		
Future Volume (vph)	14	57	93	881	919	25		
Satd. Flow (prot)	1787	1583	0	3486	2991	0		
Flt Permitted	0.950			0.840				
Satd. Flow (perm)	1756	1583	0	2938	2991	0		
Satd. Flow (RTOR)		61						
Confl. Peds. (#/hr)	10		22			22		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Heavy Vehicles (%)	1%	2%	13%	2%	5%	4%		
Parking (#/hr)					5			
Shared Lane Traffic (%)								
Lane Group Flow (vph)	15	61	0	1047	1015	0		
Turn Type	Perm	Prot	custom	NA	NA			
Protected Phases		5	6	6 4	8		3	4
Permitted Phases	5		3 4	3				
Total Split (s)	26.0	26.0	26.0		68.0		20.0	48.0
Total Lost Time (s)	5.0	5.0			5.0			
Act Effct Green (s)	15.8	15.8		89.2	63.0			
Actuated g/C Ratio	0.13	0.13		0.74	0.52			
v/c Ratio	0.06	0.23		0.42	0.65			
Control Delay	43.7	12.8		1.1	22.9			
Queue Delay	0.0	0.0		0.3	0.5			
Total Delay	43.7	12.8		1.5	23.4			
LOS	D	B		A	C			
Approach Delay	18.9			1.5	23.4			
Approach LOS	B			A	C			
Queue Length 50th (ft)	10	0		20	286			
Queue Length 95th (ft)	30	38		19	359			
Internal Link Dist (ft)	246			90	543			
Turn Bay Length (ft)		70						
Base Capacity (vph)	307	327		2521	1570			
Starvation Cap Reductn	0	0		812	197			
Spillback Cap Reductn	0	2		0	125			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.05	0.19		0.61	0.74			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 69.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: US 1/Boston Post Rd & Delancey Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø3	Ø5	Ø8
Lane Configurations									
Traffic Volume (vph)	73	234	740	140	197	774			
Future Volume (vph)	73	234	740	140	197	774			
Satd. Flow (prot)	1694	1487	3449	0	1710	1757			
Flt Permitted	0.950				0.148				
Satd. Flow (perm)	1648	1487	3449	0	266	1757			
Satd. Flow (RTOR)		252							
Confl. Peds. (#/hr)	16			14	14				
Confl. Bikes (#/hr)				2					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93			
Heavy Vehicles (%)	3%	5%	2%	3%	5%	4%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	78	252	947	0	212	832			
Turn Type	Perm	Prot	NA		custom	NA			
Protected Phases		6	4		3 5	5 8	3	5	8
Permitted Phases	6				8				
Total Split (s)	26.0	26.0	48.0				20.0	26.0	68.0
Total Lost Time (s)	5.0	5.0	5.0						
Act Effct Green (s)	26.2	26.2	43.0		83.8	83.8			
Actuated g/C Ratio	0.22	0.22	0.36		0.70	0.70			
v/c Ratio	0.22	0.48	0.77		0.34	0.68			
Control Delay	42.3	8.6	39.1		13.6	7.4			
Queue Delay	0.0	0.0	0.0		6.5	0.9			
Total Delay	42.3	8.6	39.1		20.1	8.3			
LOS	D	A	D		C	A			
Approach Delay	16.6		39.1			10.7			
Approach LOS	B		D			B			
Queue Length 50th (ft)	50	0	338		67	168			
Queue Length 95th (ft)	100	75	420		138	226			
Internal Link Dist (ft)	450		2270			90			
Turn Bay Length (ft)									
Base Capacity (vph)	359	521	1235		690	1303			
Starvation Cap Reductn	0	0	0		420	219			
Spillback Cap Reductn	0	0	0		0	0			
Storage Cap Reductn	0	0	0		0	0			
Reduced v/c Ratio	0.22	0.48	0.77		0.79	0.77			

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow

Control Type: Actuated-Coordinated

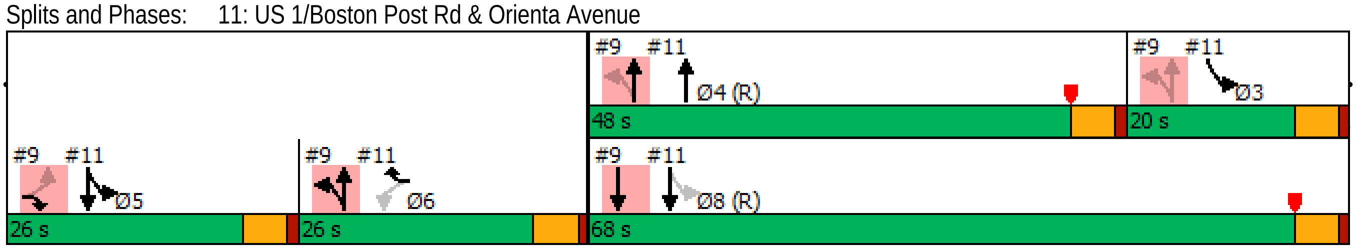
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.1 Intersection LOS: C

Intersection Capacity Utilization 53.1% ICU Level of Service A

Analysis Period (min) 15

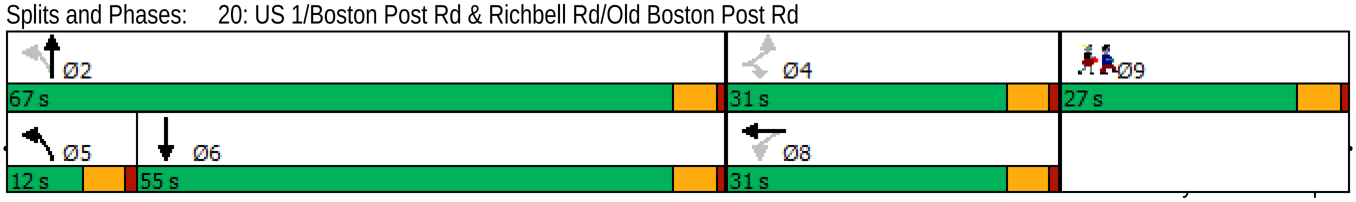
Splits and Phases: 11: US 1/Boston Post Rd & Orienta Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	0	91	107	41	56	78	797	0	0	858	96
Future Volume (vph)	98	0	91	107	41	56	78	797	0	0	858	96
Satd. Flow (prot)	1787	0	1599	1728	1644	0	1728	3303	0	0	3277	0
Flt Permitted	0.688			0.950			0.137					
Satd. Flow (perm)	1241	0	1535	1678	1644	0	247	3303	0	0	3277	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	34		20	20		34	52					52
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	1%	1%	3%	1%	1%	2%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	0	100	118	107	0	86	876	0	0	1048	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Total Split (s)	31.0		31.0	31.0	31.0		12.0	67.0			55.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Act Effct Green (s)	14.7		14.7	14.7	14.7		45.2	45.2			35.7	
Actuated g/C Ratio	0.19		0.19	0.19	0.19		0.57	0.57			0.45	
v/c Ratio	0.47		0.35	0.38	0.35		0.29	0.47			0.71	
Control Delay	44.5		40.1	40.1	39.7		14.2	13.5			24.5	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	44.5		40.1	40.1	39.7		14.2	13.5			24.5	
LOS	D		D	D	D		B	B			C	
Approach Delay		42.4			39.9			13.5			24.5	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	37		34	40	36		10	72			161	
Queue Length 95th (ft)	137		124	142	130		63	297			463	
Internal Link Dist (ft)		483			489			1683			2270	
Turn Bay Length (ft)	140			100			175					
Base Capacity (vph)	498		615	672	659		300	2646			2290	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.22		0.16	0.18	0.16		0.29	0.33			0.46	

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 79.4	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 56.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 20: US 1/Boston Post Rd & Richbell Rd/Old Boston Post Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	86	91	63	80	35	147	704	70	62	783	106
Future Volume (vph)	116	86	91	63	80	35	147	704	70	62	783	106
Satd. Flow (prot)	1770	1594	0	1652	1635	0	1745	3393	0	1668	3299	0
Flt Permitted	0.635			0.525			0.132			0.185		
Satd. Flow (perm)	1120	1594	0	894	1635	0	240	3393	0	323	3299	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	42		20	20		42	44		22	22		44
Confl. Bikes (#/hr)			6									6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	1%	6%	2%	1%	1%	1%	2%	2%	1%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	197	0	70	128	0	163	860	0	69	988	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		18.0	63.0		13.0	58.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	39.7	39.7		39.7	39.7		68.3	59.1		59.3	53.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.50	0.43		0.44	0.39	
v/c Ratio	0.40	0.42		0.27	0.27		0.69	0.58		0.34	0.77	
Control Delay	49.2	47.7		48.0	44.8		56.4	31.4		27.5	41.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.2	47.7		48.0	44.8		56.4	31.4		27.5	41.1	
LOS	D	D		D	D		E	C		C	D	
Approach Delay		48.3			45.9			35.4			40.2	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	104	161		54	99		76	303		31	396	
Queue Length 95th (ft)	181	252		108	168		118	371		55	483	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	326	464		260	476		269	1474		223	1285	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.42		0.27	0.27		0.61	0.58		0.31	0.77	

Intersection Summary

Cycle Length: 136

Actuated Cycle Length: 136

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Control Type: Actuated-Coordinated

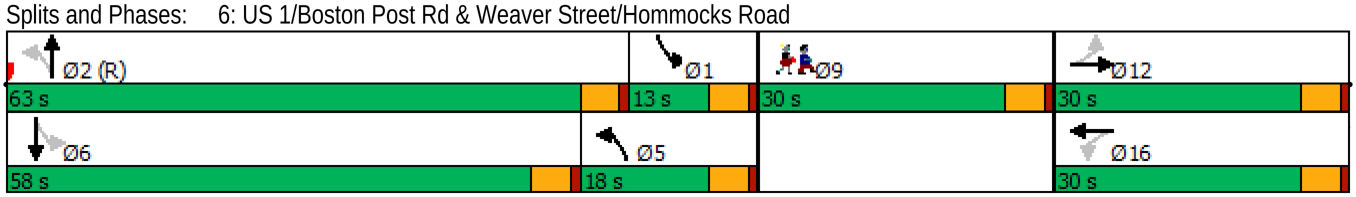
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 39.7 Intersection LOS: D

Intersection Capacity Utilization 64.8% ICU Level of Service C

Analysis Period (min) 15

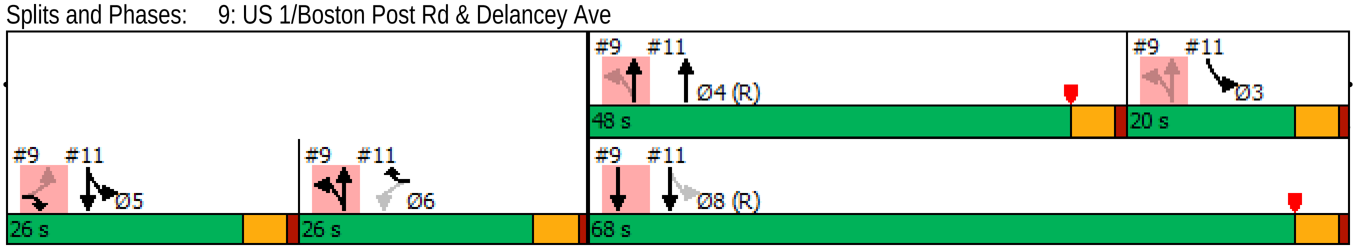
Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	14	62	96	888	934	25		
Future Volume (vph)	14	62	96	888	934	25		
Satd. Flow (prot)	1787	1583	0	3485	2991	0		
Flt Permitted	0.950			0.829				
Satd. Flow (perm)	1756	1583	0	2899	2991	0		
Satd. Flow (RTOR)		67						
Confl. Peds. (#/hr)	10		22			22		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Heavy Vehicles (%)	1%	2%	13%	2%	5%	4%		
Parking (#/hr)					5			
Shared Lane Traffic (%)								
Lane Group Flow (vph)	15	67	0	1058	1031	0		
Turn Type	Perm	Prot	custom	NA	NA			
Protected Phases		5	6	6 4	8		3	4
Permitted Phases	5		3 4	3				
Total Split (s)	26.0	26.0	26.0		68.0		20.0	48.0
Total Lost Time (s)	5.0	5.0			5.0			
Act Effct Green (s)	16.0	16.0		89.0	63.0			
Actuated g/C Ratio	0.13	0.13		0.74	0.52			
v/c Ratio	0.06	0.25		0.42	0.66			
Control Delay	43.4	12.5		1.2	23.2			
Queue Delay	0.0	0.0		0.4	0.5			
Total Delay	43.4	12.5		1.5	23.7			
LOS	D	B		A	C			
Approach Delay	18.1			1.5	23.7			
Approach LOS	B			A	C			
Queue Length 50th (ft)	10	0		20	293			
Queue Length 95th (ft)	30	40		20	367			
Internal Link Dist (ft)	246			90	543			
Turn Bay Length (ft)		70						
Base Capacity (vph)	307	332		2510	1570			
Starvation Cap Reductn	0	0		800	195			
Spillback Cap Reductn	0	3		0	145			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.05	0.20		0.62	0.75			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 69.8%	ICU Level of Service C
Analysis Period (min) 15	

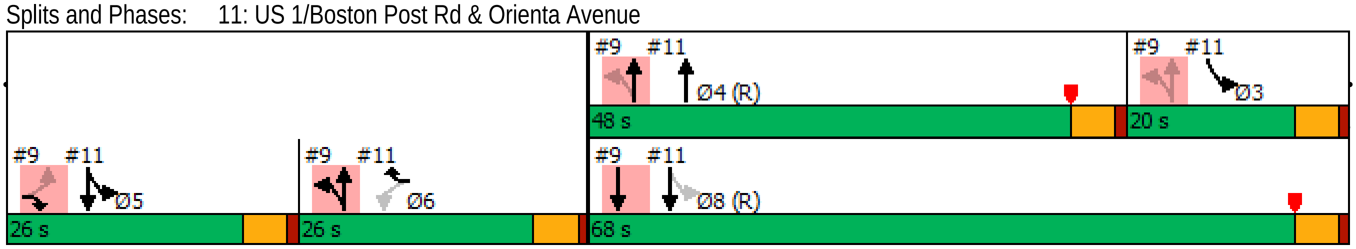
Splits and Phases: 9: US 1/Boston Post Rd & Delancey Ave



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø3	Ø5	Ø8
Lane Configurations									
Traffic Volume (vph)	73	243	741	144	217	774			
Future Volume (vph)	73	243	741	144	217	774			
Satd. Flow (prot)	1694	1487	3449	0	1710	1757			
Flt Permitted	0.950				0.146				
Satd. Flow (perm)	1648	1487	3449	0	263	1757			
Satd. Flow (RTOR)		261							
Confl. Peds. (#/hr)	16			14	14				
Confl. Bikes (#/hr)				2					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93			
Heavy Vehicles (%)	3%	5%	2%	3%	5%	4%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	78	261	952	0	233	832			
Turn Type	Perm	Prot	NA		custom	NA			
Protected Phases		6	4		3 5	5 8	3	5	8
Permitted Phases	6				8				
Total Split (s)	26.0	26.0	48.0				20.0	26.0	68.0
Total Lost Time (s)	5.0	5.0	5.0						
Act Effct Green (s)	26.0	26.0	43.0		84.0	84.0			
Actuated g/C Ratio	0.22	0.22	0.36		0.70	0.70			
v/c Ratio	0.22	0.50	0.77		0.38	0.68			
Control Delay	42.6	8.7	39.2		15.1	7.2			
Queue Delay	0.0	0.0	0.0		8.6	0.9			
Total Delay	42.6	8.7	39.2		23.6	8.0			
LOS	D	A	D		C	A			
Approach Delay	16.5		39.2			11.4			
Approach LOS	B		D			B			
Queue Length 50th (ft)	50	0	341		82	156			
Queue Length 95th (ft)	100	76	423		159	209			
Internal Link Dist (ft)	450		2270			90			
Turn Bay Length (ft)									
Base Capacity (vph)	356	526	1235		689	1303			
Starvation Cap Reductn	0	0	0		411	216			
Spillback Cap Reductn	0	0	0		0	0			
Storage Cap Reductn	0	0	0		0	0			
Reduced v/c Ratio	0.22	0.50	0.77		0.84	0.77			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 53.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 11: US 1/Boston Post Rd & Orienta Avenue

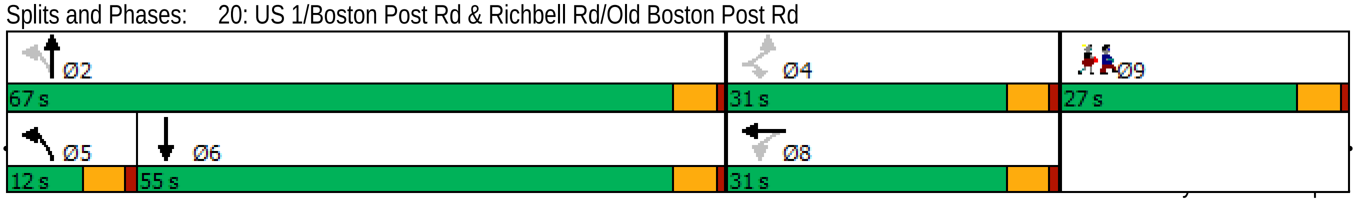


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	0	92	107	42	56	79	797	0	0	858	96
Future Volume (vph)	102	0	92	107	42	56	79	797	0	0	858	96
Satd. Flow (prot)	1787	0	1599	1728	1646	0	1728	3303	0	0	3277	0
Flt Permitted	0.687			0.950			0.136					
Satd. Flow (perm)	1239	0	1535	1678	1646	0	245	3303	0	0	3277	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	34		20	20		34	52					52
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	1%	1%	3%	1%	1%	2%	2%	2%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	0	101	118	108	0	87	876	0	0	1048	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Total Split (s)	31.0		31.0	31.0	31.0		12.0	67.0			55.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Act Effct Green (s)	15.1		15.1	15.1	15.1		45.4	45.4			35.9	
Actuated g/C Ratio	0.19		0.19	0.19	0.19		0.57	0.57			0.45	
v/c Ratio	0.48		0.35	0.37	0.35		0.30	0.47			0.71	
Control Delay	44.6		39.9	39.8	39.4		14.5	13.7			24.8	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	44.6		39.9	39.8	39.4		14.5	13.7			24.8	
LOS	D		D	D	D		B	B			C	
Approach Delay		42.4			39.6			13.8			24.8	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	39		34	40	37		11	74			163	
Queue Length 95th (ft)	141		124	142	131		65	301			467	
Internal Link Dist (ft)		483			489			1683			2270	
Turn Bay Length (ft)	140			100			175					
Base Capacity (vph)	493		611	668	655		298	2636			2278	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.23		0.17	0.18	0.16		0.29	0.33			0.46	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 23.3 Intersection LOS: C
Intersection Capacity Utilization 56.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 20: US 1/Boston Post Rd & Richbell Rd/Old Boston Post Rd

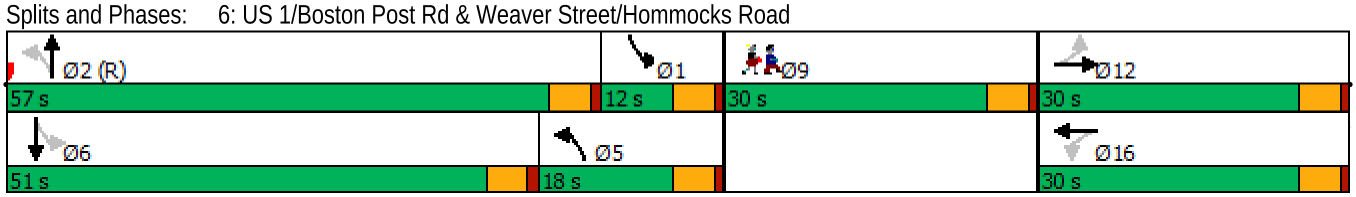


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	61	122	41	61	46	149	799	61	47	731	147
Future Volume (vph)	150	61	122	41	61	46	149	799	61	47	731	147
Satd. Flow (prot)	1787	1567	0	1668	1624	0	1745	3431	0	1668	3304	0
Flt Permitted	0.668			0.545			0.141			0.147		
Satd. Flow (perm)	1241	1567	0	930	1624	0	255	3431	0	255	3304	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	10		28	28		10	62		48	48		62
Confl. Bikes (#/hr)									4			10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	191	0	43	112	0	155	896	0	49	914	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		18.0	57.0		12.0	51.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	39.2	39.2		39.2	39.2		61.8	52.9		52.0	46.0	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.48	0.41		0.40	0.36	
v/c Ratio	0.41	0.40		0.15	0.23		0.63	0.64		0.29	0.78	
Control Delay	45.8	44.1		43.1	41.1		50.0	33.2		28.3	42.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	45.8	44.1		43.1	41.1		50.0	33.2		28.3	42.4	
LOS	D	D		D	D		D	C		C	D	
Approach Delay		44.9			41.7			35.6			41.7	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	120	146		30	81		71	314		21	355	
Queue Length 95th (ft)	202	232		68	141		113	387		43	438	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	377	476		282	493		276	1407		181	1178	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.41	0.40		0.15	0.23		0.56	0.64		0.27	0.78	

Intersection Summary

Cycle Length: 129
Actuated Cycle Length: 129
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 39.6 Intersection LOS: D
Intersection Capacity Utilization 66.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road

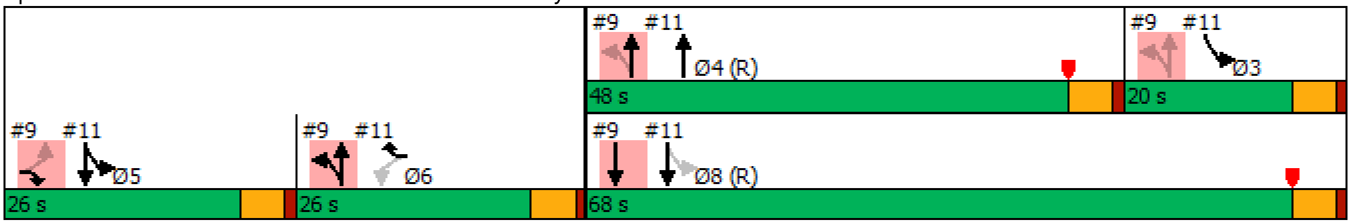


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	18	65	44	970	840	25		
Future Volume (vph)	18	65	44	970	840	25		
Satd. Flow (prot)	1787	1599	0	3567	3051	0		
Flt Permitted	0.950			0.955				
Satd. Flow (perm)	1714	1599	0	3410	3051	0		
Satd. Flow (RTOR)		68						
Confl. Peds. (#/hr)	24		32					
Confl. Bikes (#/hr)						14		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles (%)	1%	1%	1%	1%	3%	4%		
Parking (#/hr)					5			
Shared Lane Traffic (%)								
Lane Group Flow (vph)	19	68	0	1067	910	0		
Turn Type	Perm	Prot	custom	NA	NA			
Protected Phases		5	6	6 4	8		3	4
Permitted Phases	5		3 4	3				
Total Split (s)	26.0	26.0	26.0		68.0		20.0	48.0
Total Lost Time (s)	5.0	5.0			5.0			
Act Effct Green (s)	14.5	14.5		90.5	63.0			
Actuated g/C Ratio	0.12	0.12		0.75	0.52			
v/c Ratio	0.09	0.27		0.40	0.57			
Control Delay	45.3	13.0		0.9	21.0			
Queue Delay	0.0	0.0		0.5	0.2			
Total Delay	45.3	13.0		1.3	21.2			
LOS	D	B		A	C			
Approach Delay	20.1			1.3	21.2			
Approach LOS	C			A	C			
Queue Length 50th (ft)	13	0		12	242			
Queue Length 95th (ft)	35	40		13	304			
Internal Link Dist (ft)	246			90	543			
Turn Bay Length (ft)		70						
Base Capacity (vph)	299	335		2669	1601			
Starvation Cap Reductn	0	0		1015	0			
Spillback Cap Reductn	0	2		0	137			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.06	0.20		0.65	0.62			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 10.9 Intersection LOS: B
Intersection Capacity Utilization 67.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 9: US 1/Boston Post Rd & Delancey Ave

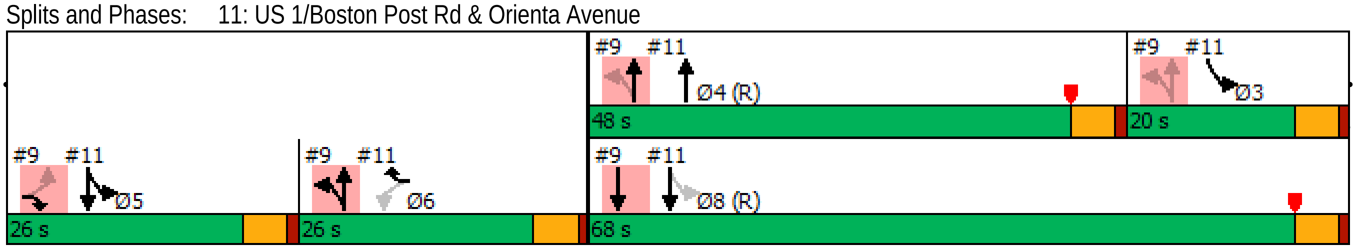


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø3	Ø5	Ø8
Lane Configurations									
Traffic Volume (vph)	51	157	857	131	192	713			
Future Volume (vph)	51	157	857	131	192	713			
Satd. Flow (prot)	1711	1516	3497	0	1710	1809			
Flt Permitted	0.950				0.111				
Satd. Flow (perm)	1687	1516	3497	0	200	1809			
Satd. Flow (RTOR)		165	16						
Confl. Peds. (#/hr)	8			22	22				
Confl. Bikes (#/hr)				6					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Heavy Vehicles (%)	2%	3%	1%	1%	5%	1%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	54	165	1040	0	202	751			
Turn Type	Perm	Prot	NA		custom	NA			
Protected Phases		6	4		3 5	5 8	3	5	8
Permitted Phases	6				8				
Total Split (s)	26.0	26.0	48.0				20.0	26.0	68.0
Total Lost Time (s)	5.0	5.0	5.0						
Act Effct Green (s)	27.5	27.5	43.0		82.5	82.5			
Actuated g/C Ratio	0.23	0.23	0.36		0.69	0.69			
v/c Ratio	0.14	0.35	0.82		0.35	0.60			
Control Delay	40.4	8.5	41.1		17.6	5.5			
Queue Delay	0.0	0.0	0.0		2.5	0.4			
Total Delay	40.4	8.5	41.1		20.1	5.9			
LOS	D	A	D		C	A			
Approach Delay	16.4		41.1			8.9			
Approach LOS	B		D			A			
Queue Length 50th (ft)	33	0	377		75	115			
Queue Length 95th (ft)	74	60	465		148	150			
Internal Link Dist (ft)	450		2270			90			
Turn Bay Length (ft)									
Base Capacity (vph)	386	474	1263		664	1341			
Starvation Cap Reductn	0	0	0		343	205			
Spillback Cap Reductn	0	0	0		0	0			
Storage Cap Reductn	0	0	0		0	0			
Reduced v/c Ratio	0.14	0.35	0.82		0.63	0.66			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 24.8 Intersection LOS: C
Intersection Capacity Utilization 54.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: US 1/Boston Post Rd & Orienta Avenue

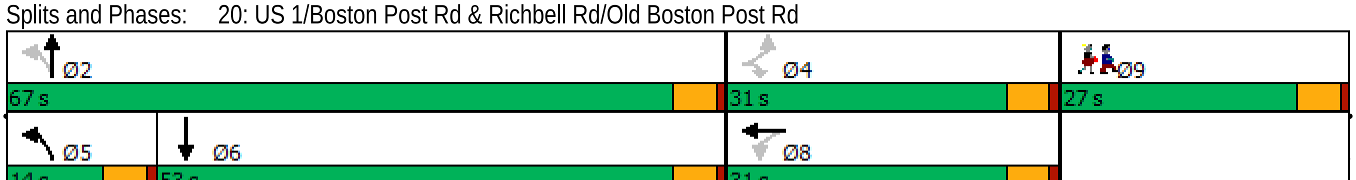


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	0	122	106	56	71	86	838	0	0	729	102
Future Volume (vph)	116	0	122	106	56	71	86	838	0	0	729	102
Satd. Flow (prot)	1787	0	1568	1728	1654	0	1728	3336	0	0	3361	0
Flt Permitted	0.669			0.950			0.172					
Satd. Flow (perm)	1230	0	1531	1708	1654	0	310	3336	0	0	3361	0
Satd. Flow (RTOR)			128		46						14	
Confl. Peds. (#/hr)	20		8	8		20	38					38
Confl. Bikes (#/hr)									10			10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	3%	1%	4%	2%	1%	1%	2%	2%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	0	128	112	134	0	91	882	0	0	874	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Total Split (s)	31.0		31.0	31.0	31.0		14.0	67.0			53.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Act Effct Green (s)	16.0		16.0	16.0	16.0		41.0	41.0			30.4	
Actuated g/C Ratio	0.21		0.21	0.21	0.21		0.53	0.53			0.40	
v/c Ratio	0.48		0.30	0.31	0.35		0.27	0.49			0.65	
Control Delay	41.8		9.7	36.3	26.8		14.7	14.8			24.8	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	41.8		9.7	36.3	26.8		14.7	14.8			24.8	
LOS	D		A	D	C		B	B			C	
Approach Delay		25.3			31.1			14.8			24.8	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	39		0	35	27		12	75			131	
Queue Length 95th (ft)	152		52	133	120		69	311			375	
Internal Link Dist (ft)		483			489			1683			2270	
Turn Bay Length (ft)			140	100			175					
Base Capacity (vph)	524		726	728	731		374	2707			2356	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.23		0.18	0.15	0.18		0.24	0.33			0.37	

Intersection Summary

Cycle Length: 125
Actuated Cycle Length: 76.7
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 21.4 Intersection LOS: C
Intersection Capacity Utilization 60.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 20: US 1/Boston Post Rd & Richbell Rd/Old Boston Post Rd

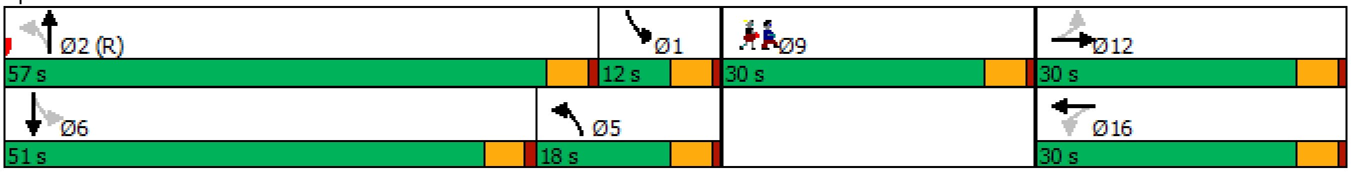


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	64	122	52	64	46	149	799	74	48	731	147
Future Volume (vph)	150	64	122	52	64	46	149	799	74	48	731	147
Satd. Flow (prot)	1787	1572	0	1668	1627	0	1745	3420	0	1668	3304	0
Flt Permitted	0.663			0.541			0.141			0.141		
Satd. Flow (perm)	1231	1572	0	923	1627	0	255	3420	0	244	3304	0
Satd. Flow (RTOR)												
Confl. Peds. (#/hr)	10		28	28		10	62		48	48		62
Confl. Bikes (#/hr)									4			10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	194	0	54	115	0	155	909	0	50	914	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		12			16		5	2		1	6	
Permitted Phases	12			16			2			6		
Total Split (s)	30.0	30.0		30.0	30.0		18.0	57.0		12.0	51.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	39.2	39.2		39.2	39.2		61.8	52.9		52.0	46.0	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.48	0.41		0.40	0.36	
v/c Ratio	0.42	0.41		0.19	0.23		0.63	0.65		0.30	0.78	
Control Delay	45.9	44.2		43.6	41.2		50.0	33.5		29.3	42.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	45.9	44.2		43.6	41.2		50.0	33.5		29.3	42.4	
LOS	D	D		D	D		D	C		C	D	
Approach Delay		45.0			42.0			35.9			41.7	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	120	149		39	83		71	321		22	355	
Queue Length 95th (ft)	#202	236		81	144		113	395		44	438	
Internal Link Dist (ft)		190			209			263			1683	
Turn Bay Length (ft)	145			150			180			140		
Base Capacity (vph)	374	478		280	494		276	1402		177	1178	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.41		0.19	0.23		0.56	0.65		0.28	0.78	

Intersection Summary

Cycle Length: 129
Actuated Cycle Length: 129
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 39.8 Intersection LOS: D
Intersection Capacity Utilization 66.5% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

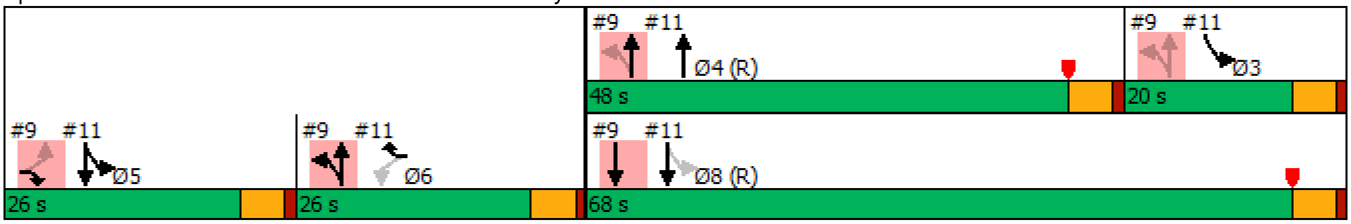
Splits and Phases: 6: US 1/Boston Post Rd & Weaver Street/Hommocks Road



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4
Lane Configurations								
Traffic Volume (vph)	18	68	46	978	850	25		
Future Volume (vph)	18	68	46	978	850	25		
Satd. Flow (prot)	1787	1599	0	3567	3051	0		
Flt Permitted	0.950			0.955				
Satd. Flow (perm)	1714	1599	0	3410	3051	0		
Satd. Flow (RTOR)		72						
Confl. Peds. (#/hr)	24		32					
Confl. Bikes (#/hr)						14		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles (%)	1%	1%	1%	1%	3%	4%		
Parking (#/hr)					5			
Shared Lane Traffic (%)								
Lane Group Flow (vph)	19	72	0	1077	921	0		
Turn Type	Perm	Prot	custom	NA	NA			
Protected Phases		5	6	6 4	8		3	4
Permitted Phases	5		3 4	3				
Total Split (s)	26.0	26.0	26.0		68.0		20.0	48.0
Total Lost Time (s)	5.0	5.0			5.0			
Act Effct Green (s)	14.8	14.8		90.2	63.0			
Actuated g/C Ratio	0.12	0.12		0.75	0.52			
v/c Ratio	0.09	0.28		0.40	0.58			
Control Delay	45.2	12.7		0.9	21.2			
Queue Delay	0.0	0.0		0.5	0.2			
Total Delay	45.2	12.8		1.4	21.4			
LOS	D	B		A	C			
Approach Delay	19.5			1.4	21.4			
Approach LOS	B			A	C			
Queue Length 50th (ft)	13	0		13	245			
Queue Length 95th (ft)	35	41		14	310			
Internal Link Dist (ft)	246			90	543			
Turn Bay Length (ft)		70						
Base Capacity (vph)	299	339		2662	1601			
Starvation Cap Reductn	0	0		1002	0			
Spillback Cap Reductn	0	3		0	174			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.06	0.21		0.65	0.65			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 11.0	Intersection LOS: B
Intersection Capacity Utilization 68.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: US 1/Boston Post Rd & Delancey Ave



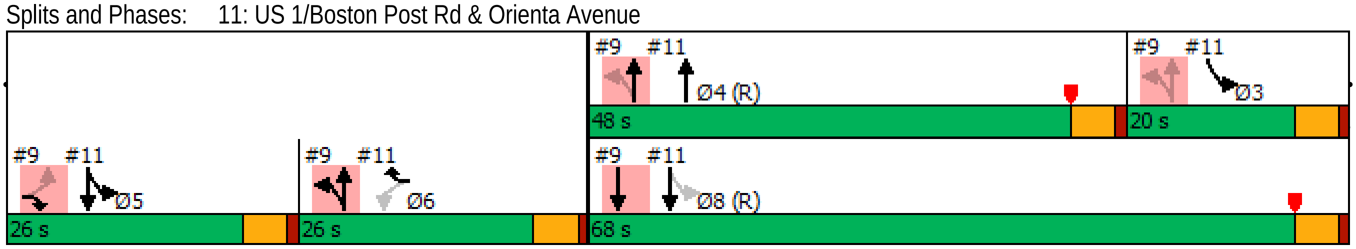
Build | Saturday Peak Hour
11: US 1/Boston Post Rd & Orienta Avenue | 08/22/2018

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø3	Ø5	Ø8
Lane Configurations									
Traffic Volume (vph)	51	168	857	133	206	713			
Future Volume (vph)	51	168	857	133	206	713			
Satd. Flow (prot)	1711	1516	3496	0	1710	1809			
Flt Permitted	0.950				0.110				
Satd. Flow (perm)	1687	1516	3496	0	198	1809			
Satd. Flow (RTOR)		177	16						
Confl. Peds. (#/hr)	8			22	22				
Confl. Bikes (#/hr)				6					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Heavy Vehicles (%)	2%	3%	1%	1%	5%	1%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	54	177	1042	0	217	751			
Turn Type	Perm	Prot	NA		custom	NA			
Protected Phases		6	4		3 5	5 8	3	5	8
Permitted Phases	6				8				
Total Split (s)	26.0	26.0	48.0				20.0	26.0	68.0
Total Lost Time (s)	5.0	5.0	5.0						
Act Effct Green (s)	27.2	27.2	43.0		82.8	82.8			
Actuated g/C Ratio	0.23	0.23	0.36		0.69	0.69			
v/c Ratio	0.14	0.37	0.83		0.38	0.60			
Control Delay	40.5	8.4	41.2		18.7	5.4			
Queue Delay	0.0	0.0	0.0		2.7	0.4			
Total Delay	40.5	8.4	41.2		21.4	5.8			
LOS	D	A	D		C	A			
Approach Delay	15.9		41.2			9.3			
Approach LOS	B		D			A			
Queue Length 50th (ft)	33	0	378		87	108			
Queue Length 95th (ft)	75	62	467		164	140			
Internal Link Dist (ft)	450		2270			90			
Turn Bay Length (ft)									
Base Capacity (vph)	383	481	1263		663	1341			
Starvation Cap Reductn	0	0	0		333	204			
Spillback Cap Reductn	0	0	0		0	0			
Storage Cap Reductn	0	0	0		0	0			
Reduced v/c Ratio	0.14	0.37	0.83		0.66	0.66			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 69 (58%), Referenced to phase 4:NBTL and 8:SBT, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 24.8 | Intersection LOS: C
Intersection Capacity Utilization 55.5% | ICU Level of Service B
Analysis Period (min) 15

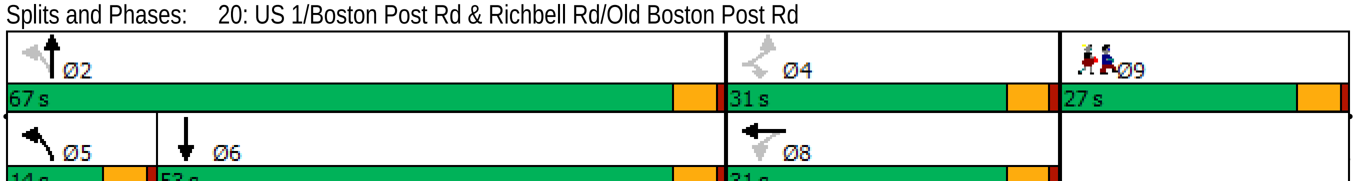
Splits and Phases: 11: US 1/Boston Post Rd & Orienta Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	0	123	106	57	71	88	839	0	0	729	102
Future Volume (vph)	119	0	123	106	57	71	88	839	0	0	729	102
Satd. Flow (prot)	1787	0	1568	1728	1655	0	1728	3336	0	0	3361	0
Flt Permitted	0.667			0.950			0.171					
Satd. Flow (perm)	1226	0	1531	1708	1655	0	308	3336	0	0	3361	0
Satd. Flow (RTOR)			129		45						14	
Confl. Peds. (#/hr)	20		8	8		20	38					38
Confl. Bikes (#/hr)									10			10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	3%	1%	4%	2%	1%	1%	2%	2%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	0	129	112	135	0	93	883	0	0	874	0
Turn Type	Perm		Perm	Perm	NA		pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases	4		4	8			2					
Total Split (s)	31.0		31.0	31.0	31.0		14.0	67.0			53.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0		5.0	5.0			5.0	
Act Effct Green (s)	16.2		16.2	16.2	16.2		41.2	41.2			30.4	
Actuated g/C Ratio	0.21		0.21	0.21	0.21		0.54	0.54			0.39	
v/c Ratio	0.48		0.30	0.31	0.35		0.27	0.50			0.65	
Control Delay	42.1		9.6	36.2	27.0		14.8	14.9			24.9	
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	42.1		9.6	36.2	27.0		14.8	14.9			24.9	
LOS	D		A	D	C		B	B			C	
Approach Delay		25.6			31.2			14.9			24.9	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	40		0	35	28		12	76			132	
Queue Length 95th (ft)	155		52	133	123		70	311			375	
Internal Link Dist (ft)		483			489			1683			2270	
Turn Bay Length (ft)			140	100			175					
Base Capacity (vph)	520		723	724	727		373	2705			2347	
Starvation Cap Reductn	0		0	0	0		0	0			0	
Spillback Cap Reductn	0		0	0	0		0	0			0	
Storage Cap Reductn	0		0	0	0		0	0			0	
Reduced v/c Ratio	0.24		0.18	0.15	0.19		0.25	0.33			0.37	

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 77	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 21.5	Intersection LOS: C
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 20: US 1/Boston Post Rd & Richbell Rd/Old Boston Post Rd



Kimley»Horn
of New York, P.C.

FEIS Chapter M Appendix Response to Comment M18 Surrounding Street Truck Activity

Comment M.18

Traffic Databank

716 S Sixth Ave
Mount Vernon, NY 10550

Site Code:
Station ID:
SB BOSTON POST RD S OF ORIENTA AVE
MAMARONECK,NY
Latitude: 0' 0.0000 Undefined

SB

Start Time	Motor	Cars Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Doubl	5 Axle Doubl	>6 Axl Doubl	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycl	Not Class	Total	
03/10/16	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
06:00	0	126	37	2	2	0	0	2	1	0	1	0	0	0	0	171	
07:00	0	498	148	3	17	0	0	6	0	0	0	0	0	1	0	673	
08:00	0	431	127	1	14	0	0	6	0	0	0	0	0	0	0	579	
09:00	0	424	125	1	13	0	0	2	0	0	0	0	0	1	0	566	
10:00	0	403	119	0	16	0	0	7	0	0	0	0	0	0	0	545	
11:00	0	459	137	1	21	0	0	6	0	0	0	0	0	0	0	624	27
12 PM	0	426	127	1	13	0	0	9	0	0	0	0	0	1	0	577	
13:00	0	418	124	2	17	0	0	6	0	0	0	0	0	0	0	567	
14:00	0	501	149	4	18	0	0	10	1	0	0	0	0	0	0	683	
15:00	0	475	142	0	16	0	0	8	0	0	0	0	0	0	0	641	
16:00	0	690	206	1	24	0	0	10	0	0	0	0	0	0	0	931	
17:00	0	609	181	1	22	0	0	14	0	0	0	1	0	0	0	828	37
18:00	0	453	135	0	12	0	0	12	0	0	1	0	0	1	0	614	
19:00	0	344	102	0	14	0	0	4	0	0	0	0	0	1	0	465	
20:00	0	232	69	0	5	0	0	5	0	0	0	0	0	0	0	311	
21:00	0	164	48	0	4	0	0	3	0	0	0	0	0	0	0	219	
22:00	0	102	30	0	0	0	0	1	0	0	0	0	0	0	0	133	
23:00	0	52	15	0	0	0	0	0	0	0	0	0	0	0	0	67	
Total	0	6807	2021	17	228	0	0	111	2	0	2	1	0	5	0	9194	
Percent	0.0%	74.0%	22.0%	0.2%	2.5%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%		

Comment M.18

Traffic Databank

716 S Sixth Ave
Mount Vernon, NY 10550

Site Code:
Station ID:
NB BOSTON POST RD S OF ORIENTA AVE
MAMARONECK,NY
Latitude: 0' 0.0000 Undefined

NB

Start Time	Motor	Cars Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Doubl	5 Axle Doubl	>6 Axl Doubl	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycl	Not Class	Total	
03/10/1 6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
06:00	0	156	60	0	6	0	0	5	0	0	0	0	0	0	0	227	
07:00	0	355	136	0	16	0	0	12	1	1	0	0	0	0	0	521	
08:00	0	530	203	0	21	0	0	16	0	0	1	0	0	0	0	771	
09:00	0	427	164	0	20	0	0	10	0	1	0	0	0	0	0	622	
10:00	0	409	156	0	19	0	0	15	0	0	0	0	0	1	0	600	
11:00	0	497	191	0	21	0	0	16	0	1	0	0	0	0	0	726	38
12 PM	0	461	176	0	18	0	0	11	0	0	0	0	0	1	0	667	
13:00	0	467	180	0	17	0	0	14	0	0	1	0	0	0	0	679	
14:00	0	511	195	0	21	0	0	16	0	0	0	0	0	0	0	743	
15:00	0	589	226	0	25	0	0	17	1	0	3	0	0	1	0	862	
16:00	0	539	205	0	20	0	0	17	0	0	0	1	0	0	0	782	
17:00	0	523	199	0	23	0	0	15	0	1	0	0	0	0	0	761	39
18:00	0	481	183	0	17	0	0	13	0	0	0	0	1	0	0	695	
19:00	0	387	148	0	20	0	0	12	0	0	1	0	0	0	0	568	
20:00	0	270	102	0	12	0	0	9	1	1	1	0	0	1	0	397	
21:00	0	219	84	0	8	0	0	8	0	0	0	1	0	0	0	320	
22:00	0	151	58	0	4	0	0	4	1	1	1	0	0	0	0	220	
23:00	0	80	31	0	4	0	0	3	0	0	0	0	0	0	0	118	
Total	0	7052	2697	0	292	0	0	213	4	6	8	2	1	4	0	10279	
Percent	0.0%	68.6%	26.2%	0.0%	2.8%	0.0%	0.0%	2.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%		

Comment M.18

Traffic Databank

716 S Sixth Ave
Mount Vernon, NY 10550

Site Code:
Station ID:
SB BOSTON POST RD S OF ORIENTA AVE
MAMARONECK,NY
Latitude: 0' 0.0000 Undefined

SB

Start Time	Motor	Cars Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Doubl	5 Axle Doubl	>6 Axl Doubl	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycl	Not Class	Total	
03/11/16	0	25	8	0	0	0	0	0	0	0	0	0	0	0	0	33	
01:00	0	11	3	0	0	0	0	0	0	0	0	0	0	0	0	14	
02:00	0	8	3	0	0	0	0	0	0	0	0	0	0	0	0	11	
03:00	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	7	
04:00	0	23	7	0	0	0	0	0	0	0	0	0	0	0	0	30	
05:00	0	64	20	0	0	0	0	1	1	0	0	0	0	0	0	86	
06:00	0	129	39	1	2	0	0	3	0	0	0	0	0	0	0	174	
07:00	0	527	157	6	20	0	0	12	0	0	0	0	0	0	0	722	
08:00	0	439	130	1	18	0	0	9	0	0	1	0	0	0	0	598	
09:00	0	403	119	1	13	0	0	8	0	0	0	0	0	0	0	544	
10:00	0	430	128	1	15	0	0	7	0	0	0	0	0	1	0	582	
11:00	0	494	147	0	21	0	0	12	1	0	0	0	0	1	0	676	35
12 PM	0	499	148	1	21	0	0	10	0	0	1	0	0	0	0	680	
13:00	0	501	148	1	18	0	0	10	0	0	0	1	0	0	0	679	
14:00	0	490	146	0	16	0	0	6	0	0	0	0	0	0	0	658	
15:00	0	504	149	3	17	0	0	5	0	0	0	0	0	0	0	678	
16:00	0	564	168	2	17	0	0	8	0	0	0	0	0	1	0	760	
17:00	0	628	187	0	26	0	0	11	0	0	0	0	0	0	0	852	37
18:00	0	542	161	0	13	0	0	6	0	0	0	0	0	1	0	723	
19:00	0	356	106	0	16	0	0	5	1	0	0	0	0	0	0	484	
20:00	0	241	72	0	9	0	0	4	0	0	0	0	0	0	0	326	
21:00	0	191	56	0	6	0	0	2	0	0	0	0	0	0	0	255	
22:00	0	156	46	0	1	0	0	0	0	0	0	0	0	0	0	203	
23:00	0	96	28	0	0	0	0	0	0	0	0	0	0	0	0	124	
Total	0	7327	2177	17	249	0	0	119	3	0	2	1	0	4	0	9899	
Percent	0.0%	74.0%	22.0%	0.2%	2.5%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		

Comment M.18

Traffic Databank

716 S Sixth Ave
Mount Vernon, NY 10550

Site Code:
Station ID:
NB BOSTON POST RD S OF ORIENTA AVE
MAMARONECK,NY
Latitude: 0' 0.0000 Undefined

NB

Start Time	Motor	Cars Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Doubl	5 Axle Doubl	>6 Axl Doubl	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Bicycl	Not Class	Total	
03/11/1																	
6	0	37	15	0	1	0	0	0	0	0	0	0	0	0	0	53	
01:00	0	18	7	0	0	0	0	0	0	0	0	0	0	0	0	25	
02:00	0	9	4	0	0	0	0	0	0	0	0	0	0	0	0	13	
03:00	0	13	3	0	0	0	0	0	0	0	0	0	0	0	0	16	
04:00	0	16	7	0	0	0	0	0	0	0	0	0	0	0	0	23	
05:00	0	42	17	0	2	0	0	0	0	0	0	0	0	0	0	61	
06:00	0	146	56	0	6	0	0	3	0	0	0	0	0	0	0	211	
07:00	0	451	173	0	19	0	0	12	1	0	0	0	0	0	0	656	
08:00	0	529	202	0	22	0	0	17	0	0	0	0	0	0	0	770	
09:00	0	458	175	0	18	0	0	12	0	0	0	0	0	0	0	663	
10:00	0	415	158	0	18	0	0	12	1	1	2	0	0	1	0	608	
11:00	0	481	183	0	23	0	0	14	0	0	0	1	0	0	0	702	38
12 PM	0	513	196	0	18	0	0	14	1	0	0	0	0	1	0	743	
13:00	0	498	191	0	22	0	0	13	0	0	0	0	0	0	0	724	
14:00	0	495	189	0	21	0	0	16	0	1	0	0	0	0	0	722	
15:00	0	627	239	0	23	0	0	16	0	0	2	0	0	0	0	907	
16:00	0	593	226	0	22	0	0	19	1	0	1	1	1	0	0	864	
17:00	0	555	212	0	21	0	0	13	0	2	0	2	0	0	0	805	38
18:00	0	503	193	0	21	0	0	16	0	0	0	0	0	0	0	733	
19:00	0	422	161	0	17	0	0	14	0	1	0	0	0	0	0	615	
20:00	0	279	107	0	14	0	0	5	0	0	1	0	0	0	0	406	
21:00	0	242	92	0	11	0	0	5	0	0	0	0	0	0	0	350	
22:00	0	168	64	0	7	0	0	5	0	0	0	0	0	0	0	244	
23:00	0	108	41	0	4	0	0	2	1	0	0	0	0	0	0	156	
Total	0	7618	2911	0	310	0	0	208	5	5	6	4	1	2	0	11070	
Percent	0.0%	68.8%	26.3%	0.0%	2.8%	0.0%	0.0%	1.9%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%		

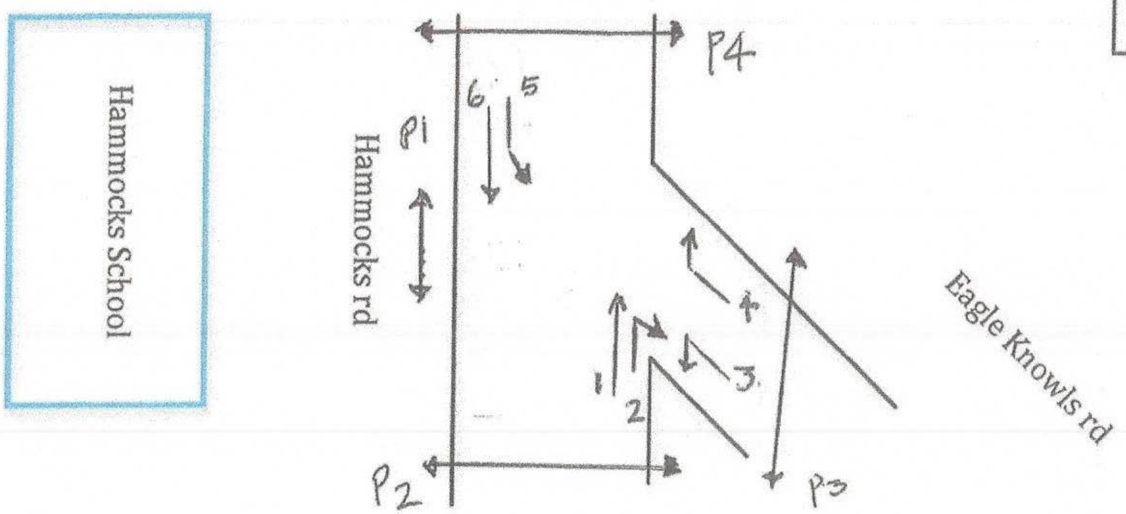
Job Title: Mamaroneck Project **Weather:** cloudy
Location: Mamaroneck ny **Field Tech:**
Date: 3 /15/ 2016 Tuesday DAY# 1

TDC
TRAFFIC DATA COLLECTIONS
914-302-6326 fax-914-629-6815 cell

Comment M.18

TIME	1 C	1 T	1 SB	1 PB	1 B	2 C	2 T	2 SB	2 PB	2 B	3 C	3 T	3 SB	3 PB	3 B	4 C	4 T	4 SB	4 PB	4 B	5 C	5 T	5 SB	5 PB	5 B	6 C	6 T	6 SB	6 PB	6 B	P 1	P 2	P 3	P 4
7-7:15p																1					3					1	1						1	
7:30		1														2					1													
7:45	3															15					3									~~8~~	5	1		3
8:00	3				3						1					48				4	17					3								
8:15	4										1					12				2	3					3								
8:30	2															2					4				1	1								2
8:45	4															5					5					3								2
9:00	4															4					3					3								
9:15	6															1					2					2								

KEY:
C=cars
T=truck 3+axle
SB= school bus
PB=Public trans
B=Bicycle



This intersection is not signalized

Kimley-Horn of New York, P.C.

FEIS Chapter M Appendix

Response to Comment M34

Vicinity Development Traffic

Hampshire Vicinity Developments

EXHIBIT 3M-8.1

Project Site

Project Site

Vicinity Developments

1 690 Mamaroneck Ave (21units)

2 270 Waverly Ave (96 units)

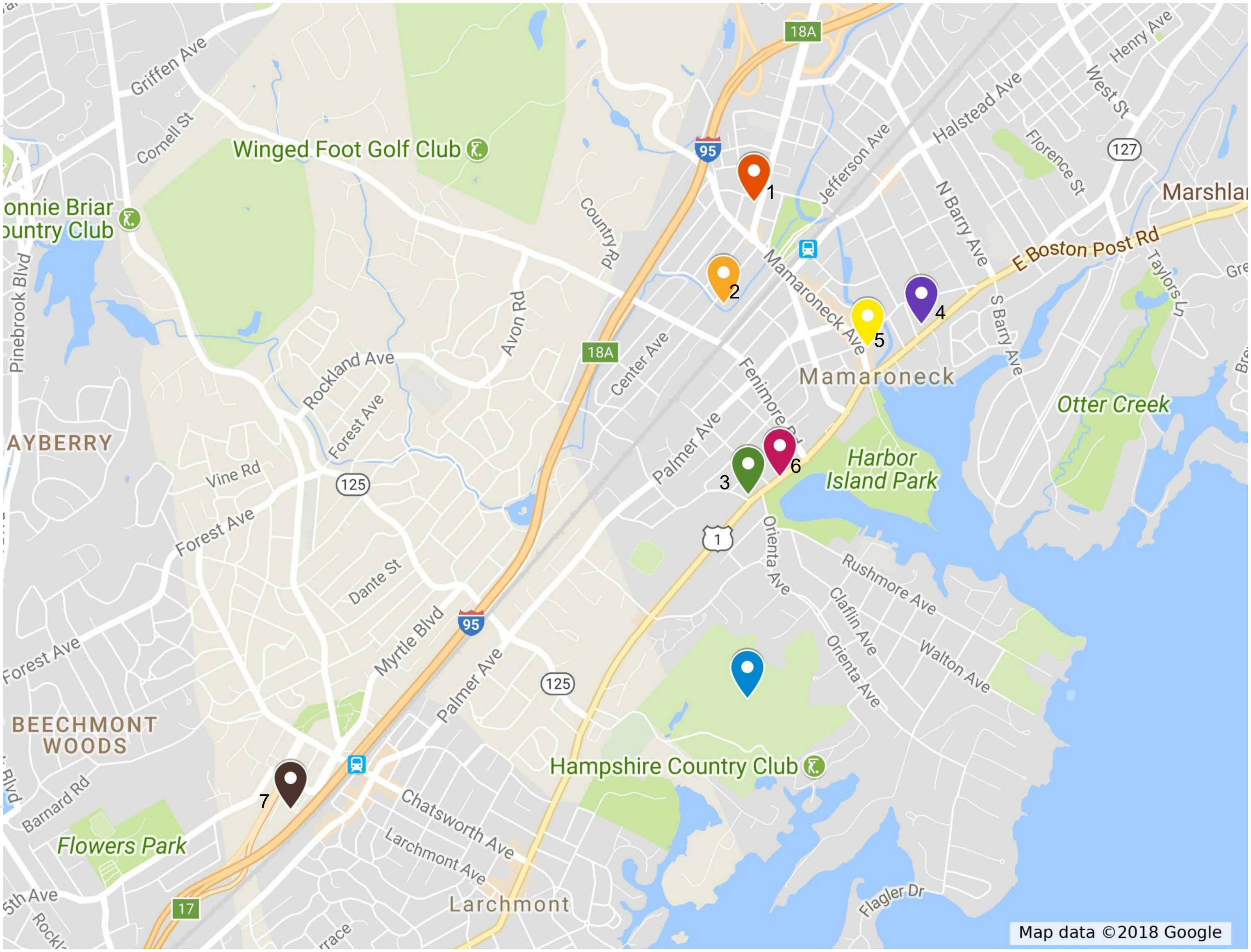
3 620 W Boston Post Rd (6 units)

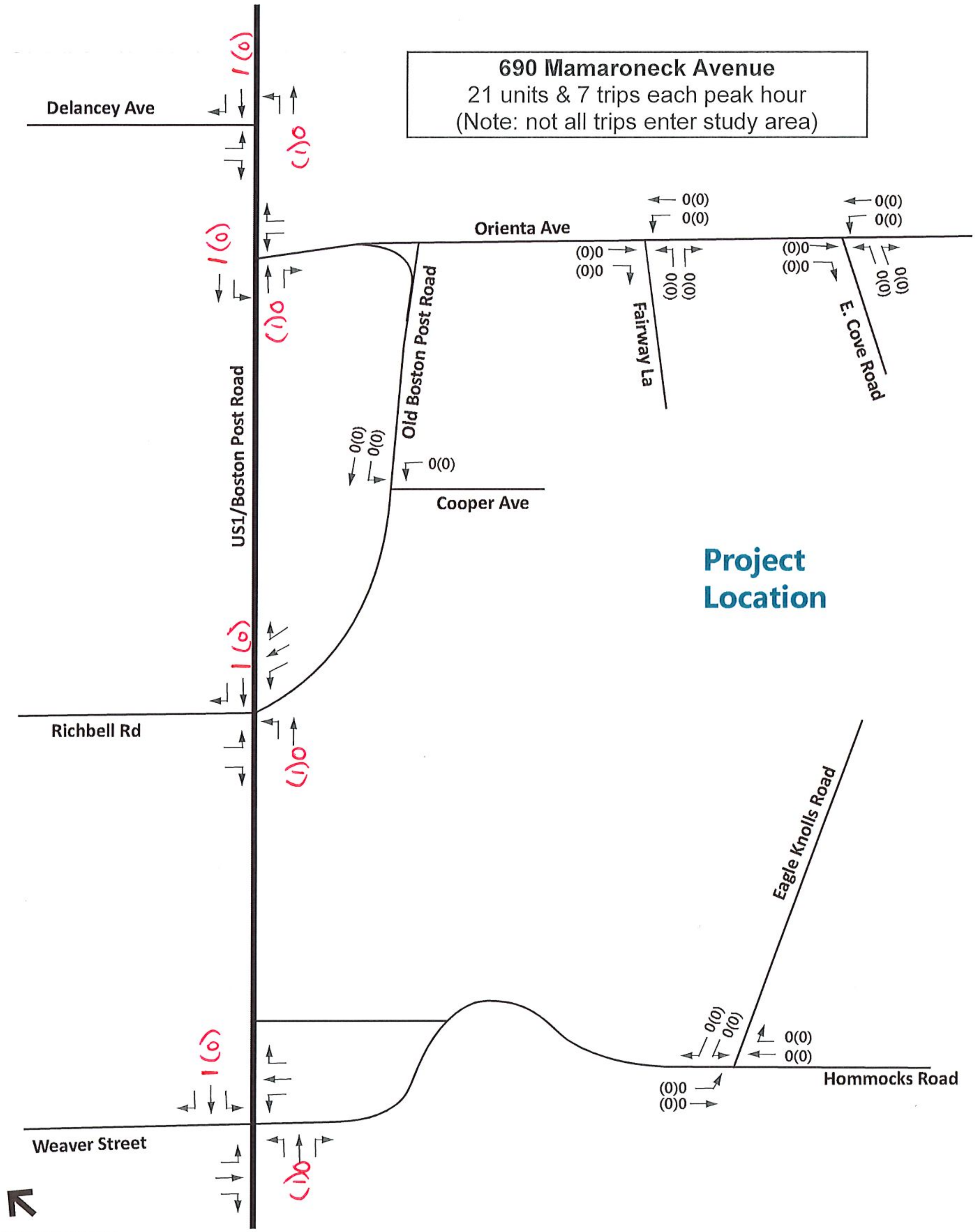
4 422 E Boston Post Rd (13 units)

5 151 Mamaroneck Ave (10 units)

6 532 W Boston Post Rd (7 units)

7 The Cambium (149 units)



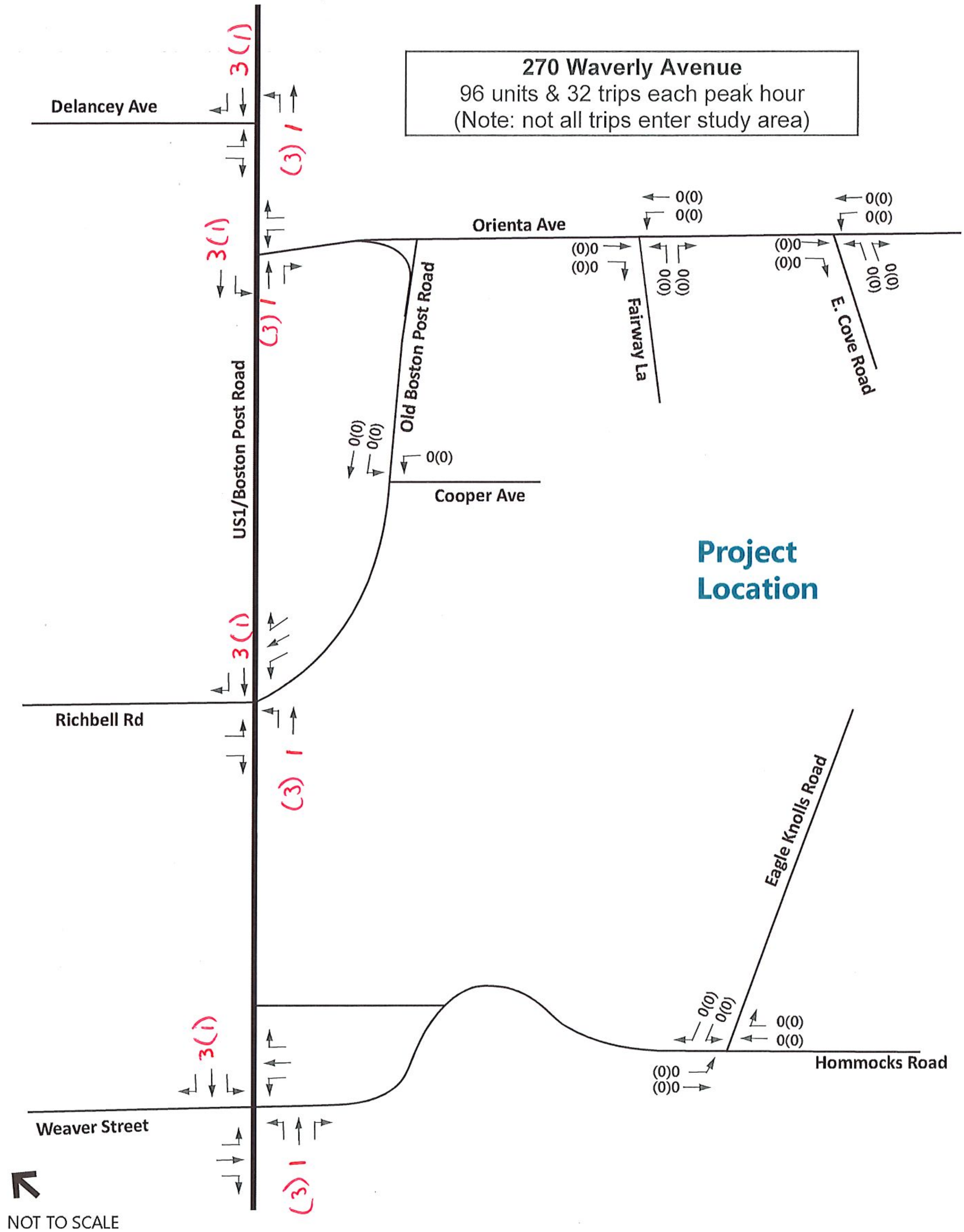


NOT TO SCALE

00= AM Peak Hour

(00)=PM Peak Hour

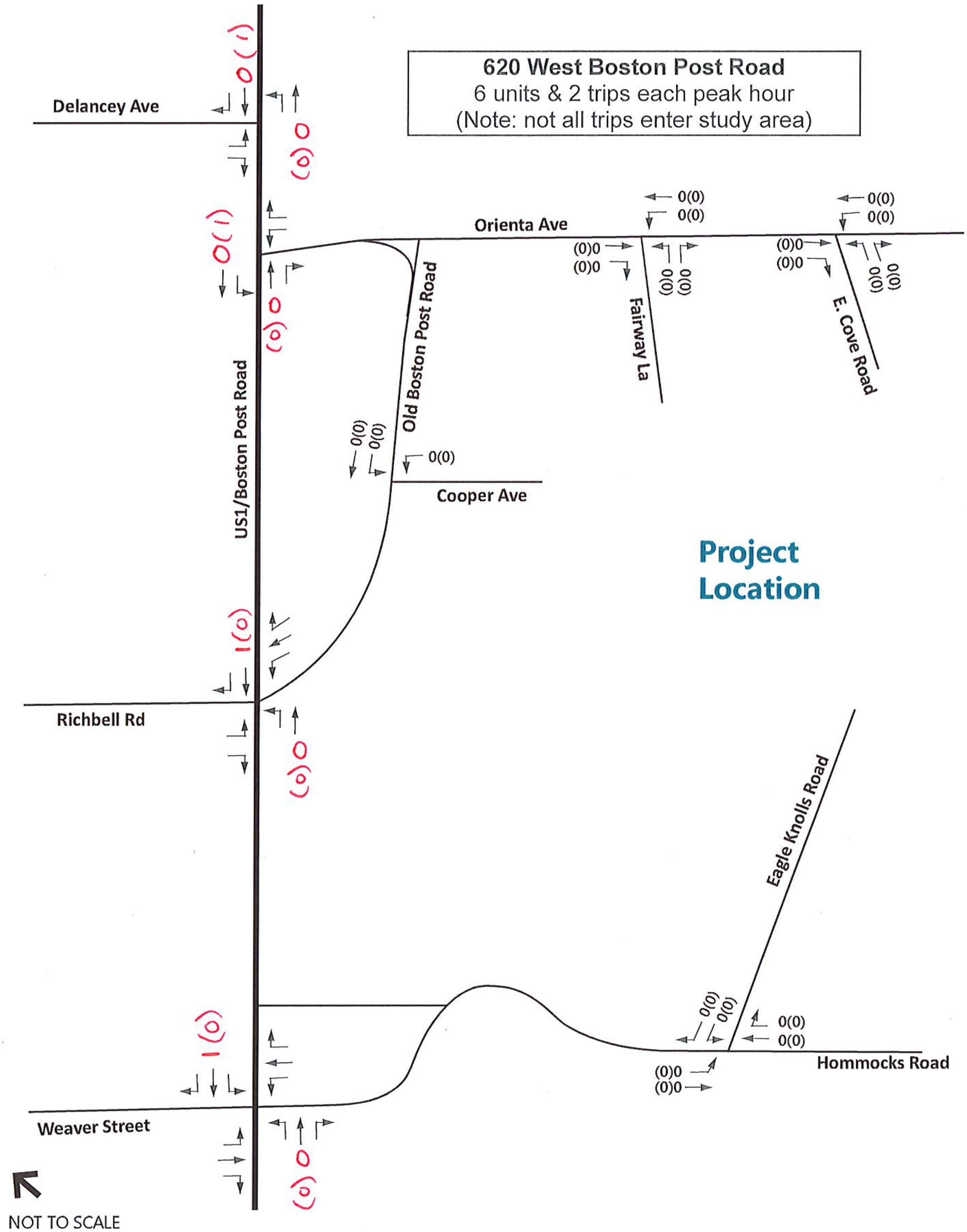
Vicinity Development Weekday Hour Volumes



00= AM Peak Hour

(00)=PM Peak Hour

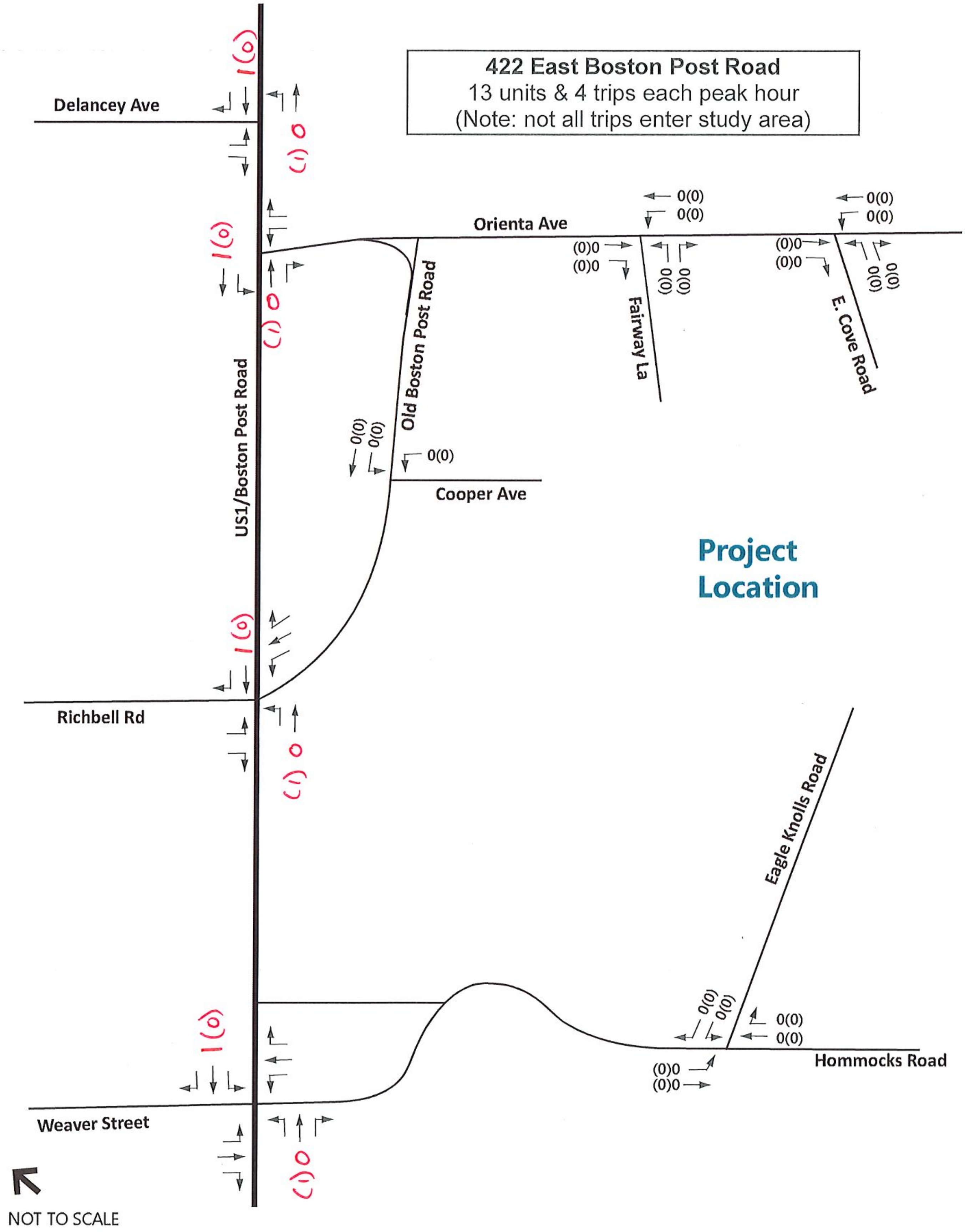
Vicinity Development Weekday Hour Volumes



00= AM Peak Hour

(00)=PM Peak Hour

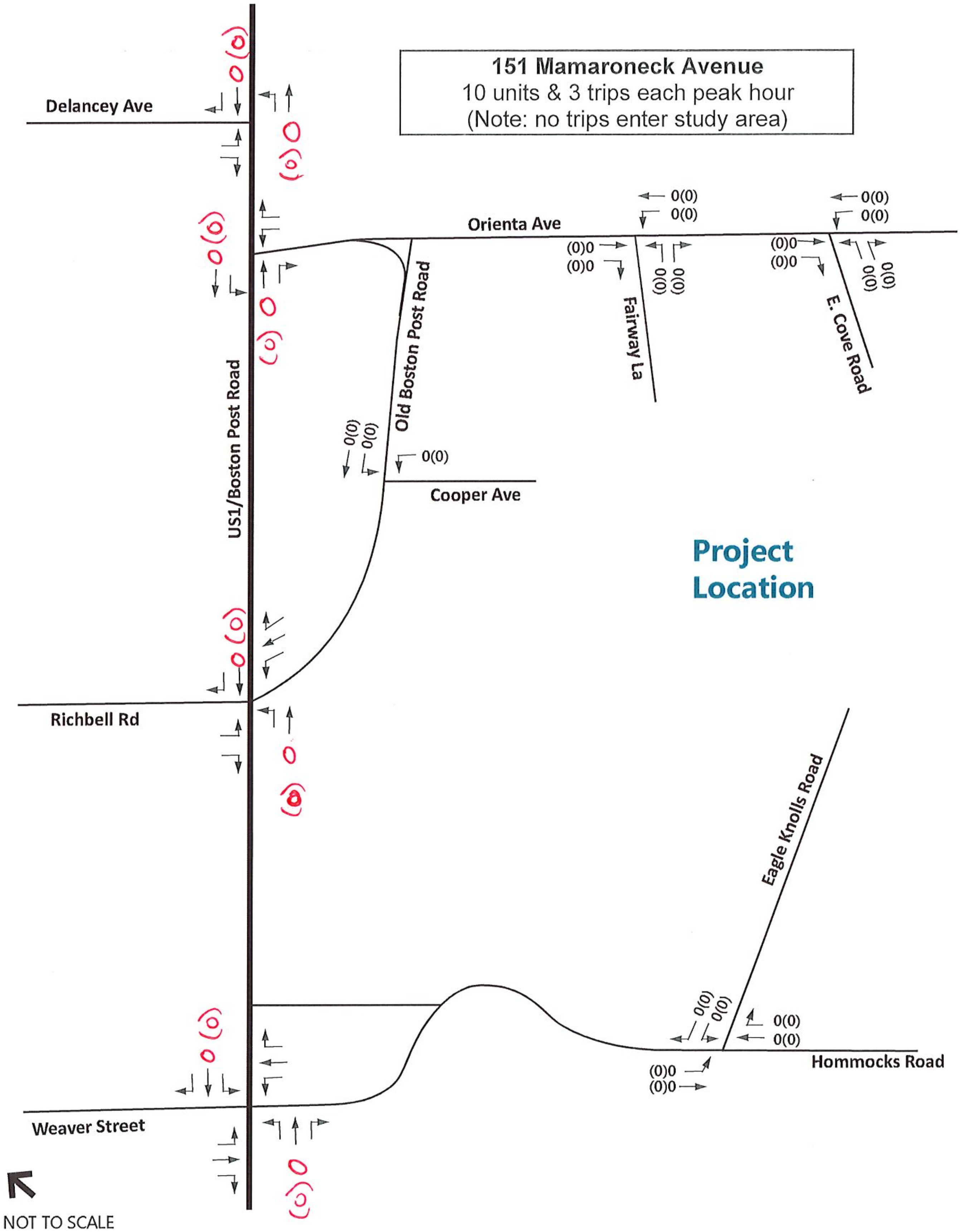
Vicinity Development
Weekday Hour Volumes



00= AM Peak Hour

(00)=PM Peak Hour

Vicinity Development
Weekday Hour Volumes

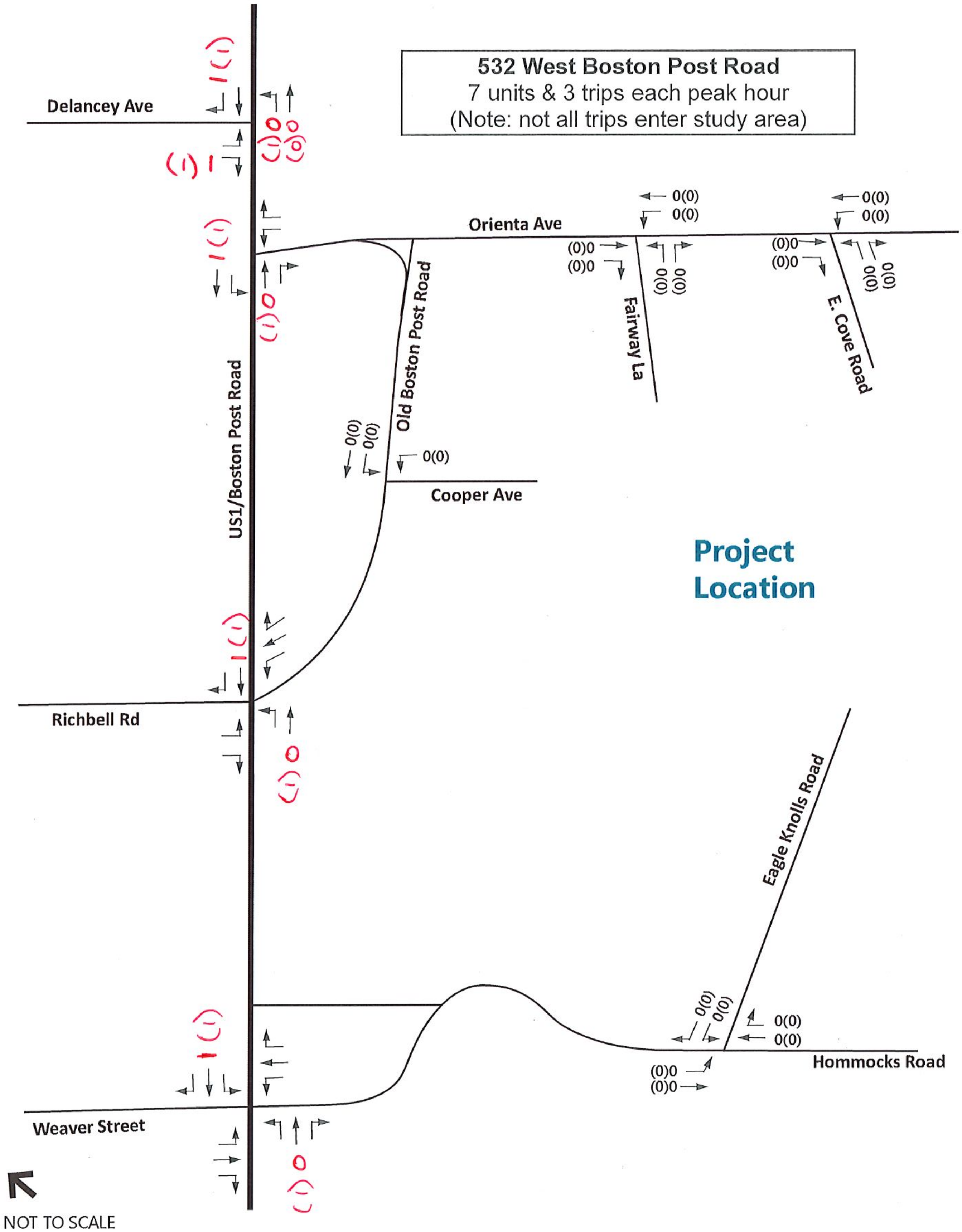


Hampshire Country Club - PRD | Village of Mamaroneck, NY

00= AM Peak Hour

(00)=PM Peak Hour

Vicinity Development Weekday Hour Volumes

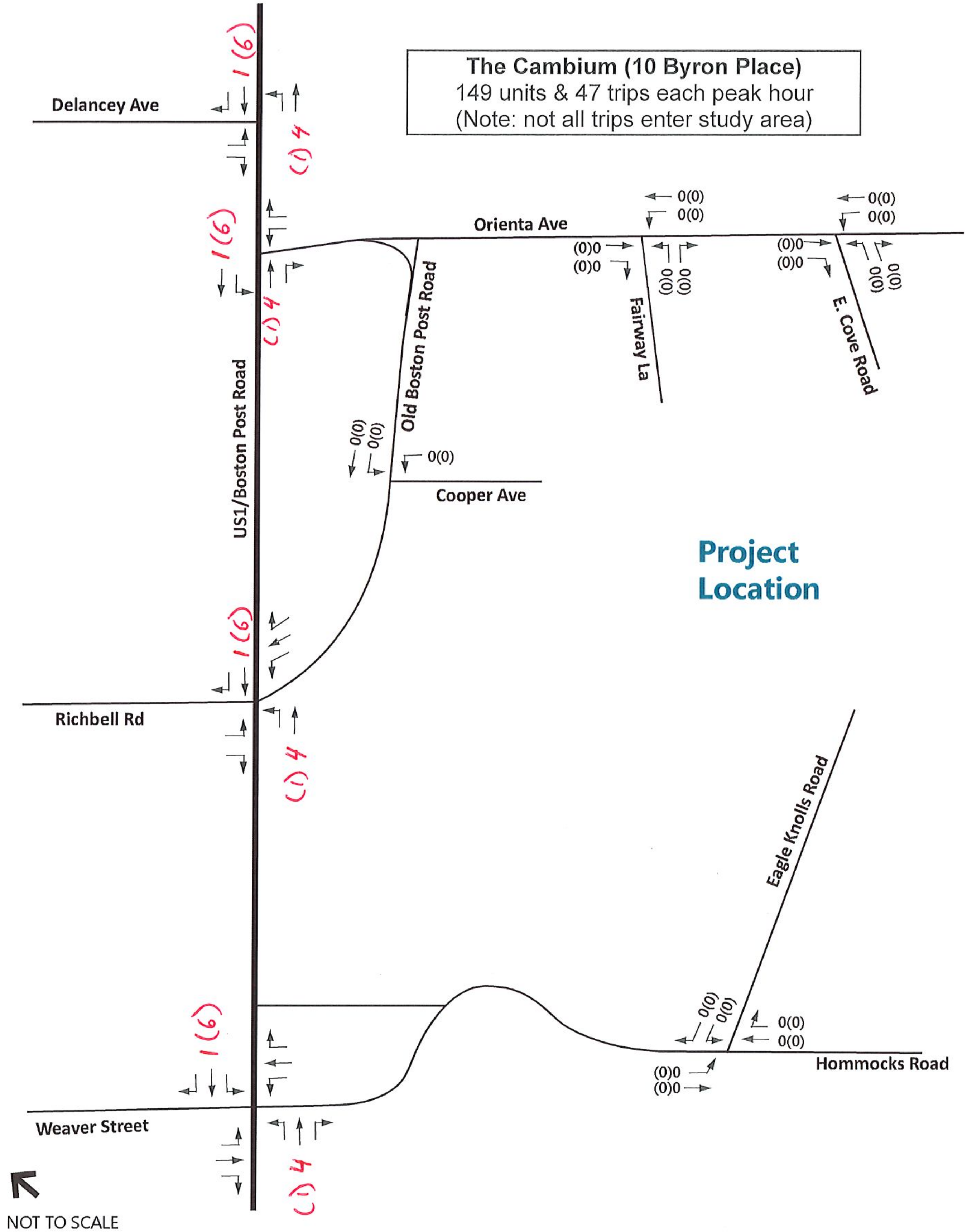


Hampshire Country Club - PRD | Village of Mamaroneck, NY

00= AM Peak Hour

(00)=PM Peak Hour

Vicinity Development Weekday Hour Volumes

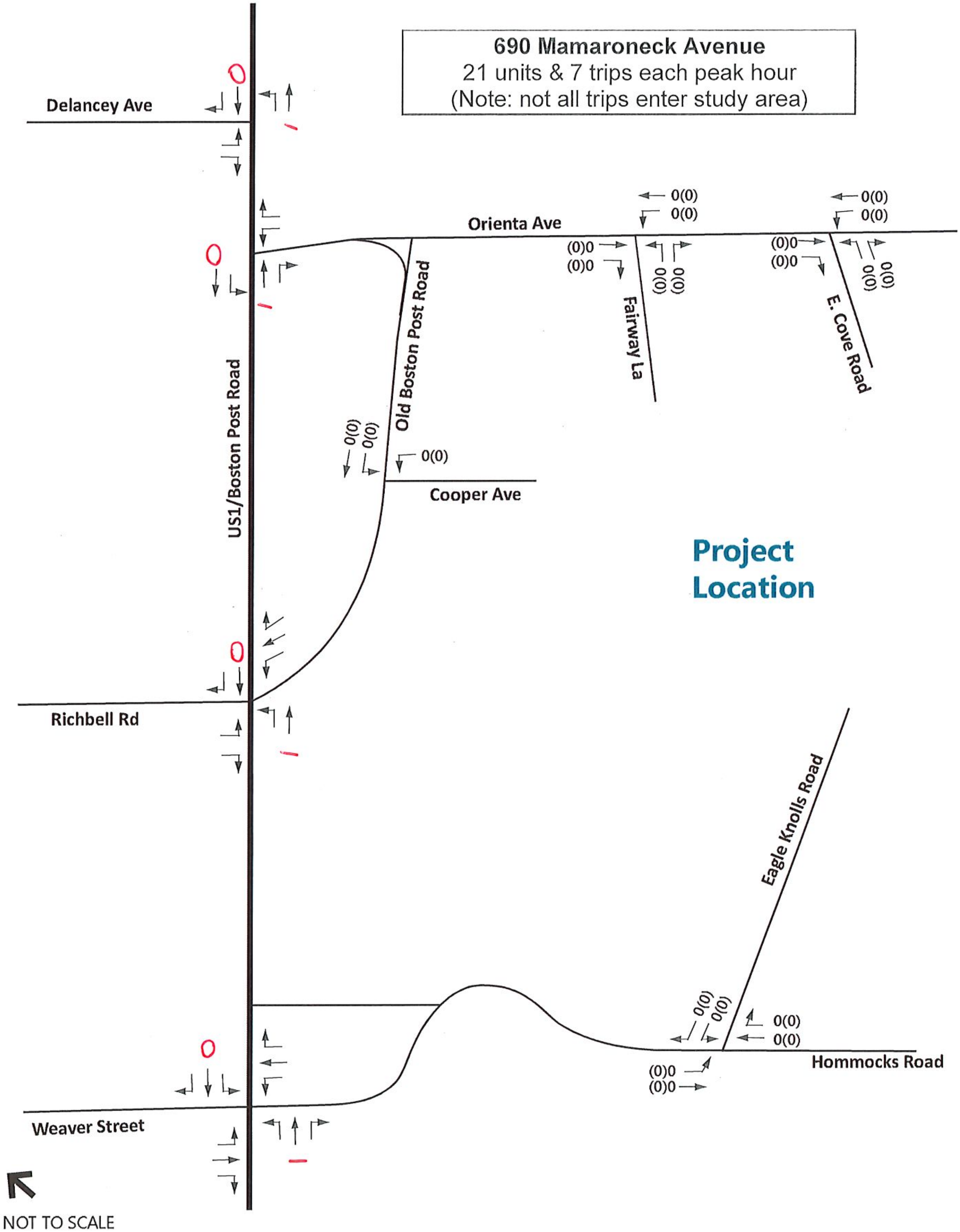


Hampshire Country Club - PRD | Village of Mamaroneck, NY

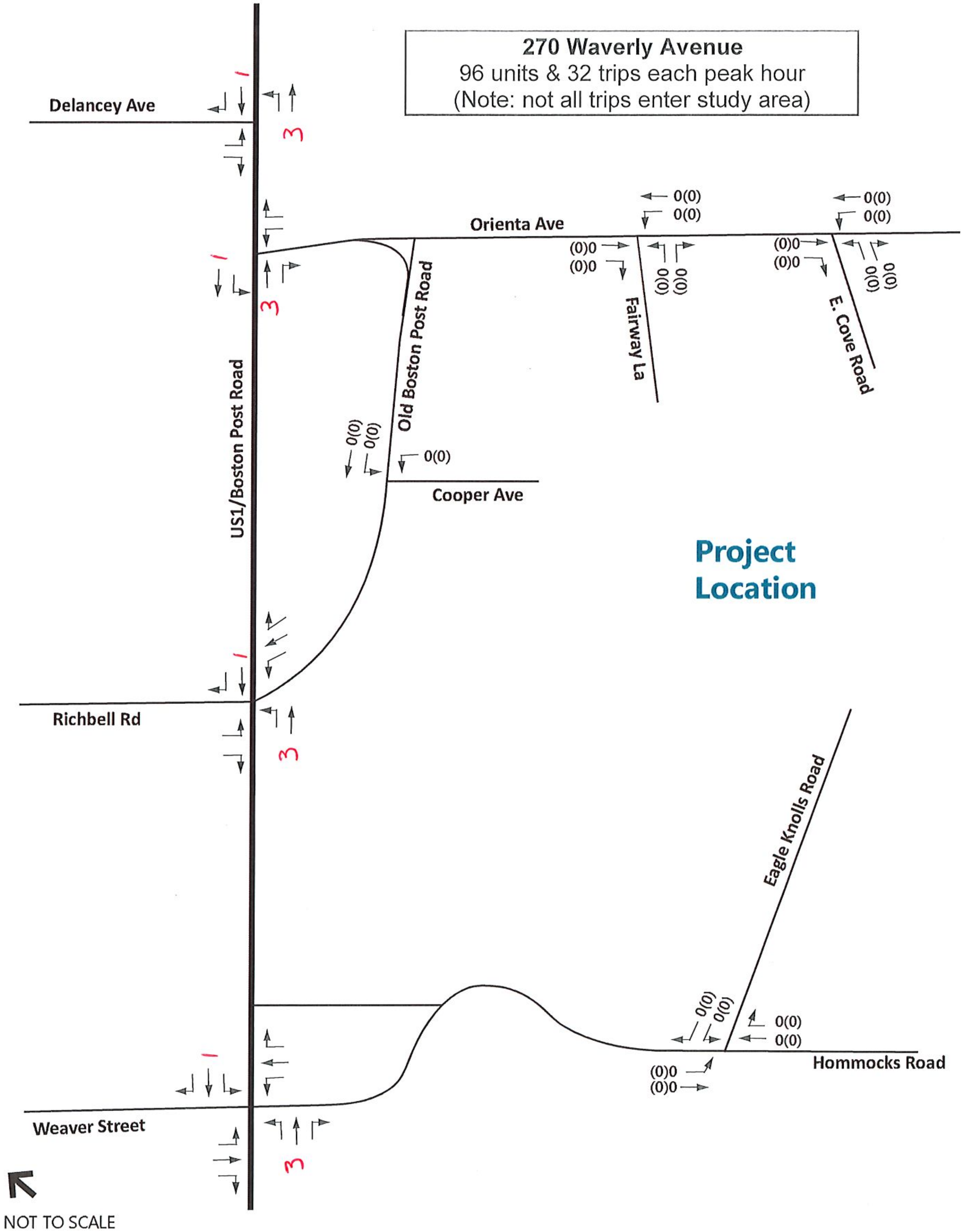
00= AM Peak Hour

(00)=PM Peak Hour

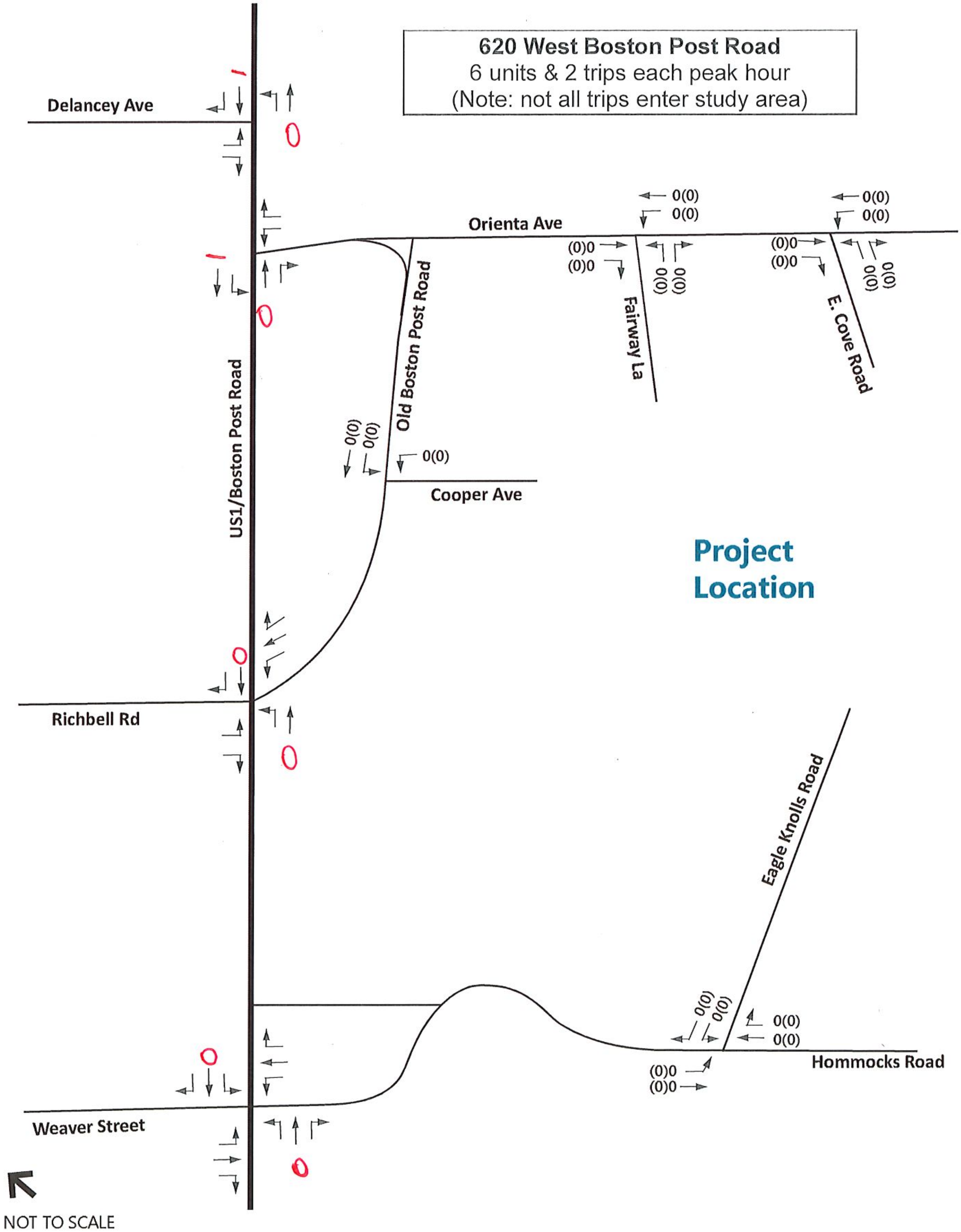
Vicinity Development
Weekday Hour Volumes



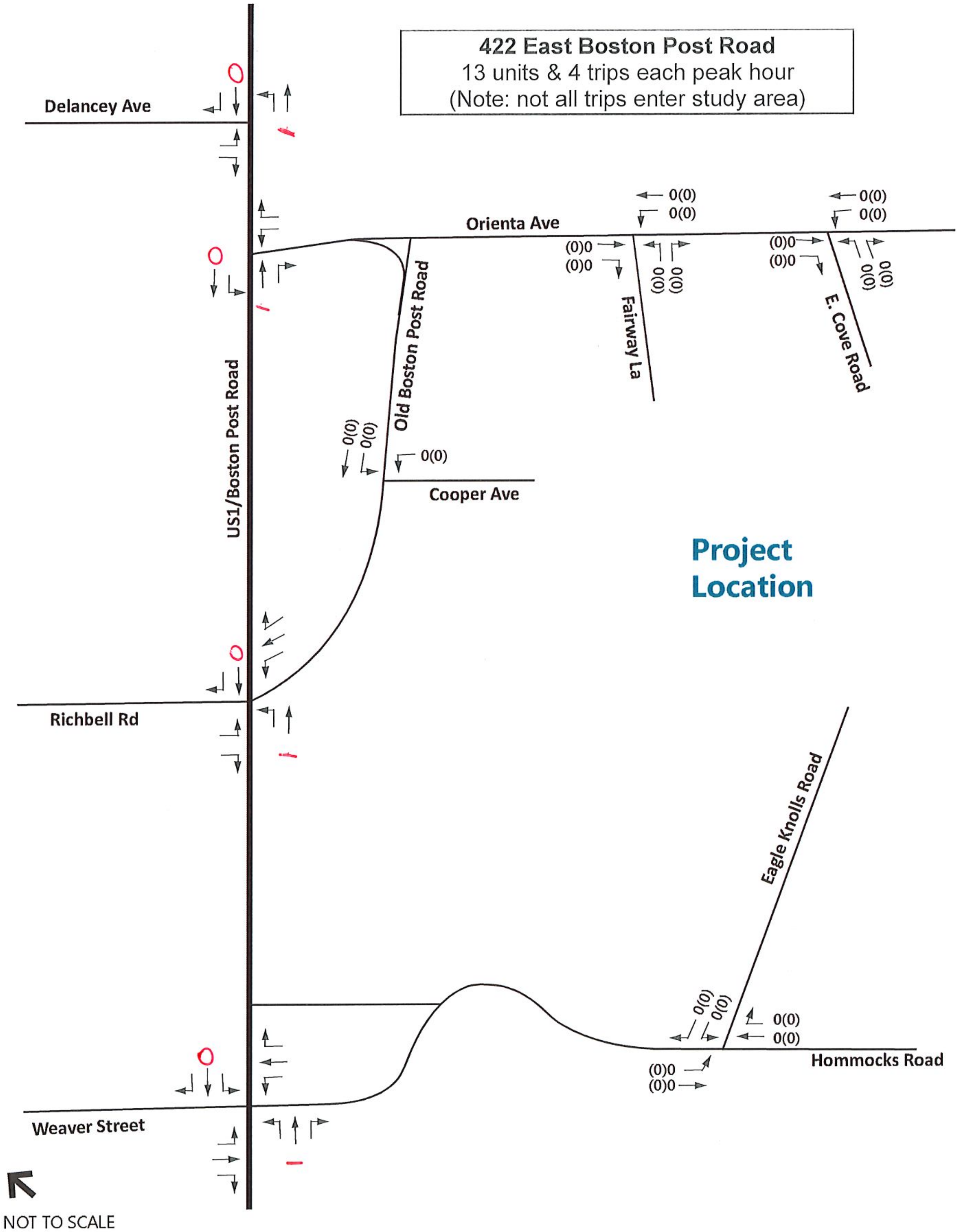
Vicinity Development Saturday Peak Hour Volumes



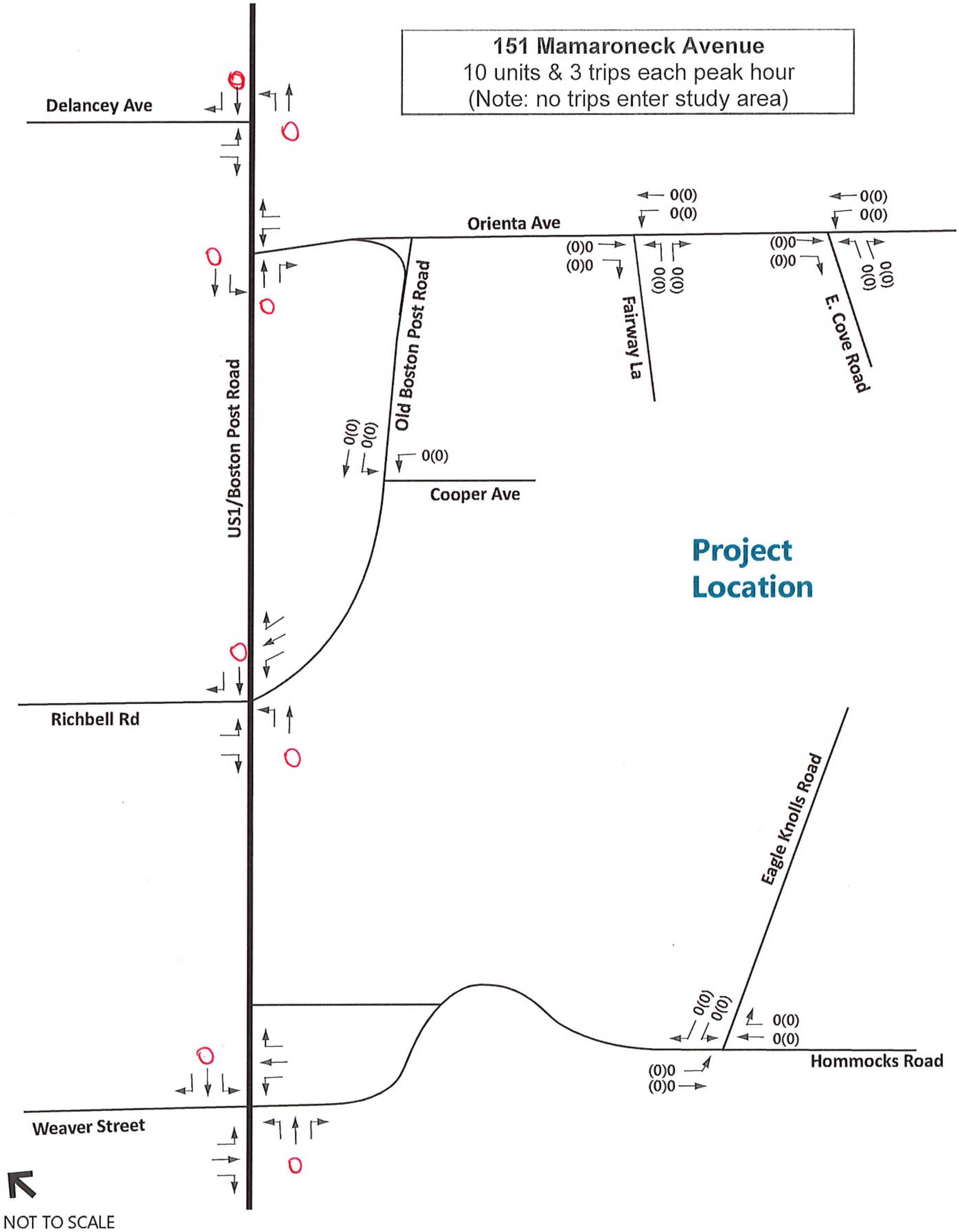
Vicinity Development Saturday Peak Hour Volumes



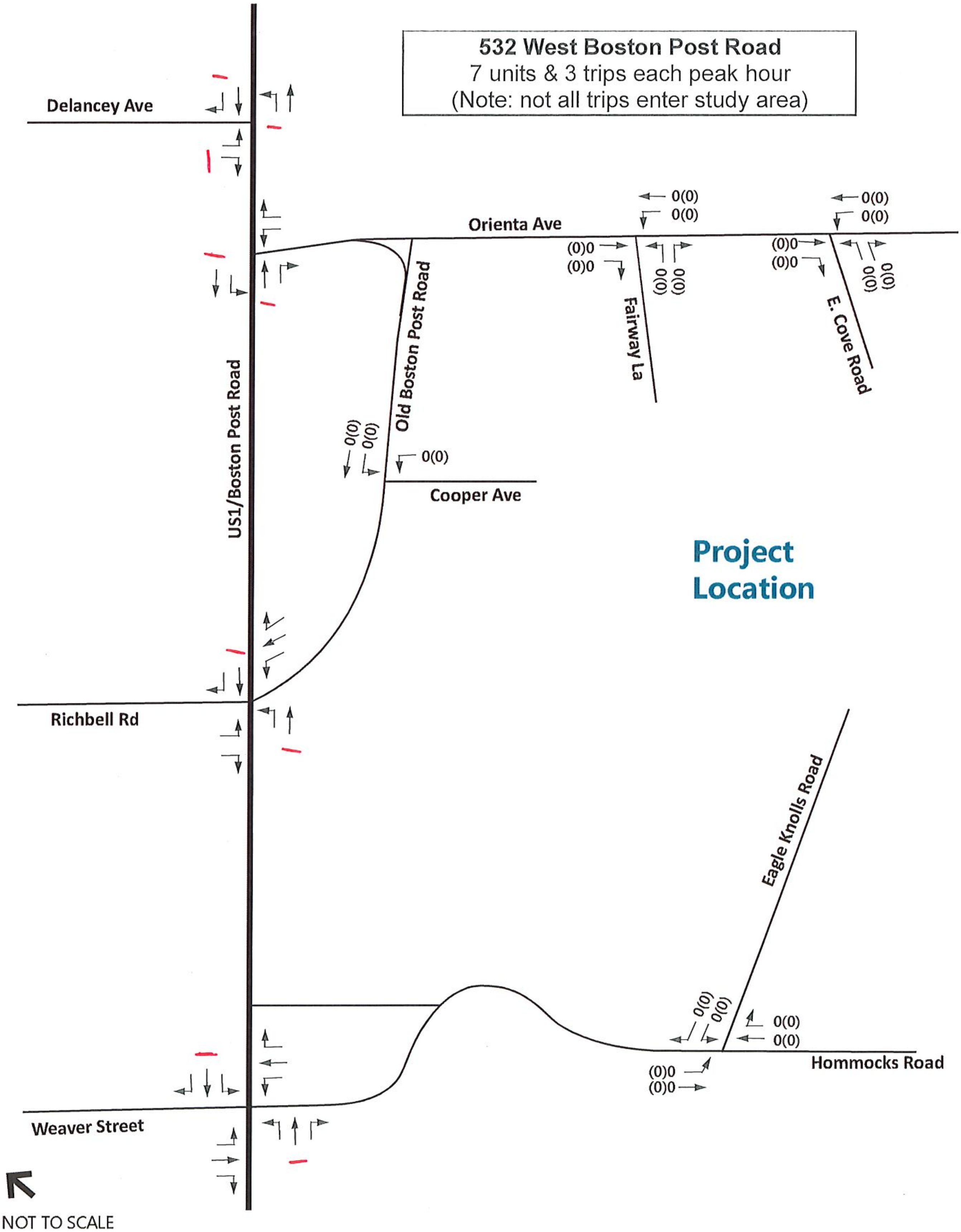
Vicinity Development Saturday
Peak Hour Volumes



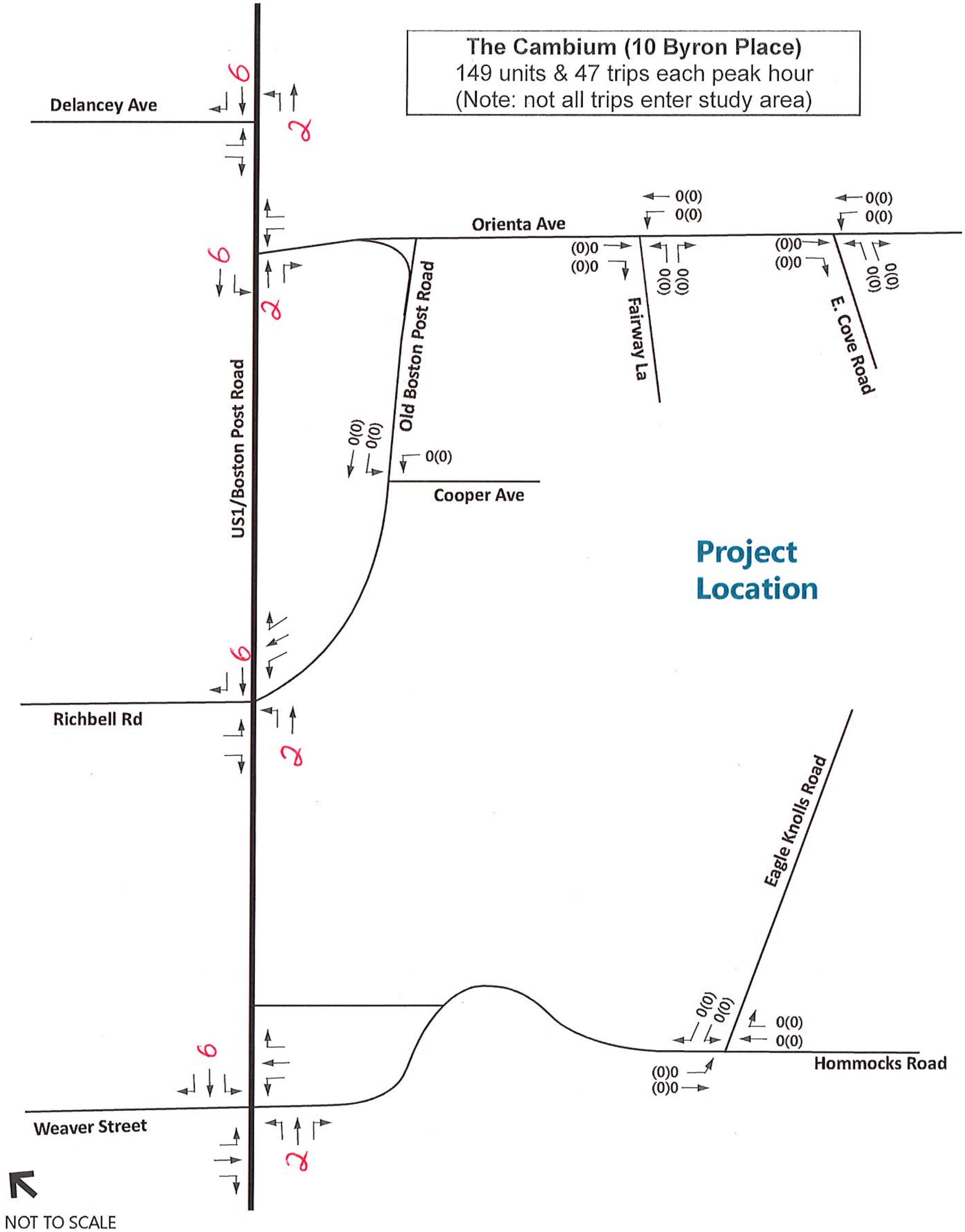
Vicinity Development Saturday Peak Hour Volumes



Vicinity Development Saturday Peak Hour Volumes



Vicinity Development Saturday Peak Hour Volumes



Vicinity Development Saturday Peak Hour Volumes

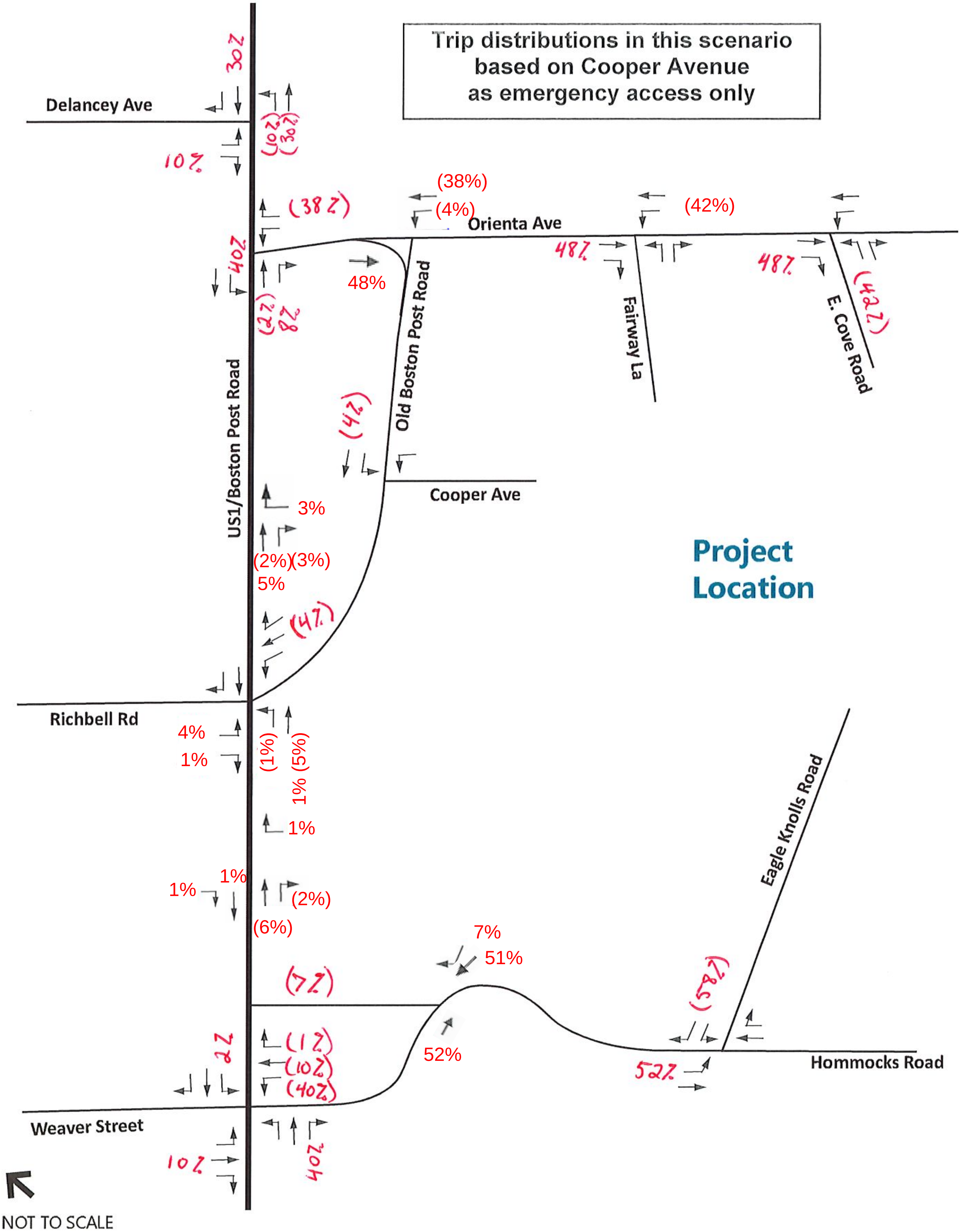
Kimley»Horn of New York, P.C.

FEIS Chapter M Appendix

Response to Comment M35

Project Traffic

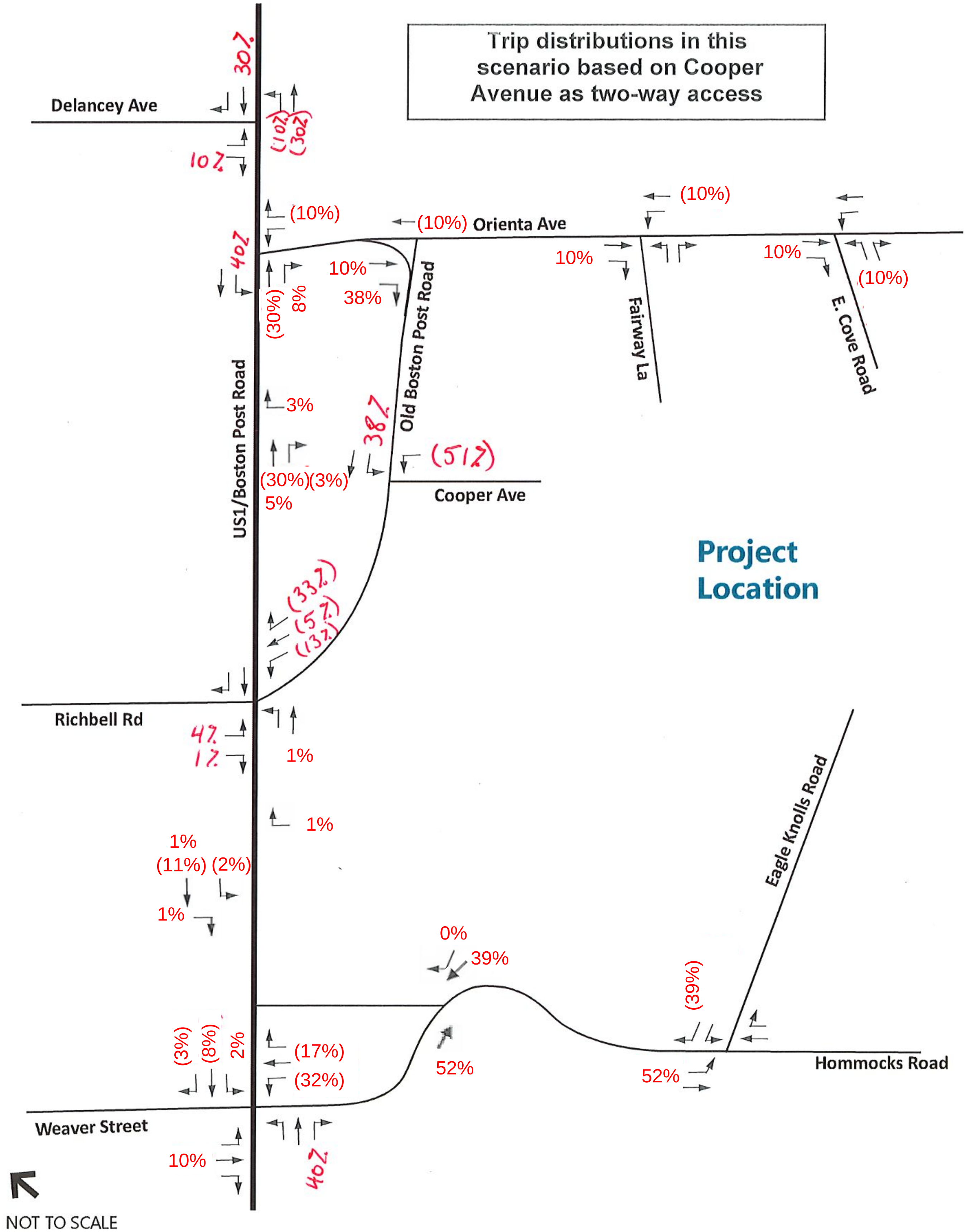
Trip distributions in this scenario based on Cooper Avenue as emergency access only



00= Arrival

(00)=Departure

Trip Distributions
Proposed Access
(Cooper Avenue Closed,
Except if needed for Emergency Access)



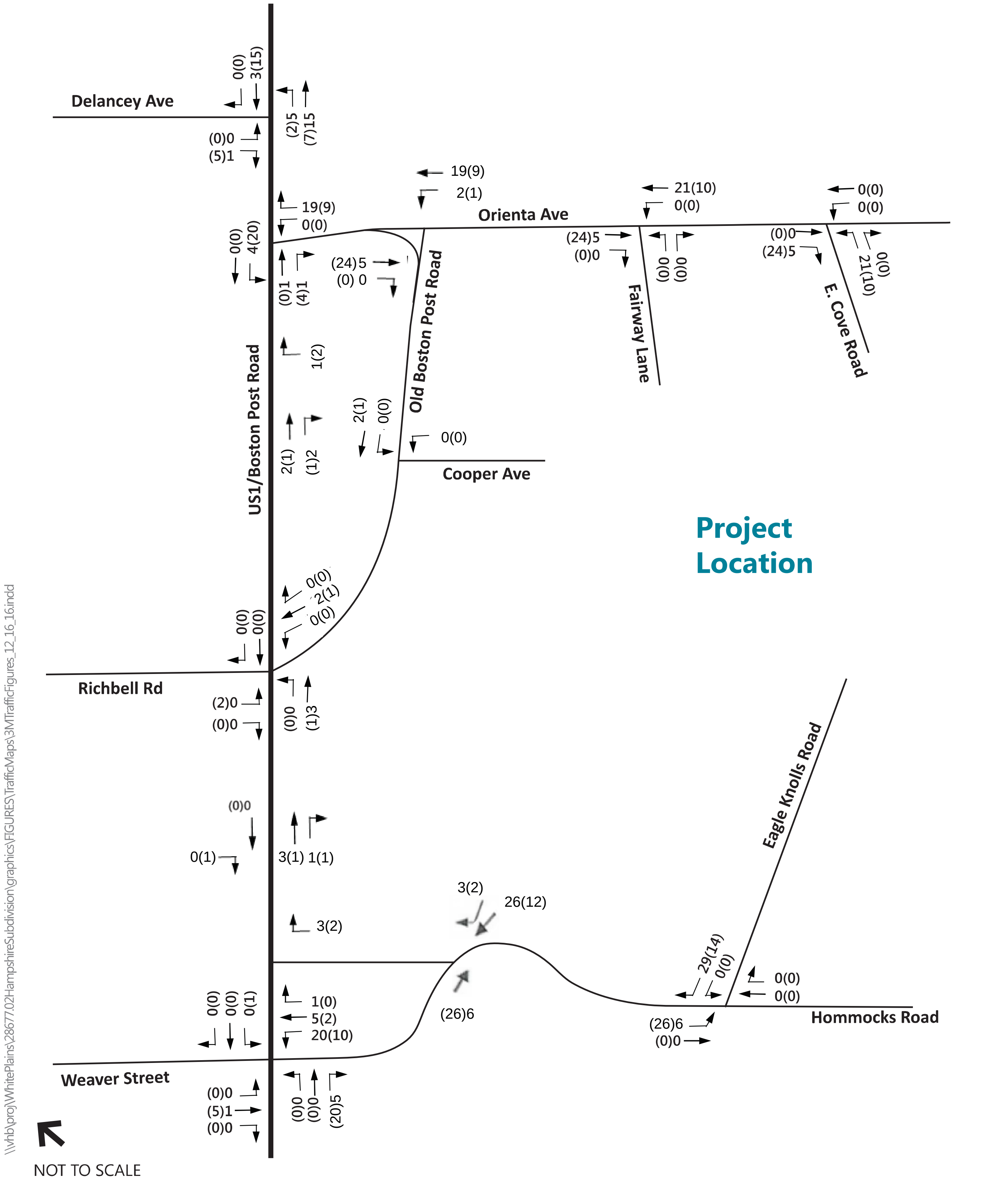
00= Arrival

(00)=Departure

Trip Distributions

Alternative Access

(Cooper Avenue Two-way Access)



Hampshire Country Club - PRD | Village of Mamaroneck, NY

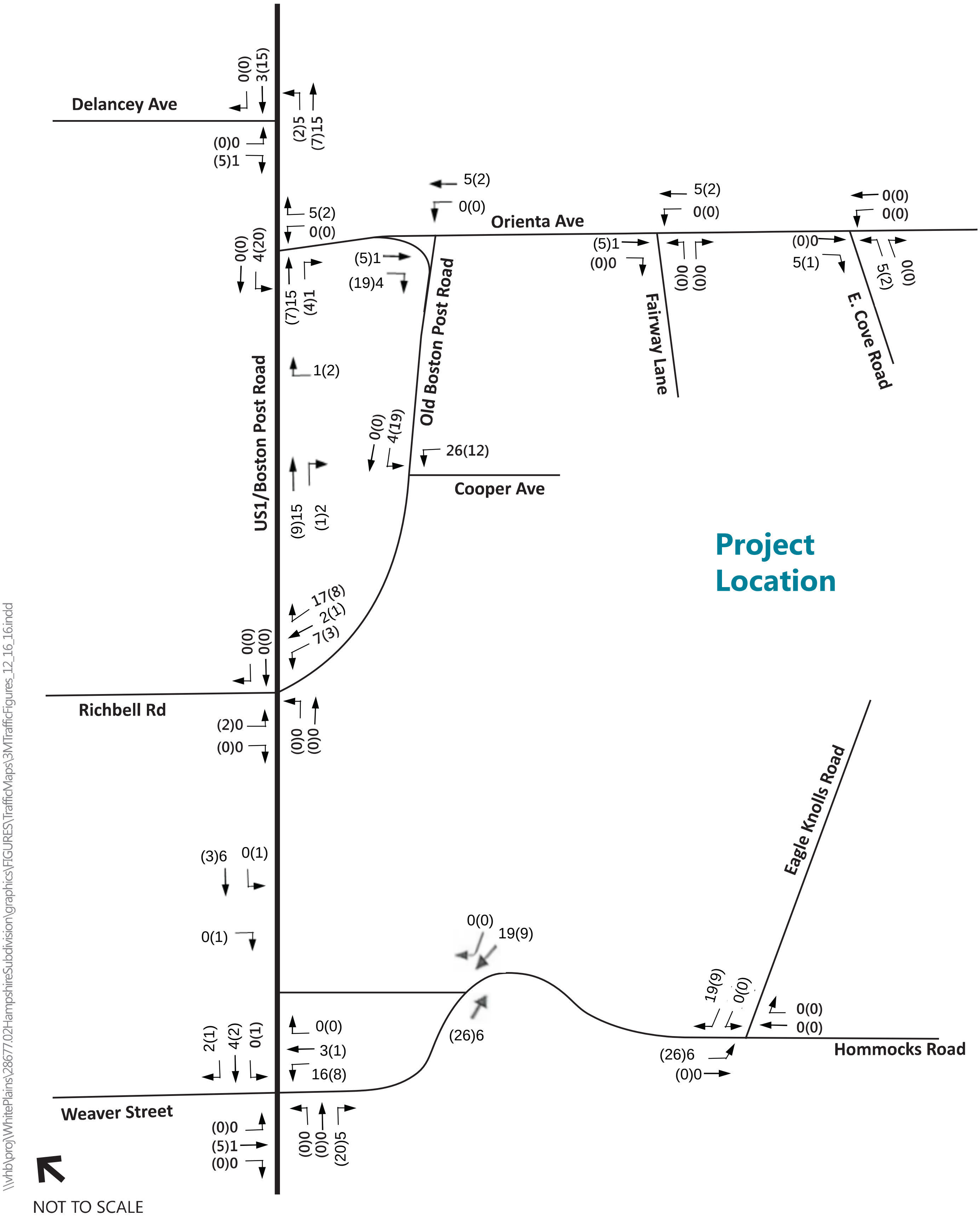
00= AM Peak Hour

(00)=PM Peak Hour

Project Generated Weekday Peak Hour Volumes

Proposed Access

(Cooper Avenue Closed,
Except if needed for Emergency Access)



\\vhb\proj\WhitePlains\28677.02HampshireSubdivision\graphics\FIGURES\TrafficMaps\3MTrafficFigures_12_16_16.indd

Hampshire Country Club - PRD | Village of Mamaroneck, NY

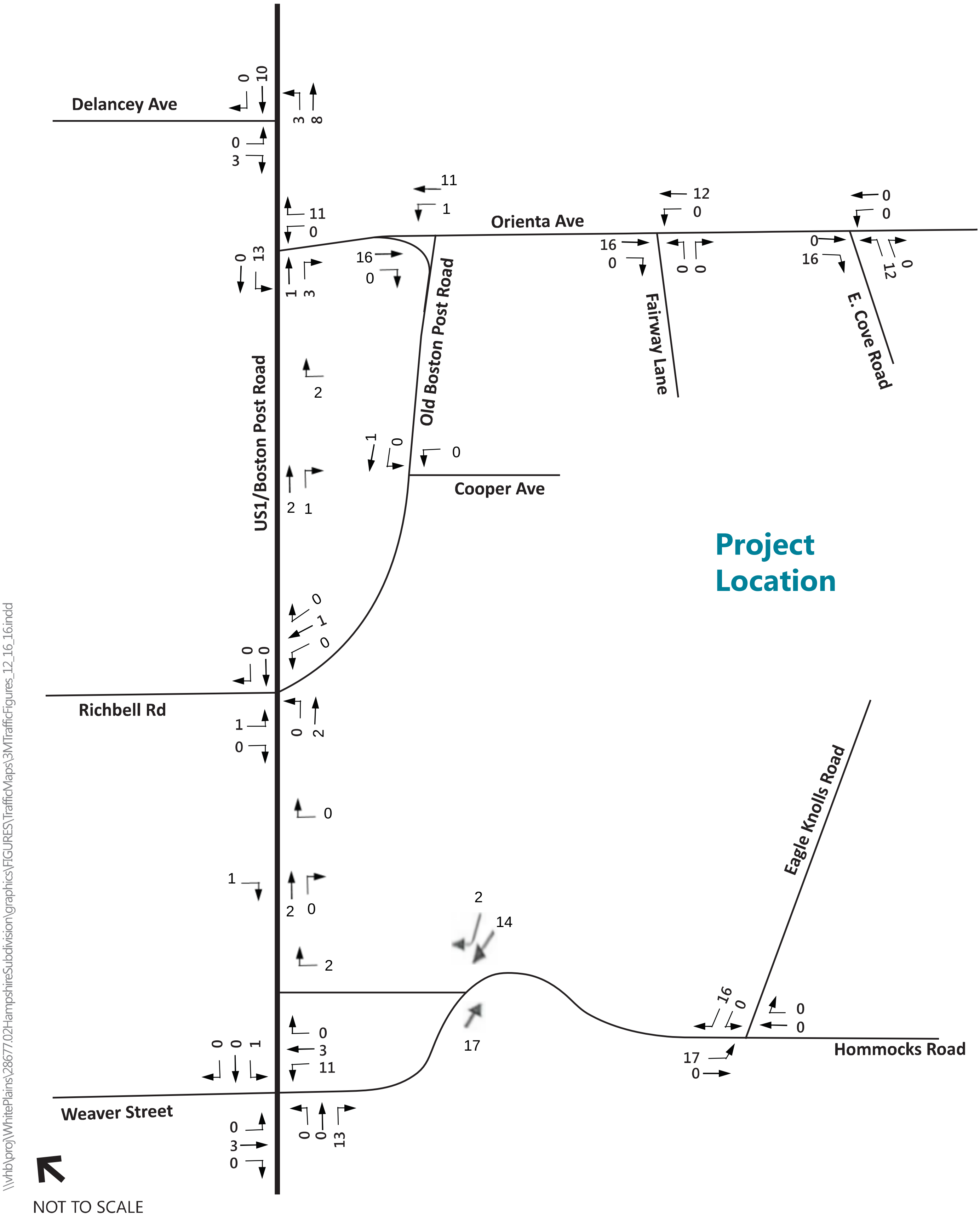
00= AM Peak Hour

(00)=PM Peak Hour

Project Generated Weekday Peak Hour Volumes

Alternative Access

(Cooper Avenue Two-way Access)

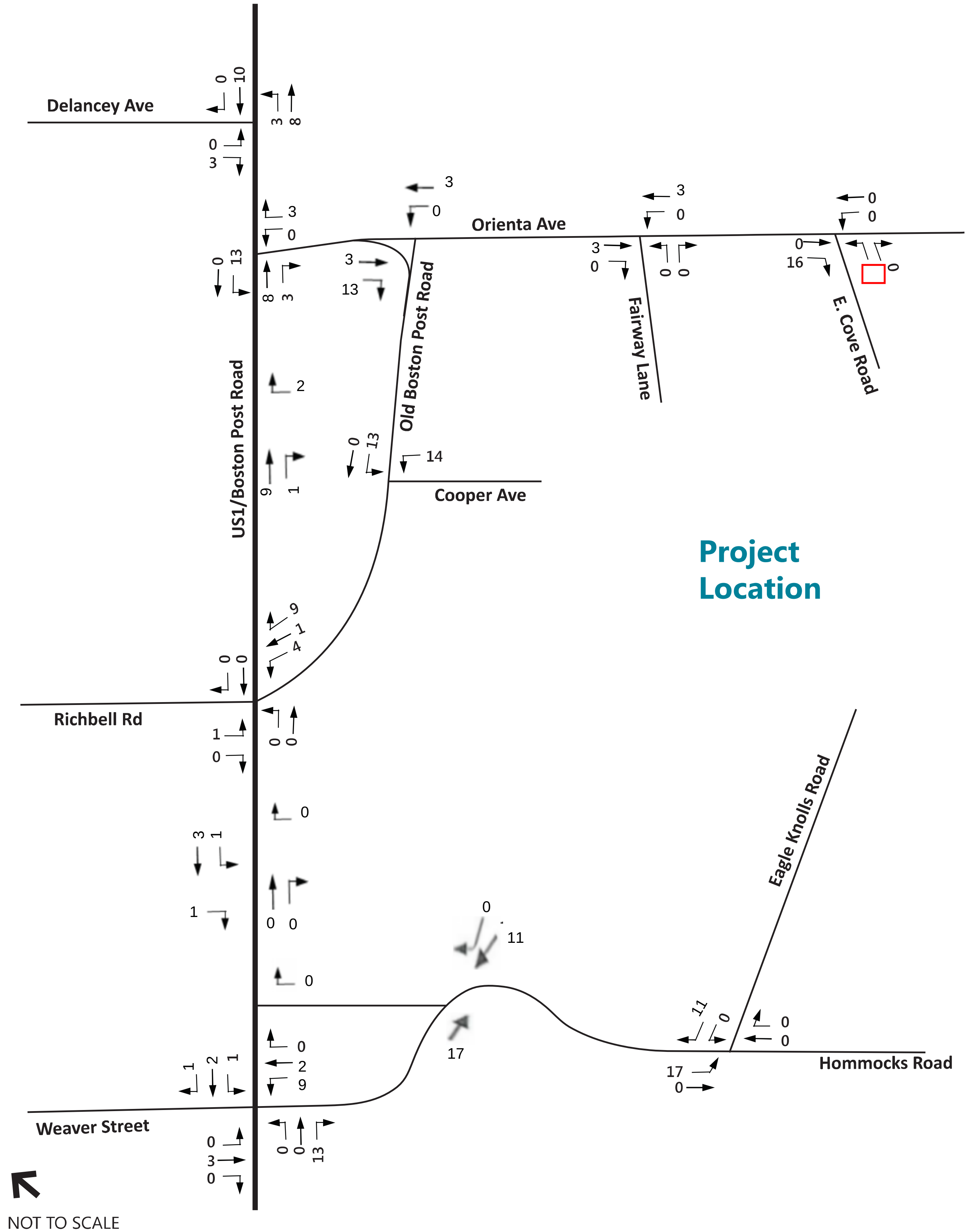


\\vhb\proj\WhitePlains\28677.02HampshireSubdivision\graphics\FIGURES\TrafficMaps\3MTrafficFigures_12_16_16.indd

Project Generated Saturday Peak Hour Volumes

Proposed Access

(Cooper Avenue Closed,
Except when needed for Emergency Access)



Project Generated Saturday Peak Hour Volumes
Alternative Access
(Cooper Avenue Two-way Access)

Kimley»Horn
of New York, P.C.

FEIS Chapter M Appendix

Response to Comment M36

V/C Values for LOS E Lane Groups

Table showing V/C ratio values for locations with LOS "E" or worse.

(with pedestrians doubled)

Levels-of-Service and Volume-to-Capacity Ratios for Lane Groups with LOS E or Worse					
Scenario	**Approach**	**Lane Group**	**LOS**	**Delay**	**V/C**
Boston Post Rd & Hommocks Rd/Weaver St					
No-Build AM	EB	L	E	62.7	0.60
	WB	L	E	56.7	0.48
	NB	TR	E	72.0	1.00
	SB	L	E	76.2	0.87
No-Build PM	NB	L	E	56.4	0.69
Build AM	EB	L	E	64.0	0.61
	WB	L	E	66.7	0.65
	NB	TR	E	73.8	1.00
	SB	L	E	76.2	0.87
Build PM	NB	L	E	56.4	0.69

Hampshire Country Club Planned Residential Development
Village of Mamaroneck,
Westchester County, New York
Final Environmental Impact Statement

Z Wetland Functional Assessment

Wetland Functional Assessment

Hampshire Country Club Property

Cove Road
Village of Mamaroneck and
Town of Mamaroneck,
Westchester County,
New York

Prepared for: **Hampshire Recreation, LLC**
c.o. New World Realty Advisors
1500 Broadway, 15th Floor
New York, NY 10036

Prepared by: vhb
50 Main Street, Suite 360
White Plains, New York 10606

March 2019 Update

Table of Contents

List of Attachments

1.0 Introduction

This wetland functional assessment has been prepared by VHB Engineering, Surveying and Landscape Architecture, P.C. (VHB) for the 106.2-acre Hampshire County Club golf course property, located between East Boston Post Road and the Long Island Sound, in Westchester County, New York (the "Project Site," see Attachment A, Figure 1). The Village/Town of Mamaroneck municipal boundary line passes through the Project Site, creating a 98.9-acre portion located within the Village of Mamaroneck and a smaller 7.3-acre portion within the Town of Mamaroneck.

The Project Site is currently developed with fairways, greens, roughs, treed areas and water features that are part of an 18-hole golf course. The remainder of the Project Site is developed with recreational membership club facilities, including a 35,000 square-foot (sf) clubhouse, swimming pool, tennis courts, maintenance facilities and other support uses.

The golf course water features noted above include seven ponds and several ditches associated with the golf course drainage system, as well as two vegetated marshes. These features are regulated as "wetlands" by the Board of Trustees of the Village of Mamaroneck, pursuant to Village Code Chapter 192 (Freshwater Wetlands), and by the Town Board of the Town of Mamaroneck, pursuant to Town Code Chapter 114 (Wetlands and Watercourses).

Hampshire Recreation, LLC is proposing a new Planned Residential Development (PRD) consisting of 105 residential units, parking areas, seven tennis courts and approximately 36 acres of common open space at the Project Site. The existing golf course use would be downsized to a 9-hole golf course to to facilitate the development of the PRD, which would be built in its entirety within the portion of the Project Site located within the Village of Mamaroneck. No development is proposed within the Town of Mamaroneck. As such, the Planning Board of the Village of Mamaroneck is serving as the Lead Agency for the State Environmental Quality Review Act (SEQRA) review of the proposed PRD. Therefore, in accordance with the requirements of the Village Planning Board as Lead Agency, this report provides a detailed description of the regulated wetlands at the Project Site and summarizes the results of a wetland functional assessment performed by VHB in May 2016.

2.0

Wetland Functional Assessment

2.1 Site and Wetland Overview

The Project Site is comprised of various habitats that are predominantly anthropogenic (i.e., created or altered by humans) in origin. Specifically, based upon field surveys conducted in May 2016, the Project Site supports the following ecological communities, as described in the New York Natural Heritage Program (NYNHP) publication *Ecological Communities of New York State*[1]

- Urban Structure Exterior
- Paved Road/Path
- Unpaved Road/Path
- Mowed Lawn
- Mowed Lawn with Trees
- Farm Pond/Artificial Pond
- Ditch/Artificial Intermittent Stream
- Common Reed Marsh

The latter three communities encompass the regulated wetlands at the Project Site, which include the ponds and ditches comprising the golf course drainage system, as well as an additional isolated wetland feature (see Attachment A, Figure 2). As described in detail in Section 2.3 below, the majority of the wetlands at the Project Site are anthropogenic features that were created or altered to provide drainage and irrigation for the golf course, and to serve as water hazards. The wetlands have been adversely impacted due to historic and current stormwater inputs and golf course management practices. The primary hydrological influences to the wetlands at the Project Site include stormwater and groundwater. Additionally, some of the site wetland features are tidally-influenced from the marine waters of Delancey Cove, located to the south of the Project Site. In general, the boundaries of the golf course

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[1] Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State.* Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

wetlands are well-defined, due to the abrupt transitions (i.e., rock-lined or grass-lined banks) that have been constructed along the boundaries of these surface water features and the adjacent maintained turf areas of the golf course.

2.2 Methodology

The wetland functional assessment was conducted according to the methods developed by Denis W. Magee (with technical contributions from Garrett G. Hollands), as described in "*A Rapid Procedure for Assessing Wetland Functional Capacity based on Hydrogeomorphic (HGM) Classification*"[2] (the "Magee-Hollands Method"). According to the aforementioned resource, the Magee-Hollands Method was developed and is intended to be applied to six distinct wetland classes within "the glaciated Northeast-Midwest Region" (depressional, slope, lacustrine fringe, extensive peatlands, flats and riverine wetlands). In accordance with the Magee-Hollands Method, the functional capacity for each of eight principal wetland functions is assessed, based partially on review of "desktop" resources (e.g., aerial imagery, maps and other references), but primarily upon field observations of hydrological, geological and biological characteristics of the wetland and the surrounding watershed uses and land uses. The eight wetland functions are:

- Modification of Groundwater Discharge
- Modification of Groundwater Recharge
- Storm and Flood Water Storage
- Modification of Stream Flow
- Modification of Water Quality
- Export of Detritus
- Contribution to Abundance and Diversity of Wetland Vegetation
- Contribution to Abundance and Diversity of Wetland Fauna

During the assessment, relative value weights are assigned to assorted variables applying to each of the eight aforementioned wetland functions. The sum of the variable weights for each wetland function is then totaled and divided by the maximum potential score for that function, in order to derive a Functional Capacity Index (FCI) score. The FCI score is then compared to the FCI index range for other wetlands of the same wetland class (e.g., depressional wetlands, etc.) based upon data from over 1,000 assessments performed on wetlands in the glaciated Northeast-Midwest Region, within which the Magee-Hollands Method was developed.

Field data for the wetland functional assessment were collected at the Project Site on May 17-18, 2016, by VHB Project Scientist David Kennedy, MS (*Curriculum Vitae* included as Attachment E) and recorded on Magee-Hollands Method data forms

▼

[2] Magee, Denis W., with technical contributions by Garret G. Hollands. 1998. *A Rapid Procedure for Assessing Wetland Functional Capacity based on Hydrogeomorphic (HGM) Classification.* Normandeau Associates, Bedford Massachusetts.

(copies included as Attachment C). Additional information regarding the Project Site wetlands was collected during an interview with golf course superintendent Mr. Scott Olsen. Relevant information obtained from Mr. Olsen is included within the text of this report. Additionally, VHB reviewed the 2012 *Wetland Characterization Assessment* prepared by Nelson, Pope & Voorhis, LLC (NP&V) (copy included as Attachment D) to obtain additional background information regarding the wetlands at the Project Site.

Based upon field observations of surface water connections or other hydrological connections, the various wetland features at the Project Site were grouped as four distinct wetlands for the purpose of this wetland functional assessment (see Attachment A, Figure 2) . For consistency, the four wetlands have been identified primarily according to the naming conventions utilized in the aforementioned NP&V report, as amended by VHB based upon current site observations:

- Golf Course Drainage System 1 (Pond 13, Pond 16 and Drainage Ditch 1)
- Golf Course Drainage System 2 (Pond 5 and Pond 6)
- Golf Course Drainage System 3 (Pond 10, Pond 11, Pond 18, vegetated wetland and Drainage Ditch 2)
- Isolated Wetland A

Following the Magee-Hollands Method procedures, the four wetland groupings identified above were all classified under the depressional wetland class, due to the fact that they occur within topographic depressions and have either no outlets or intermittent outlets.

2.3 Results

The Magee-Hollands FCI Scores for each of the eight analyzed wetland functions within the four Project Site wetlands are presented in Table 1 below.

Table 1 – Summary of Magee-Hollands Wetland Functional Capacity Scores

Wetland Function	Golf Course Drainage System 1 (FCI Score)	Golf Course Drainage System 2 (FCI Score)	Golf Course Drainage System 3 (FCI Score)	Isolated Wetland A (FCI Score)
Modification of Groundwater Discharge (FCI Range = 0.19-1.0)	0.55	0.50	0.55	0.28
Modification of Groundwater Recharge (FCI Range = 0.19-1.0)	0.57	0.43	0.62	0.62
Storm and Flood Water Storage (FCI Range = 0.15-1.0)	0.55	1.0	0.52	1.0
Modification of Stream Flow (FCI Range = 0.11-1.0)	0.44	0.0	0.44	0.0
Modification of Water Quality (FCI Range = 0.22-1.0)	1.0	1.0	1.0	0.77
Export of Detritus (FCI Range = 0.27-1.0)	0.39	0.0	0.44	0.0
Contribution to Abundance and Diversity of Wetland Vegetation (FCI Range = 0.13-1.0)	0.20	0.13	0.46	0.60
Contribution to Abundance and Diversity of Wetland Fauna (FCI Range = 0.11-1.0)	0.39	0.36	0.55	0.44

The following provides a summary of the functional capacity of the four wetlands at the Project Site, based upon the Magee-Hollands FCI scores, site observations, the NP&V report and information provided by Mr. Olsen.

<u>Golf Course Drainage System 1</u>

This wetland system is comprised of Ponds 13 and 16, with associated drainage ditches and pipes. Pond 16 is an artificial structure located at and beyond the northwestern property boundary. The pond was constructed in 1982, in order to accommodate stormwater runoff from the adjoining condominium development, as well as to provide drainage for the golf course. Reportedly, Pond 16 has also been subject to illicit stormwater discharges from adjacent commercial uses. As stormwater is a primary hydrological source, Pond 16, contains high levels of algae, organic matter and sediment deposits. According to Mr. Olsen, the pond is periodically treated with herbicides and/or organic microbe applications. The plant community within the pond is dominated by submerged aquatic vegetation, with no emergent plants observed during the wetland assessment.

Water exits Pond 16 via a subgrade pipe that outfalls to a drainage ditch (Ditch 1) that connects to Pond 13. The ditch is largely unvegetated and contains a mineral substrate comprised primarily of gravels and clays. A similar pipe/ditch combination drains the northcentral portion of the golf course and also discharges to Pond 13.

Pond 13 was reportedly a naturally occurring pond that was modified and expanded between 1960 and 1976. With the exception of scattered patches of emergent vegetation, the majority of the pond is largely unvegetated. The pond contains algal deposits and has been impacted by both organic and mineral sediment deposits from stormwater runoff. Two large culvert openings with manually-operated gate valves occur within a concrete and fieldstone wall located at the terminus of the pond along the western property boundary near Hummocks Road. The culverts reportedly run under Hummocks Road to a subgrade vault located beneath the school athletic field, which in turn discharges via a culvert to the tidal wetlands of Delancey Cove to the south. The culvert gate valves were observed to be open at the time of the May 2016 wetland assessment. According to Mr. Olsen, the gate valves are left open continuously, and the water level within Pond 13 is therefore subject to a two-foot range as a result of tidal influence. As also observed during the wetland assessment, two smaller culvert openings occur within the fieldstone wall at the western terminus of Pond 13. The culverts appear to discharge stormwater from Hummocks Road to the pond.

Based on the Magee-Hollands assessment, the primary functions of Golf Course Drainage System 1 are Modification of Water Quality and Storm and Floodwater Storage, which are the functions that the ponds and ditches that comprise the system were created and/or modified for. It is important to note that as a result of providing these functions for the adjacent condominium development and the golf course, water quality within the system itself is low. The system also provides a moderate degree of functionality with respect to Modification of Groundwater Recharge/Discharge functions to/from the underlying groundwater table, which appears to be located close to the ground surface through much of the low-lying portions of the golf course. Given the lack of a permanent outlet, the system offers limited functionality with respect to Export of Detritus. As the system does not support significant vegetative communities, Contribution to Abundance and Diversity of Wetland Vegetation functionality is low. Due to this factor, as well as low overall water quality, the system does not offer a significant degree of functionality with respect to Contribution to Abundance and Diversity of Wetland Fauna.

Golf Course Drainage System 2

This wetland system is comprised of Ponds 5 and 6, with associated subgrade drainage pipes located at the northeastern portion of the golf course. Ponds 5 and 6 are artificial structures that were constructed between 1960 and 1994 for irrigation and stormwater drainage purposes. According to Mr. Olsen, groundwater from two irrigation wells is pumped into Pond 5 from June to September, in order to supply the golf course irrigation system. Accordingly, water levels within the pond reportedly fluctuate by as much as four feet. Pond 6 receives overflow from Pond 5 via a 12-inch subgrade pipe, and water levels within this pond reportedly fluctuate by up to 18 inches. Although interconnected, the ponds do not have outlets to other wetlands or surface waters.

Both Ponds 5 and 6 also receive stormwater inputs via overland flow and via golf course drainage pipes. Additionally, Pond 6 receives stormwater inputs from the residential neighborhood to the north and east of the golf course via at least one culvert. As observed during the wetland assessment, both ponds support submerged aquatic vegetation and contain high levels of algae and organic sediments. The ponds are reportedly treated with herbicides and/or organic microbe applications, as needed.

The primary Magee-Hollands assessment functions of Golf Course Drainage System 2 are the Modification of Water Quality and Storm and Floodwater Storage functions provided by this artificially created system. The system also provides a moderate degree of functionality with respect to Modification of Groundwater Recharge/Discharge functions. However, it is important to note that groundwater discharge within the system is due primarily to pumping of groundwater to supply the golf course irrigation system, rather than natural discharge of groundwater. Due to the lack of an outlet, the system does not provide Modification of Stream Flow or Export of Detritus functions. The system provides limited Contribution to Abundance and Diversity of Wetland Vegetation functionality and very limited Contribution to Abundance and Diversity of Wetland Fauna functionality.

Golf Course Drainage System 3

This system is comprised of Ponds 10, 11, 18 and Drainage Ditch 2. Additionally, the system includes a vegetated emergent wetland located contiguous to Pond 10.

Drainage Ditch 2 and associated subgrade pipes provide drainage for the eastern and southern portions of the golf course. Portions of the ditch appear to have been a natural stream that was modified in association with the creation of the golf course. The uppermost (northern) reaches of the ditch are primarily stone- or gravel-lined and largely unvegetated, while further to the south the stream is characterized by finer-grained sediments and supports emergent vegetation communities.

An intermittent connection exists between Drainage Ditch 2 and Pond 18, which is located adjacent to the north of Eagle Knolls Road. Pond 18 is an anthropogenic structure that was created for stormwater storage and aesthetic purposes. The pond is comprised of two levels ("upper" and "lower") that are hydrologically connected. Water is transported by a recirculation pump from the lower level of the pond to the upper level, where it discharges through a fountain and flows back to the lower level via a stone spillway/waterfall. The pond receives stormwater drainage from paved areas located near the golf course clubhouse. The stormwater discharges to the upper level of Pond 18 via a culvert. An overflow located within the lower level of the pond discharges water to Ditch 2 during significant storm events. As such, Pond 18 and Ditch 2 are hydrologically linked via this intermittent connection. The lower level of Pond 18 was observed to contain significant algal growth at the time of the wetland assessment.

Beyond Pond 18, Ditch 2 crosses beneath Eagle Knolls Road and empties into Pond 10, located at the southern end of the golf course. Pond 10 is reportedly a natural feature that has been modified in association with the golf course. The pond is a shallow and largely unvegetated feature that appears to receive intermittent tidal water via three culvert outlets equipped with manually-operated gate valves. The culverts are set at different elevations within a concrete headwall located at the southeastern end of the pond. The gate valves were all observed to be in the open position at the time of the wetland assessment. The three culverts are connected to concrete control structures with tide gates set at different elevations within an embankment located along the shoreline of Delancey Cove. The control structures and tide gates appear to have been designed to allow for drainage from Pond 10 to Delancey Cove to occur during storm events, while preventing tidal waters from entering Pond 10. However, at the time of the wetland assessment, water was observed discharging to Pond 10 through two of the three culverts, and evidence of tidal wetland flora was observed within portions of the pond.

The western portion of Pond 10 is contiguous with and hydrologically connect to a densely vegetated emergent wetland that is dominated by common reed (*Phragmites australis*). Pond 10 also receives water from Pond 11 via a subgrade culvert. Pond 11 was reportedly constructed in 1998 to improve drainage at the southern portion of the golf course. Scattered emergent vegetation, submergent vegetation, algal growth and organic matter were observed within the Pond 11 at the time of the wetland assessment.

Similar to the other two golf course drainage systems, the primary functions of Golf Course Drainage System 3 are Modification of Water Quality and Storm and Floodwater Storage. In particular, these functions are facilitated by the emergent wetland located to the west of Pond 10. As a result of providing these two functions, overall water quality within Golf Course Drainage System 3 is low. The system also provides a moderate degree of functionality with respect to the Modification of Groundwater Recharge/Discharge functions. Given the lack of a permanent outlet, the system offers limited functionality with respect to Export of Detritus. Due primarily to the emergent wetland to the west of Pond 10, as well as the vegetated lower reaches of Ditch 2, the system provides a higher level of functionality for the Diversity of Wetland Vegetation and Contribution to Abundance and Diversity of Wetland Fauna functions, as compared to the other two golf course drainage systems.

Isolated Wetland A

Isolated Wetland A is a common reed-dominated emergent marsh located along the northwestern property boundary with the adjacent residential development. Unlike the three golf course drainage systems, Isolated Wetland A was not constructed or altered for stormwater purposes, although the feature appears to receive overland flow from higher topography within the immediate surrounding area. No surface water was observed within the feature at the time of the wetland functional assessment, however saturated soils were observed several inches below the surface. Evidence of historic clearing was observed along the border of the wetland with the adjacent residential properties.

Based on the Magee-Hollands assessment, the chief functions performed by Isolated Wetland A are Storm and Floodwater Storage and Modification of Water Quality. These functions are due primarily to the fact that the wetland has no outlet, as well as the surficial soils and continuance vegetation cover within the wetland. The wetland also provides a relatively high degree of functionality with respect to Modification of Groundwater Recharge and Contribution to Abundance and Diversity of Wetland Vegetation. Wetland A offers limited functionality for Modification of Groundwater Discharge and Contribution to Abundance and Diversity of Wetland Fauna. Due to the lack of an outlet, Wetland A does not provide any functionality for Export of Detritus and Modification of Stream Flow.

3.0

Conclusions

The wetlands at the Project Site are primarily anthropogenic features that were created or altered to provide drainage and irrigation for the golf course, and to serve as water hazards. These features have been adversely impacted due to stormwater inputs from onsite and offsite sources, as well golf course management practices. The results of the Magee-Hollands wetland functional assessment indicate that the primary functions performed by the Project Site wetlands are the Modification of Groundwater Quality and Storm and Floodwater Storage functions that these features were created or historically altered to perform. As a result of performing these functions, water quality is impaired and bottom substrates within the wetlands have been impacted by mineral and organic sediments. The Project site wetlands as a whole also offer a moderate degree of functionality with respect to the Modification of Groundwater Recharge and Modification of Groundwater Discharge functions to/from the underlying groundwater table. Due to their disturbed condition, impaired water quality and siltation impacts, overall functionality is low for the Diversity of Wetland Vegetation and Contribution to Abundance and Diversity of Wetland Fauna functions. Similarly, due primarily to the lack of permanent outlets, overall functionality is low to non-existent for the Export of Detritus and Modification of Stream flow functions.

Based upon the foregoing results of the wetland functional assessment, the wetlands at the Project Site are currently best-suited for their intended functions as stormwater management features and golf course water hazards.

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Attachment A

Attachment B

Attachment C

Attachment D

Attachment E

Attachment A

FIGURE 1 – EXCERPT OF USGS TOPOGRAPHIC MAP

SITE NAME: Hampshire Country Club
STREET ADDRESS: 1025 Cove Road Mamaroneck, NY 10543
BASE MAP SOURCE: United States Geological Survey Topographic Map – Mamaroneck, New York Quadrangle (2013)

N

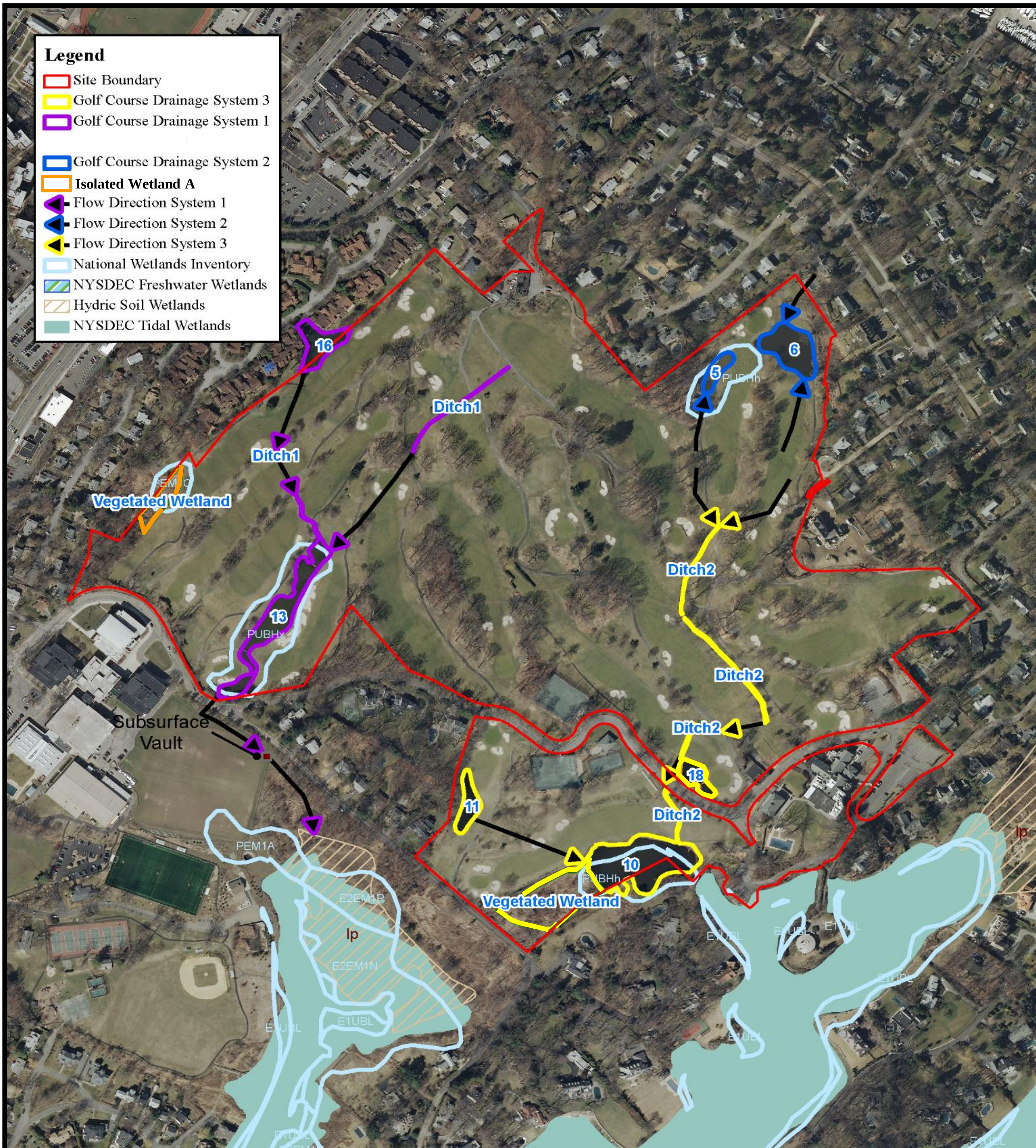

FIGURE 2 – DRAINAGE SYSTEM AND WETLAND MAP

SITE NAME: Hampshire Country Club
STREET ADDRESS: 1025 Cove Road Mamaroneck, NY 10543
BASE MAP SOURCE: *Wetland Characterization Assessment* - Figure 5, prepared by Nelson, Pope and Voorhis, LLC (September 17, 2012), as revised by VHB based on current conditions as observed on May 17-18, 2016

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Attachment B

Photograph No. 1: Pond 16 of Golf Course Drainage System 1 (May 17, 2016).

Photograph No. 2: Ditch 1 of Golf Course Drainage System 1 (May 17, 2016).


Photograph No. 3: Pond 13 of Golf Course Drainage System 1 (May 17, 2016).

Photograph No. 4: Culverts with gate valves at the western end of Pond13, within Golf Course Drainage System 1 (May 17, 2016).


Photograph No. 5: Ditch 2 of Golf Course Drainage System 3 (May 18, 2016).

Photograph No. 6: Lower level (foreground) and upper level (background, with fountain) of Pond 18 of Golf Course Drainage System 3 (May 17, 2016).

Photograph No. 7: Gate valves at the southeastern end of Pond 10. of Golf Course Drainage System 3 (May 18, 2016).

Photograph No. 8: Concrete control structures located along the shoreline of Delancey Cove. The control structures allow intermittent tidal flow to Golf Course Drainage System 3 (May 18, 2016).

Photograph No. 9: Pond 10 (foreground) and contiguous vegetated wetland (background) of Golf Course Drainage System 3 (May 18, 2016).

Photograph No. 10: Pond 11 of Golf Course Drainage System 3 (May 18, 2016).


Photograph No. 11: Isolated Wetland A (May 17, 2016).

Photograph No. 12: Emergent wetland vegetation along the boundary of Isolated Wetland A (May 17, 2016).

Attachment C

WETLAND INVENTORY DATA - CHARACTERIZATION OF WETLAND

Project Name: Hampshire Country Club Date: 5/17/16

Field Investigators: David Kennedy, MS, Project Scientist, VHB

Golf Course Drainage System 1 (Pond #s 13 + 16, ditches)

SURFACE WATER FLOW VECTORS

- ☒ Depressional - 100% Percent/Acreage
- ☐ Slope - ______ Perecent/Acreage
- ☐ Extensive Peatland - ____ Percent/Acreage
- ☐ Lacustrine Fringe - ____ Percent/Acreage
- ☐ Riverine - _____ Percent/Acreage

VEGETATION TYPES

Forested Wetland

- ☐ Evergreen Needle-leaved - ______________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ______________ Percent/Acreage

Scrub Shrub

- ☐ Evergreen Needle-leaved - ______________ Percent/Acreage
- ☐ Evergreen Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ______________ Percent/Acreage

Emergent Wetland

- ☒ Persistent - 3% Percent/Acreage
- ☒ Non-persistent - 2% Percent/acreage
- ☒ Aquatic Bed - 5% Percent/Acreage

Total - 10%

SOIL TYPES

Histosol:

- ☐ Fibric
- ☐ Hemic
- ☒ Sapric (ponds)

Mineral Hydric Soil:

- ☒ Gravelly
- ☐ Sandy
- ☐ Silty
- ☒ Clayey

(drainage ditches)

GEOLOGY

Surficial: glacial till

Bedrock: pelitic schists

Hampshire CC - Golf Course Drainage System 1

PRE-EMPTIVE STATUS

- ☐ Public Ownership
- ☐ Wildlife Management Area
- ☐ Fisheries Management Area
- ☐ Designated State or Federal Protected Wetland
- ☐ Documented Habitat for State or Federal Listed Species
- ☐ Regionally Scarce Wetland Category
- ☐ Historic/Archaeological Area

PLANT SPECIES

NAME	OW	FW	F	FU	DOM	C	S	TS	LS	H
Potamogeton sp.	X				X					X
Iris versicolor	X				X					X
Phragmites australis		X								X

OW-Obligate Wetland
FW- Facultative Wetland
F – Facultative
FU – Facultative Upland

Dom – Dominant
C- Canopy
S- Sapling
TS – Tall Shrub

LS- Low Shrub
H - Herb

Hampshire CC - Golf Course Drainage System 1

WETLAND INVENTORY DATA - CHARACTERIZATION OF MODEL VARIABLES

LANDSCAPE VARIABLES

Size:

- [x] Small (< 10 ACRES)
- [ ] Medium (10-100 ACRES)
- [ ] Large (> 100 ACRES)

Wetland Juxtaposition:

- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below (culvert + tide gate to tidal wetland)
- [ ] Other wetlands Nearby But Not Connected
- [ ] Wetland Isolated

Fire Occurrence and Frequency:

- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-Caused; Predictable
- [ ] Human-Caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:

- [x] Not Scarce (> 5% of total wetland area of region)
- [ ] Scarce (< 5% of total wetland areas of region)

Watershed Land Use:

- [x] > 50% Urbanized
- [ ] 25-50% Urbanized
- [ ] 0-25% Urbanized

HYDROLOGICAL VARIABLES

Surface Water Level Fluctuation of Wetlands:

- [x] High Fluctuation Stormwater + Tidal influences
- [ ] Low Fluctuation
- [ ] Never Inundated

Frequency of Overbank Flooding:

- [x] Return Interval > 5 years
- [ ] Return Interval 2-5 Yeasts
- [ ] Return Interval 1-2 Years
- [ ] No Overbank Flooding

pH:

- [ ] Acid <5.5
- [ ] Circumneutral 5.5-7.4
- [x] Alkaline > 7.4 (7.5)
- [ ] No Water

Surficial Geologic Deposit Under Wetland:

- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [x] Glacial Till

Wetland Land Use:

- [x] High Intensity (i.e. agriculture) (Stormwater, fertilizer + chemical applications)
- [ ] Moderate Intensity (i.e. forestry)
- [ ] Low Intensity (i.e. open space)

Wetland Water Regime:

- [x] Wet: Permanently Flooded, Intermittently Exposed, Semi-Permanently Flooded
- [ ] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:

- [ ] High Gradient > 2%
- [x] Low Gradient < 2%

Degree of Outlet Restriction:

- [x] Restricted Outflow (culverts + tide gates)
- [ ] Unrestricted Outflow
- [ ] No Outflow

Ratio of Wetland Area to Watershed Area:

- [ ] High > 10%
- [x] Low < 10%

Microrelief of Wetland Surface:

- [ ] Pronounced > 45 cm
- [ ] Well Developed 15-45 cm
- [x] Poorly Developed < 15 cm
- [ ] Absent

Inlet/Outlet Class:

- [ ] No Inlet/No Outlet
- [x] No Inlet/Intermittent Outlet (culvert + tide gate
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:

- [ ] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [x] Not Available

Relations of Wetlands' Substrate Elevation to Regional Piezometric Surface:

- [ ] Piezometer Surface Above or at Substrate Elevation
- [ ] Piezometer Surface Below Substrate Elevation
- [x] Not Available

Evidence of Sedimentation:

- [ ] No Evidence Observed
- [x] Sediment Observed on Wetland Substrate (stormwater sediment deposits)
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:

- [x] No Seeps or Springs
- [ ] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:

- [ ]

Histosol:

- [ ] Fibric
- [ ] Hemic
- [x] Sapric (ponds)

Hampshire CC - Golf Course Drainage System 1

Mineral Hydric Soil:

- [x] Gravelly
- [ ] Sandy
- [ ] Silty
- [x] Clayey

VEGETATION VARIABLES

Vegetation Lacking:

- [ ]

Dominant Wetland Type:

- [ ] Forested – Evergreen – Needle-leaved
- [ ] Forested – Deciduous – Broad-leaved
- [ ] Forested – Deciduous – Needle-leaved
- [ ] Scrub Shrub – Evergreen – Broad-leaved
- [ ] Scrub Shrub – Evergreen – Needle-leaved
- [ ] Scrub Shrub – Deciduous – Broad-leaved
- [ ] Scrub Shrub – Decisuous – Needle-leaved
- [x] Emergent – Persistent
- [ ] Emergent – Non-persistent
- [x] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types:

- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

Evenness of Distribution:

- [ ] Even Distribution
- [ ] Moderately Even Distribution
- [x] Highly Uneven Distribution

Vegetation Density/Dominance:

- [x] Sparce (0-20%)
- [ ] Low Density (20-40%)
- [ ] Medium Density (40-60%)
- [ ] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetation Interspersion:

- [ ] High (small groupings, diverse and interspersed)
- [ ] Moderate (broken irregular rings)
- [x] Low (~~large~~ small patches, isolated ~~concentric rings~~)

Number of Layers and Percent Cover:

Number of Layers:

- [ ] 6 or > (actual #)
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

Percent Cover:

- [x] Submergents: 5
- [ ] Floating:
- [ ] Moss-lichen:
- [ ] Short Herb:
- [x] Tall Herb: 5
- [ ] Dwarf shrub:
- [ ] Short shrub:
- [ ] Tall shrub:
- [ ] Sapling:
- [ ] Tree:

Plant Species Diversity:

- [x] Low 1-2 plots sampled
- [ ] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Plant Foods:

- [x] Low (5-25%)
- [ ] Medium (25-50%)
- [ ] High (> 50%)

Cover Distribution:

- [ ] Continuous Cover
- [ ] Small Scattered Patches
- [x] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:

- [ ] Abundant (50% of wetland surface)
- [ ] Moderately Abundant (25-50% of surface)
- [x] Low Abundance (0-25% of surface)

Interspersion of Cover and Open Water:

- [x] < 25% Scattered or Peripheral
- [ ] 26-75 % Scattered or Peripheral
- [ ] > 75% Scattered or Peripheral
- [ ] 100% Cover or Open Water

Stream Sinuosity:

- [ ] Highly Convoluted (Index 1.50 or >)
- [ ] Moderately Convoluted (Index 1.25-1.50)
- [x] Straight/Slightly Irregular (Index 1.10-1.25) (ditches)

Presence of Islands:

- [ ] Several to Many
- [ ] One or Few
- [x] Absent

PROJECT NAME: Hampshire CC - Golf Course Drainage System 1

MODIFICATION OF GROUNDWATER DISCHARGE									
Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:							
VARIABLES	CONDITIONS	D		S		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction									
Inlet/Outlet Class	perennial inlet/no outlet	0		0		0		0	
Nested Piezometer Data	recharge	0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0	
Direct Indicators of Function									
Presence of Springs and Seeps	evidence of perennial steeps or springs	18		15		15		18	
Neated Piezometer Data	discharge condition	18		15		15		18	
Relationship to Regional Piezometric Surface	wetland substrate elevation below piezometric surface	18		15		15		18	
Inlet/Outlet Class	no inlet/perennial outlet	18		15		15		18	
Primary Variables									
Microrelief of Wetland Surfaces	pronounced well developed poorly developed absent	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Inlet/Outlet Class	perennial inlet/perennial outlet intermittent inlet/perennial outlet all other classes	3 2 0		3 2 0		0 0 0		3 2 0	
pH	alkaline circumneutral acid no water present	3 2 0 0		3 2 0 0		3 2 0 0		3 2 0 0	
Surficial Geologic Deposit Under Wetland	high permeability stratified deposits low permeability stratified deposits glacial till	3 2 1		3 2 1		3 2 1		3 2 1	
Wetland water regime	wet; permanently flooded, intermittently exposed semipermanently, flooded drier; seasonally flooded, temporarily flooded, saturated	3 1		0 0		3 1		3 1	
Soil Type	histosol (ponds) mineral hydric soil (ditches) both	3 1 2		3 1		3 1		3 1	
	Total Score: Functional Capacity Index:	10/18 0.55							
	Model Range Index Range:	3-18 .19-1.0		2-15 .16-1.0		3-15 .22-1.0		3-18 .19-1.0	

PROJECT NAME: Hampshire CC Golf Course - Drainage System 1

MODIFICATION OF GROUNDWATER RECHARGE											
Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:									
VARIABLES	CONDITIONS	D		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction											
Inlet/Outlet Class	no inlet/perennial outlet; intermittent inlet/perennial outlet	0								0	
Nested Piezometer Data:	discharge condtion	0		0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0		0	
Presence of Seeps and Springs	presence of seeps or springs	0		0		0		0		0	
Direct Indicators of Function											
Inlet/Outlet Class	perennial inlet/no outlet	21								21	
Nested Piezometer Data	recharge condition	21								21	
Relationship to Regional Peizometeric Surface	wetland substrate elevation below piezometric surface	21								21	
Primary Variables											
Microrelief of Wetland Surface	poorly developed absent well developed pronounced	3 3 2 1		3 3 2 1		1 1 2 3		3 3 2 1		3 3 2 1	
Inlet/Outlet Class	perennial inlet/intermittent outlet all other classes	3 0		0 0		0 0		0 0		3 0	
pH	acid circumneutral alkaline no water present	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Surficial Geologic Deposit Under Wetland	glacial till low permeability stratified deposits high permeability stratified deposits	3 2 1		1 2 3		1 2 3		1 2 3		3 2 1	
Surface Water Level Fluctuation of the Wetland	high fluctuation low fluctuation never inundated	3 2 1		3 2 1		0 0 0		3 2 1		3 2 1	

Hampshire CC Golf Course - Drainage System 1

Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:				
VARIABLES	**CONDITIONS**	**D**	**L**	**EP**	**R**	**F**
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated	3	3	0	3	3
	wet; permanently flooded, intermittently exposed, semipermanently flooded	1	1	0	1	1
Soil Type				0	3	3
	gravelly or sandy mineral hydric	3	3	0	2	2
	silty or clayey mineral hydric	2	2	0	1	1
	sapric histosol	1	1	3	0	0
	fibric or hemic histosol	0	0			
	Total Score:	12/21				
	Model Score:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	0.57				
	Index Range:	.19-1.0	.22-1.0	0.16-1.0	.22-1.0	.19-1.0

* This model should be applied to both year long and seasonal recharge wetlands

* If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half of the year

PROJECT NAME: Hampshire CC - Drainage System 1

STORM AND FLOOD-WATER STORAGE							
Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:					
VARIABLES	CONDITIONS	D Wgt Scr	S Wgt Scr	L Wgt Scr	EP Wgt Scr	R Wgt Scr	F Wgt Scr
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables Inlet/Outlet Class	perennial inlet/intermittent outlet	3	3	0	0	0	3
	intermittent inlet/intermittent outlet	2	2	0	0	0	2
	non-inlet/intermittent outlet	1	1	0	0	0	1
	non-inlet/perennial outlet	1	1	0	0	0	1
	intermittent inlet/perennial outlet	1	1	0	0	0	1
	perennial inlet/perennial outlet	1	1	0	0	0	1
Degree of Outlet Restriction	restricted	3	0	0	0	0	3
	unrestricted	0	0	0	0	0	0
Basin Topographic Gradient	low gradient	3	3	0	3	3	3
	high gradient	1	1	0	0	1	1
Wetland Water Regime	drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
Surface Water Level Fluctuation of the Wetland	high fluctuation	3	0	3	0	3	3
	low fluctuation	2	0	2	0	2	2
	never inundated	0	0	0	0	0	0
Ratio of Wetland Area to Watershed Area	large	3	3	3	0	3	3
	small	1	1	1	0	1	1
Microrelief of Wetland Surface	prounounced	3	3	3	3	3	3
	well developed	2	2	2	2	2	2
	poorly developed	1	1	1	1	1	1
	absent	0	0	0	0	0	0

Hampshire CC - Drainage System 1

STORM AND FLOOD-WATER STORAGE							
Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:					
VARIABLES	CONDITIONS	D	S	L	EP	R	F
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr
Frequency of Overbank Flooding	overbank flooding absent	0	0	0	0	0	0
	return interval of >5 yrs.	0	0	1	0	1	1
	return interval of 2-5 yrs.	0	0	2	0	2	2
	return interval of 1-2 yrs.	0	0	3	0	3	3
Vegetation Density/Dominance	high/very high	3	3	3	3	3	3
	moderate	2	2	2	2	2	2
	sparse/low	1	1	1	1	1	1
	no vegetation	0	0	0	0	0	0
Dead Woody Material	abundant	3	3	3	3	3	3
	moderately abundant	2	2	2	2	2	2
	sparse	1	1	1	1	1	1
	absent	0	0	0	0	0	0
	Total Score:	15/27					
	Functional Capacity Index:	0.55					
	Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
	Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

PROJECT NAME: Hampshire CC - Drainage System 1

MODIFICATION OF STREAM FLOW (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Outlet	0
Direct Indicators of Function	None	

Primary Variables

Storm and Flood Water Storage Function Model Score X Modification of Groundwater Discharge Function Model Score

Total Score: 4

Storm and Flood Water Storage			Modification of Groundwater Discharge			
High*	3	X	High	3	=	9
Mod	2	X	High	3	=	6
Low	1	X	High	3	=	3
High	3	X	Mod	2	=	6
Mod	2	X	Mod	2	=	4
Low	1	X	Mod	2	=	2
High	3	X	Low	1	=	3
Mod	2	X	Low	1	=	2
Low	1	X	Low	1	=	1

Total Score: 4/9

Model Range: 1-9

Function Capacity Index: .44

Index Range:

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

PROJECT NAME: Hampshire CC-Drainage System 1

MODIFICATION OF WATER QUALITY								
Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:						
VARIABLES	**CONDITIONS**	**D**	**S**	**L**	**EP**	**R**	**F**	
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	
Indicators of disfunction	None							
Direct Indicators of Function	Evidence of Sedimentation	18	15	12	12	12	18	
Primary Variables Wetland Land Use	low intensity moderate intensity high intensity	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1	
Degree of Outlet Restriction	restricted outflow no outlet unrestricted outflow	3 2 1	0 0 0	0 0 0	0 0 0	0 0 0	3 2 1	
Inlet/Outlet Type	no outlet intermittent outlet perennial outlet	3 2 1	3 2 1	0 0 0	0 0 0	0 0 0	3 2 1	
Dominant Wetland Type	forested wetland scrub-shrub emergent wetland aquatic bed no vegetation	3 2 2 1 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	
Cover Distribution	forming a continuous cover growing in small scattered patches one or more large patches solitary scattered stems no vegetation	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	
Soil Type	histosol or clayey soil silty soil sandy or gravelly soil	3 2 1	3 2 1	3 2 1	3 0 0	3 2 1	3 2 1	
	Total Score:	18/18						
	Functional Capacity Index:	1.0						
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18	
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0	

PROJECT NAME: Hampshire CC - Drainage System 1

EXPORT OF DETRITUS													
Wetland ID(s): Drainage System 1 HGM Type: D		HGM TYPES:											
VARIABLES	CONDITIONS	D		S		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction	no outlet	0		0				0				0	
Direct Indicators of Function	none												
Primary Variables Wetland Land Use	moderate intensity low intensity high intensity	3 2 1		3 2 1		3 2 1		3 2 1		3 2 1		3 2 1	
Degree of Outlet Restriction	unrestricted outflow restricted outflow	3 1		0 0		0 0		0 0		0 0		3 1	
Inlet/Outlet Class	perennial outlet intermittent outlet	3 1		3 1		0 0		0 0		0 0		3 1	
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated wet; permanently flooded, intermittently exposed, semipermanently flooded	3 1		3 1		3 1		0 1		3 1		3 1	
Vegetation Density/Dominance	high/very high medium sparse/low no vegetation	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Soil type	mineral hydric soil histosol both	3 1	2	3 1		3 1		3 1		3 1		3 1	
	Total Score:	7/18											
	Functional Capacity Index:	0.39											
	Model Range:	5-18		4-15		3-12		2-10		3-12		5-18	
	Index Range:	0.27-1.0		0.26-1.0		0.25-1.0		0.20-1.0		0.25-1.0		0.27-1.0	

PROJECT NAME: Hampshire CC - Drainage System 1

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND VEGETATION (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Vegetation	0
Direct Indicators of Function	None	
Primary Variables		Score:
Plant Species Diversity	high diversity 5 medium diversity 3 low diversity 1	
Vegetation Density/Dominance	high/very high 5 medium 3 sparse/low 1	
Wetland Juxtaposition	connected to upstream and downstream 5 connected above or below 3 other wetlands nearby but not connected (400 m or closer) 1 isolated 0 (culvert connection only)	
		Total Score: 3/15 Model Range: 2-15
		Functional Capacity Index: 0.20 Index Range: 0.13-1.0

s

PROJECT NAME: Hampshire CC - Drainage System 1

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Direct Indicators of Disfunction	None	
Direct Indicators of Function	None	
Primary Variables Watershed Land Use	low intensity (0-25% urbanized) moderate intensity (25-50% urbanized) high intensity (>50% urbanized)	3 2 1
Wetland Land Use	low intensity moderate intensity high intensity	3 2 1
Wetland Water Regime	wet: permanently flooded, intermittently exposed, semipermanently flooded drier: seasonally flooded, temporarily flooded, saturated	3 1
Microrelief of Wetland Surface	pronounced well developed poorly developed absent	3 2 1 0
Number of Wetland Types and Relative Proportions	5 or more types 3-4 types 1-2 types no vegetation	3 2 1 0
	even distribution moderately even distribution highly uneven distribution no vegetation	3 2 1 0
Vegetation Interspersion	high interspersion moderate interspersion low interspersion no vegetation	3 2 1 0

Hampshire CC - Drainage System 1

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (CONT'D)		
Variables	**Conditions**	**Weights**
Number of Layers and Percent Cover	5 or more layers 3-4 layers 1-2 layers no vegetation	3 2 1 0
	layers well developed (>50% cover) layers with moderate cover (26-50% cover) layers poorly distinguishible (<25% cover) no vegetation	3 2 1 0
Interspersion of Vegetation Cover and Open Water	26-75%scattered or peripheral >75% scattered or peripheral <25% scattered or peripheral 100% cover or open water no vegetation	3 2 1 1 0
Size	large (>100 acres) medium (10-100 acres) small (<10 acres)	3 2 1
Wetland Juxtaposition	other wetlands within 400 m and connected above or below other wetlands within 400 m but not connected wetland isolated	3 1 0
Slope Wetlands: Model Range: 4-33 Functional Capacity Index: Index Range: 0.12-1.0	All other HGM types: Total Score: 14/36 Model Range: 4-36 Functional Capacity Index: 0.39 Index Range: 0.11-1.0	

WETLAND INVENTORY DATA - CHARACTERIZATION OF WETLAND

Project Name: Hampshire Country Club Date: 5/18/16

Field Investigators: David Kennedy, MS, Project Scientist, VHB

SURFACE WATER FLOW VECTORS

Golf Course Drainage System 2
(Pond #s 5+6 + subgrade culverts)

- ☒ Depressional - 100% Percent/Acreage
- ☐ Slope - ______ Perecent/Acreage
- ☐ Extensive Peatland - ____ Percent/Acreage
- ☐ Lacustrine Fringe - ____ Percent/Acreage
- ☐ Riverine - _____ Percent/Acreage

VEGETATION TYPES

Forested Wetland

- ☐ Evergreen Needle-leaved - ____________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ____________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ____________ Percent/Acreage

Scrub Shrub

- ☐ Evergreen Needle-leaved - ____________ Percent/Acreage
- ☐ Evergreen Broad-leaved - ____________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ____________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ____________ Percent/Acreage

Emergent Wetland

- ☒ Persistent - 1% Percent/Acreage
- ☐ Non-persistent - 10% Percent/acreage
- ☒ Aquatic Bed - 30% Percent/Acreage

Total - 41%

SOIL TYPES

Histosol:

- ☐ Fibric
- ☒ Hemic
- ☐ Sapric

Mineral Hydric Soil:

- ☐ Gravelly
- ☐ Sandy
- ☒ Silty
- ☒ Clayey

GEOLOGY

Surficial: glacial till

Bedrock: Pelitic Schists

Hampshire CC - Golf Course Drainage System 2

PRE-EMPTIVE STATUS

- ☐ Public Ownership
- ☐ Wildlife Management Area
- ☐ Fisheries Management Area
- ☐ Designated State or Federal Protected Wetland
- ☐ Documented Habitat for State or Federal Listed Species
- ☐ Regionally Scarce Wetland Category
- ☐ Historic/Archaeological Area

PLANT SPECIES

NAME	OW	FW	F	FU	DOM	C	S	TS	LS	H
Lemna minor	X									X
Potamogeton sp.	X				X					X
Iris versicolor	X									X

OW-Obligate Wetland
FW- Facultative Wetland
F – Facultative
FU – Facultative Upland

Dom – Dominant
C- Canopy
S- Sapling
TS – Tall Shrub

LS- Low Shrub
H - Herb

Hampshire CC - Golf Course Drainage System 2

WETLAND INVENTORY DATA - CHARACTERIZATION OF MODEL VARIABLES

LANDSCAPE VARIABLES

Size:

- ☒ Small (< 10 ACRES)
- ☐ Medium (10-100 ACRES)
- ☐ Large (> 100 ACRES)

Wetland Juxtaposition:

- ☐ Connected Upstream and Downstream
- ☐ Only Connected Above
- ☐ Only Connected Below
- ☒ Other wetlands Nearby But Not Connected
- ☐ Wetland Isolated

Fire Occurrence and Frequency:

- ☐ Natural; Predictable Frequency
- ☐ Natural; Sporadic Frequency
- ☐ Human-Caused; Predictable
- ☐ Human-Caused; Sporadic
- ☐ Rare Event
- ☒ No Evidence

Regional Scarcity:

- ☒ Not Scarce (> 5% of total wetland area of region)
- ☐ Scarce (< 5% of total wetland areas of region)

Watershed Land Use:

- ☒ > 50% Urbanized
- ☐ 25-50% Urbanized
- ☐ 0-25% Urbanized

HYDROLOGICAL* VARIABLES

Surface Water Level Fluctuation of Wetlands:

- ☒ High Fluctuation
- ☐ Low Fluctuation
- ☐ Never Inundated

groundwater withdrawals for irrigation. Fluctuations up to 4' ±

Frequency of Overbank Flooding:

- ☒ Return Interval > 5 years
- ☐ Return Interval 2-5 Yeasts
- ☐ Return Interval 1-2 Years
- ☐ No Overbank Flooding

pH:

- ☐ Acid <5.5
- ☐ Circumneutral 5.5-7.4
- ☒ Alkaline > 7.4 7.5
- ☐ No Water

Surficial Geologic Deposit Under Wetland:

- ☐ Low Permeability Stratified Deposits
- ☐ High Permeability Stratified Deposits
- ☒ Glacial Till

Wetland Land Use:

- ☒ High Intensity (i.e. agriculture) Stormwater Chemical + fertilizer application
- ☐ Moderate Intensity (i.e. forestry)
- ☐ Low Intensity (i.e. open space)

Wetland Water Regime:

- ☒ Wet: Permanently Flooded, Intermittently Exposed, Semi-Permanently Flooded
- ☐ Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:

- ☒ High Gradient > 2%
- ☐ Low Gradient < 2%

Degree of Outlet Restriction:

- ☐ Restricted Outflow
- ☐ Unrestricted Outflow
- ☒ No Outflow

Ratio of Wetland Area to Watershed Area:

- ☒ High > 10%
- ☐ Low < 10%

Microrelief of Wetland Surface:

- ☐ Pronounced > 45 cm
- ☐ Well Developed 15-45 cm
- ☐ Poorly Developed < 15 cm
- ☒ Absent

Inlet/Outlet Class: Stormwater + groundwater only

- ☒ No Inlet/No Outlet
- ☐ No Inlet/Intermittent Outlet
- ☐ No Inlet/Perennial Outlet
- ☐ Intermittent Inlet/No Outlet
- ☐ Intermittent Inlet/Intermittent Outlet
- ☐ Intermittent Outlet/Perennial Outlet
- ☐ Perennial Inlet/No Outlet
- ☐ Perennial Inlet/Intermittent Outlet
- ☐ Perennial Inlet/Perennial Outlet

Nested Piezometer Data:

- ☐ Recharge
- ☐ Discharge
- ☐ Horizontal Flow
- ☒ Not Available

Relations of Wetlands' Substrate Elevation to Regional Piezometric Surface:

- ☐ Piezometer Surface Above or at Substrate Elevation
- ☐ Piezometer Surface Below Substrate Elevation
- ☒ Not Available

Evidence of Sedimentation:

- ☐ No Evidence Observed
- ☒ Sediment Observed on Wetland Substrate Stormwater sediment deposits
- ☐ Fluvaquent Soils

Evidence of Seeps and Springs:

- ☒ No Seeps or Springs
- ☐ Seeps Observed
- ☐ Perennial Spring
- ☐ Intermittent Spring

SOIL VARIABLES

Soil Lacking:

- ☐

Histosol:

- ☐ Fibric
- ☒ Hemic
- ☐ Sapric

* The primary hydrological source for the two irrigation ponds is groundwater withdrawals from an adjacent well. Minor contributions from drainage culverts. The ponds are the primary irrigation source for the golf course

Hampshire CC - Golf Course Drainage System 2

Mineral Hydric Soil:

- ☐ Gravelly
- ☐ Sandy
- ☒ Silty
- ☒ Clayey

VEGETATION VARIABLES

Vegetation Lacking:

☐

Dominant Wetland Type:

- ☐ Forested – Evergreen – Needle-leaved
- ☐ Forested – Deciduous – Broad-leaved
- ☐ Forested – Deciduous – Needle-leaved
- ☐ Scrub Shrub – Evergreen – Broad-leaved
- ☐ Scrub Shrub – Evergreen – Needle-leaved
- ☐ Scrub Shrub – Deciduous – Broad-leaved
- ☐ Scrub Shrub – Decisuous – Needle-leaved
- ☒ Emergent – Persistent
- ☐ Emergent – Non-persistent
- ☒ Aquatic Bed

Number of Types & Relative Proportions:

Number of Types:

- ☐ Actual #
- ☐ 5
- ☐ 4
- ☐ 3
- ☒ 2
- ☐ 1

Evenness of Distribution:

- ☐ Even Distribution
- ☐ Moderately Even Distribution
- ☒ Highly Uneven Distribution

Vegetation Density/Dominance:

- ☐ Sparce (0-20%)
- ☒ Low Density (20-40%)
- ☐ Medium Density (40-60%)
- ☐ High Density (60-80%)
- ☐ Very High Density (80-100%)

Vegetation Interspersion:

- ☐ High (small groupings, diverse and interspersed)
- ☐ Moderate (broken irregular rings)
- ☒ Low (large patches, + small patches ~~concentric rings~~)

Number of Layers and Percent Cover:

Number of Layers:

- ☐ 6 or > (actual #)
- ☐ 5
- ☐ 4
- ☐ 3
- ☒ 2
- ☐ 1

Percent Cover:

- ☒ Submergents: 20
- ☒ Floating: 20
- ☐ Moss-lichen:
- ☐ Short Herb:
- ☒ Tall Herb: 1
- ☐ Dwarf shrub:
- ☐ Short shrub:
- ☐ Tall shrub:
- ☐ Sapling:
- ☐ Tree:

Plant Species Diversity:

- ☒ Low 1-2 plots sampled
- ☐ Medium 3-4 plots sampled
- ☐ High 5 or more plots sampled

Proportion of Animal Plant Foods:

- ☒ Low (5-25%)
- ☐ Medium (25-50%)
- ☐ High (> 50%)

Cover Distribution:

- ☐ Continuous Cover
- ☐ Small Scattered Patches
- ☒ 1 or More Large Patches; Parts of Site Open
- ☐ Solitary, Scattered Stems

Dead Woody Material:

- ☐ Abundant (50% of wetland surface)
- ☐ Moderately Abundant (25-50% of surface)
- ☒ Low Abundance (0-25% of surface)

Interspersion of Cover and Open Water:

- ☒ < 25% Scattered or Peripheral
- ☐ 26-75 % Scattered or Peripheral
- ☐ > 75% Scattered or Peripheral
- ☐ 100% Cover or Open Water

Stream Sinuosity: N/A

- ☐ Highly Convoluted (Index 1.50 or >)
- ☐ Moderately Convoluted (Index 1.25-1.50)
- ☐ Straight/Slightly Irregular (Index 1.10-1.25)

Presence of Islands:

- ☐ Several to Many
- ☐ One or Few
- ☒ Absent

PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

MODIFICATION OF GROUNDWATER DISCHARGE									
Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:							
VARIABLES	CONDITIONS	D		S		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction									
Inlet/Outlet Class	perennial inlet/no outlet	0		0		0		0	
Nested Piezometer Data	recharge	0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0	
Direct Indicators of Function									
Presence of Springs and Seeps	evidence of perennial steeps or springs	18		15		15		18	
Neated Piezometer Data	discharge condition	18		15		15		18	
Relationship to Regional Piezometric Surface	wetland substrate elevation below piezometric surface	18		15		15		18	
Inlet/Outlet Class	no inlet/perennial outlet	18		15		15		18	
Primary Variables									
Microrelief of Wetland Surfaces	pronounced well developed poorly developed absent	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Inlet/Outlet Class	perennial inlet/perennial outlet intermittent inlet/perennial outlet all other classes	3 2 0		3 2 0		0 0 0		3 2 0	
pH	alkaline circumneutral acid no water present	3 2 0 0		3 2 0 0		3 2 0 0		3 2 0 0	
Surficial Geologic Deposit Under Wetland	high permeability stratified deposits low permeability stratified deposits glacial till	3 2 1		3 2 1		3 2 1		3 2 1	
Wetland water regime	wet; permanently flooded, intermittently exposed semipermanently, flooded drier; seasonally flooded, temporarily flooded, saturated	3 1		0 0		3 1		3 1	
Soil Type	histosol mineral hydric soil both	3 1 2		3 1		3 1		3 1	
	Total Score: Functional Capacity Index:	9/18 0.50							
	Model Range Index Range:	3-18 .19-1.0		2-15 .16-1.0		3-15 .22-1.0		3-18 .19-1.0	

PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

MODIFICATION OF GROUNDWATER RECHARGE											
Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:									
VARIABLES	CONDITIONS	D		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction											
Inlet/Outlet Class	no inlet/perennial outlet; intermittent inlet/perennial outlet	0								0	
Nested Piezometer Data:	discharge condtion	0		0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0		0	
Presence of Seeps and Springs	presence of seeps or springs	0		0		0		0		0	
Direct Indicators of Function											
Inlet/Outlet Class	perennial inlet/no outlet	21								21	
Nested Piezometer Data	recharge condition	21								21	
Relationship to Regional Peizometeric Surface	wetland substrate elevation below piezometric surface	21								21	
Primary Variables											
Microrelief of Wetland Surface	poorly developed absent well developed pronounced	3 3 2 1		3 3 2 1		1 1 2 3		3 3 2 1		3 3 2 1	
Inlet/Outlet Class	perennial inlet/intermittent outlet all other classes	3 0		0 0		0 0		0 0		3 0	
pH	acid circumneutral alkaline no water present	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Surficial Geologic Deposit Under Wetland	glacial till low permeability stratified deposits high permeability stratified deposits	3 2 1		1 2 3		1 2 3		1 2 3		3 2 1	
Surface Water Level Fluctuation of the Wetland	high fluctuation* low fluctuation never inundated *artificially maintained from pumped groundwater	3 2 1		3 2 1		0 0 0		3 2 1		3 2 1	

Hampshire CC - Golf Course Drainage System 2

Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:									
VARIABLES	CONDITIONS	D		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated	3		3		0		3		3	
	wet; permanently flooded, intermittently exposed, semipermanently flooded	1		1		0		1		1	
Soil Type	gravelly or sandy mineral hydric	3		3		0		3		3	
	silty or clayey mineral hydric	2		2		0		2		2	
	sapric histosol	1		1		0		1		1	
	fibric or hemic histosol	0		0		3		0		0	
	Total Score:	9/21									
	Model Score:	4-21		4-18		2-12		4-18		4-21	
	Functional Capacity Index:	0.43									
	Index Range:	.19-1.0		.22-1.0		0.16-1.0		.22-1.0		.19-1.0	

* This model should be applied to both year long and seasonal recharge wetlands

* If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half of the year

PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

STORM AND FLOOD-WATER STORAGE							
Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:					
VARIABLES	CONDITIONS	D	S	L	EP	R	F
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr
Indicators of disfunction	none						
Direct Indicators of Function	no outlet	27	21				30
Primary Variables Inlet/Outlet Class	perennial inlet/intermittent outlet	3	3	0	0	0	3
	intermittent inlet/intermittent outlet	2	2	0	0	0	2
	non-inlet/intermittent outlet	1	1	0	0	0	1
	non-inlet/perennial outlet	1	1	0	0	0	1
	intermittent inlet/perennial outlet	1	1	0	0	0	1
	perennial inlet/perennial outlet	1	1	0	0	0	1
Degree of Outlet Restriction	restricted	3	0	0	0	0	3
	unrestricted	0	0	0	0	0	0
Basin Topographic Gradient	low gradient	3	3	0	3	3	3
	high gradient	1	1	0	0	1	1
Wetland Water Regime	drier: seasonally flooded, temporarily flooded, saturated	3	3	3	0	3	3
	wet: permanently flooded, intermittently exposed, semipermanently flooded	1	1	1	0	1	1
Surface Water Level Fluctuation of the Wetland	high fluctuation	3	0	3	0	3	3
	low fluctuation	2	0	2	0	2	2
	never inundated	0	0	0	0	0	0
Ratio of Wetland Area to Watershed Area	large	3	3	3	0	3	3
	small	1	1	1	0	1	1
Microrelief of Wetland Surface	prounounced	3	3	3	3	3	3
	well developed	2	2	2	2	2	2
	poorly developed	1	1	1	1	1	1
	absent	0	0	0	0	0	0

Hampshire CC - Golf Course Drainage System 2

STORM AND FLOOD-WATER STORAGE													
Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:											
VARIABLES	CONDITIONS	D		S		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Frequency of Overbank Flooding	overbank flooding absent	0		0		0		0		0		0	
	return interval of >5 yrs.	0		0		1		0		1		1	
	return interval of 2-5 yrs.	0		0		2		0		2		2	
	return interval of 1-2 yrs.	0		0		3		0		3		3	
Vegetation Density/Dominance	high/very high	3		3		3		3		3		3	
	moderate	2		2		2		2		2		2	
	sparse/low	1		1		1		1		1		1	
	no vegetation	0		0		0		0		0		0	
Dead Woody Material	abundant	3		3		3		3		3		3	
	moderately abundant	2		2		2		2		2		2	
	sparse	1		1		1		1		1		1	
	absent	0		0		0		0		0		0	
	Total Score:	27/27											
	Functional Capacity Index:	1.0											
	Model Range:	4-27		4-21		2-21		0-12		3-24		4-30	
	Index Range:	0.15-1.0		0.19-1.0		0.09-1.0		0-1.0		0.12-1.0		0.13-1.0	

PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

MODIFICATION OF STREAM FLOW (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Outlet	0
Direct Indicators of Function	None	

Primary Variables

Storm and Flood Water Storage Function Model Score		X	Modification of Groundwater Discharge Function Model Score				Total Score:
High*	3	X	High	3	=	9	
Mod	2	X	High	3	=	6	
Low	1	X	High	3	=	3	
High	3	X	Mod	2	=	6	
Mod	2	X	Mod	2	=	4	
Low	1	X	Mod	2	=	2	
High	3	X	Low	1	=	3	
Mod	2	X	Low	1	=	2	
Low	1	X	Low	1	=	1	

Total Score: 0/9

Model Range: 1-9

Function Capacity Index: 0.0

Index Range:

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

MODIFICATION OF WATER QUALITY							
Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:					
VARIABLES	**CONDITIONS**	**D**	**S**	**L**	**EP**	**R**	**F**
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr
Indicators of disfunction	None						
Direct Indicators of Function	Evidence of Sedimentation	18	15	12	12	12	18
Primary Variables Wetland Land Use	low intensity	3	3	3	3	3	3
	moderate intensity	2	2	2	2	2	2
	high intensity	1	1	1	1	1	1
Degree of Outlet Restriction	restricted outflow	3	0	0	0	0	3
	no outlet	2	0	0	0	0	2
	unrestricted outflow	1	0	0	0	0	1
Inlet/Outlet Type	no outlet	3	3	0	0	0	3
	intermittent outlet	2	2	0	0	0	2
	perennial outlet	1	1	0	0	0	1
Dominant Wetland Type	forested wetland	3	3	3	3	3	3
	scrub-shrub	2	2	2	2	2	2
	emergent wetland	2	2	2	2	2	2
	aquatic bed	1	0	0	0	0	0
	no vegetation	0	0	0	0	0	0
Cover Distribution	forming a continuous cover	3	3	3	3	3	3
	growing in small scattered patches	2	2	2	2	2	2
	one or more large patches	1	1	1	1	1	1
	solitary scattered stems	1	1	1	1	1	1
	no vegetation	0	0	0	0	0	0
Soil Type	histosol or clayey soil	3	3	3	3	3	3
	silty soil	2	2	2	0	2	2
	sandy or gravelly soil	1	1	1	0	1	1
	Total Score:	18/18					
	Functional Capacity Index:	1.00					
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

PROJECT NAME: Hampshire Country Club - Golf Course Drainage System 2

EXPORT OF DETRITUS													
Wetland ID(s): Drainage System 2 HGM Type: D		HGM TYPES:											
VARIABLES	CONDITIONS	D		S		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction	no outlet	0		0				0				0	
Direct Indicators of Function	none												
Primary Variables Wetland Land Use	moderate intensity low intensity high intensity	3 2 1		3 2 1		3 2 1		3 2 1		3 2 1		3 2 1	
Degree of Outlet Restriction	unrestricted outflow restricted outflow	3 1		0 0		0 0		0 0		0 0		3 1	
Inlet/Outlet Class	perennial outlet intermittent outlet	3 1		3 1		0 0		0 0		0 0		3 1	
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated wet; permanently flooded, intermittently exposed, semipermanently flooded	3 1		3 1		3 1		0 1		3 1		3 1	
Vegetation Density/Dominance	high/very high medium sparse/low no vegetation	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Soil type	mineral hydric soil histosol	3 1		3 1		3 1		3 1		3 1		3 1	
	Total Score: Functional Capacity Index:	0/18 0.0											
	Model Range: Index Range:	5-18 0.27-1.0		4-15 0.26-1.0		3-12 0.25-1.0		2-10 0.20-1.0		3-12 0.25-1.0		5-18 0.27-1.0	

PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND VEGETATION (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Vegetation	0
Direct Indicators of Function	None	
Primary Variables Plant Species Diversity Vegetation Density/Dominance Wetland Juxtaposition	 high diversity 5 medium diversity 3 low diversity 1 high/very high 5 medium 3 sparse/low 1 connected to upstream and downstream 5 connected above or below 3 other wetlands nearby but not connected (400 m or closer) 1 isolated 0	Score:
		Total Score: 3/15 Model Range: 2-15
		Functional Capacity Index: 0.20 Index Range: 0.13-1.0

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PROJECT NAME: Hampshire CC - Golf Course Drainage System 2

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Direct Indicators of Disfunction	None	
Direct Indicators of Function	None	
Primary Variables Watershed Land Use	low intensity (0-25% urbanized) moderate intensity (25-50% urbanized) high intensity (>50% urbanized)	3 2 1
Wetland Land Use	low intensity moderate intensity high intensity	3 2 1
Wetland Water Regime	wet: permanently flooded, intermittently exposed, semipermanently flooded drier: seasonally flooded, temporarily flooded, saturated	3 1
Microrelief of Wetland Surface	pronounced well developed poorly developed absent	3 2 1 0
Number of Wetland Types and Relative Proportions	5 or more types 3-4 types 1-2 types no vegetation	3 2 1 0
	even distribution moderately even distribution highly uneven distribution no vegetation	3 2 1 0
Vegetation Interspersion	high interspersion moderate interspersion low interspersion no vegetation	3 2 1 0

Hampshire CC - Golf Course Drainage System 2

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (CONT'D)		
Variables	**Conditions**	**Weights**
Number of Layers and Percent Cover	5 or more layers 3-4 layers 1-2 layers no vegetation	3 2 1 0
	layers well developed (>50% cover) layers with moderate cover (26-50% cover) layers poorly distinguishible (<25% cover) no vegetation	3 2 1 0
Interspersion of Vegetation Cover and Open Water	26-75%scattered or peripheral >75% scattered or peripheral <25% scattered or peripheral 100% cover or open water no vegetation	3 2 1 1 0
Size	large (>100 acres) medium (10-100 acres) small (<10 acres)	3 2 1
Wetland Juxtaposition	other wetlands within 400 m and connected above or below other wetlands within 400 m but not connected wetland isolated	3 1 0
Slope Wetlands: Model Range: 4-33 Functional Capacity Index: Index Range: 0.12-1.0	All other HGM types: Total Score: 13/36 Model Range: 4-36 Functional Capacity Index: 0.36 Index Range: 0.11-1.0	

WETLAND INVENTORY DATA - CHARACTERIZATION OF WETLAND

Project Name: Hampshire Country Club Date: 5/13/06

Field Investigators: David Kennedy, MS, Project Scientist, VHB

SURFACE WATER FLOW VECTORS

Golf Course Drainage System 3
(Ponds 10, 11, 13, emergent wetland + ditches)

- ☒ Depressional - 100% Percent/Acreage
- ☐ Slope - ______ Perecent/Acreage
- ☐ Extensive Peatland - ____ Percent/Acreage
- ☐ Lacustrine Fringe - ____ Percent/Acreage
- ☐ Riverine - _____ Percent/Acreage

VEGETATION TYPES

Forested Wetland

- ☐ Evergreen Needle-leaved - ______________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ______________ Percent/Acreage

Scrub Shrub

- ☐ Evergreen Needle-leaved - ______________ Percent/Acreage
- ☐ Evergreen Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ______________ Percent/Acreage

Emergent Wetland

- ☐ Persistent - 40% Percent/Acreage
- ☐ Non-persistent - ______________ Percent/acreage
- ☐ Aquatic Bed - 25% Percent/Acreage

Total - 65%

SOIL TYPES

Histosol:

- ☐ Fibric
- ☒ Hemic
- ☐ Sapric

Mineral Hydric Soil:

- ☒ Gravelly
- ☐ Sandy
- ☐ Silty
- ☒ Clayey

GEOLOGY

Surficial: glacial till

Bedrock: pelitic schists

Hampshire CC - Golf Course Drainage System 3

PRE-EMPTIVE STATUS

- ☐ Public Ownership
- ☐ Wildlife Management Area
- ☐ Fisheries Management Area
- ☐ Designated State or Federal Protected Wetland
- ☐ Documented Habitat for State or Federal Listed Species
- ☐ Regionally Scarce Wetland Category
- ☐ Historic/Archaeological Area

PLANT SPECIES

NAME	OW	FW	F	FU	DOM	C	S	TS	LS	H
Iris versicolor	X				X					X
Rudbeckia lacinata		X								X
Phalaris arundinacea		X								X
Lemna minor	X				X					X
Phragmites australis		X			X					X
Potamogeton sp.	X				X					X
Polygonum cuspidatum										X
Spartina alterniflora	X									X

OW-Obligate Wetland
FW- Facultative Wetland
F – Facultative
FU – Facultative Upland

Dom – Dominant
C- Canopy
S- Sapling
TS – Tall Shrub

LS- Low Shrub
H - Herb

Hampshire CC - Golf Course Drainage System 3

WETLAND INVENTORY DATA - CHARACTERIZATION OF MODEL VARIABLES

LANDSCAPE VARIABLES

Size:

- [x] Small (< 10 ACRES)
- [ ] Medium (10-100 ACRES)
- [ ] Large (> 100 ACRES)

Wetland Juxtaposition:

- [ ] Connected Upstream and Downstream
- [ ] Only Connected Above
- [x] Only Connected Below culverts/tide gates
- [ ] Other wetlands Nearby But Not Connected to tidal wetland

Wetland Isolated

Fire Occurrence and Frequency:

- [ ] Natural; Predictable Frequency
- [ ] Natural; Sporadic Frequency
- [ ] Human-Caused; Predictable
- [ ] Human-Caused; Sporadic
- [ ] Rare Event
- [x] No Evidence

Regional Scarcity:

- [x] Not Scarce (> 5% of total wetland area of region)
- [ ] Scarce (< 5% of total wetland areas of region)

Watershed Land Use:

- [x] > 50% Urbanized
- [ ] 25-50% Urbanized
- [ ] 0-25% Urbanized

HYDROLOGICAL VARIABLES

Surface Water Level Fluctuation of Wetlands:

- [x] High Fluctuation
- [ ] Low Fluctuation
- [ ] Never Inundated

Pond 10 is tidally influenced

Frequency of Overbank Flooding:

- [ ] Return Interval > 5 years
- [ ] Return Interval 2-5 Yeasts
- [ ] Return Interval 1-2 Years
- [ ] No Overbank Flooding

pH:

- [ ] Acid <5.5
- [ ] Circumneutral 5.5-7.4
- [ ] Alkaline > 7.4
- [ ] No Water

Surficial Geologic Deposit Under Wetland:

- [ ] Low Permeability Stratified Deposits
- [ ] High Permeability Stratified Deposits
- [ ] Glacial Till

Wetland Land Use:

- [x] High Intensity (i.e. agriculture) Stormwater chemical + fertilizer applications
- [ ] Moderate Intensity (i.e. forestry)
- [ ] Low Intensity (i.e. open space)

Wetland Water Regime:

- [x] Wet: Permanently Flooded, Intermittently Exposed, Semi-Permanently Flooded
- [ ] Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:

- [x] High Gradient > 2%
- [ ] Low Gradient < 2%

Degree of Outlet Restriction:

- [x] Restricted Outflow culverts + tide gates
- [ ] Unrestricted Outflow
- [ ] No Outflow

Ratio of Wetland Area to Watershed Area:

- [ ] High > 10%
- [x] Low < 10%

Microrelief of Wetland Surface:

- [ ] Pronounced > 45 cm
- [ ] Well Developed 15-45 cm
- [x] Poorly Developed < 15 cm
- [ ] Absent

Inlet/Outlet Class:

- [ ] No Inlet/No Outlet
- [x] No Inlet/Intermittent Outlet
- [ ] No Inlet/Perennial Outlet
- [ ] Intermittent Inlet/No Outlet
- [ ] Intermittent Inlet/Intermittent Outlet
- [ ] Intermittent Outlet/Perennial Outlet
- [ ] Perennial Inlet/No Outlet
- [ ] Perennial Inlet/Intermittent Outlet
- [ ] Perennial Inlet/Perennial Outlet

Nested Piezometer Data:

- [ ] Recharge
- [ ] Discharge
- [ ] Horizontal Flow
- [x] Not Available

Relations of Wetlands' Substrate Elevation to Regional Piezometric Surface:

- [ ] Piezometer Surface Above or at Substrate Elevation
- [ ] Piezometer Surface Below Substrate Elevation
- [x] Not Available

Evidence of Sedimentation:

- [ ] No Evidence Observed
- [x] Sediment Observed on Wetland Substrate stormwater deposits
- [ ] Fluvaquent Soils

Evidence of Seeps and Springs:

- [x] No Seeps or Springs
- [ ] Seeps Observed
- [ ] Perennial Spring
- [ ] Intermittent Spring

SOIL VARIABLES

Soil Lacking:

- [ ]

Histosol:

- [ ] Fibric
- [x] Hemic
- [ ] Sapric

Hampshire CC - Golf Course Drainage System 3

Mineral Hydric Soil:

- [x] Gravelly
- [ ] Sandy
- [ ] Silty
- [x] Clayey

VEGETATION VARIABLES

Vegetation Lacking:

- [ ]

Dominant Wetland Type:

- [ ] Forested – Evergreen – Needle-leaved
- [ ] Forested – Deciduous – Broad-leaved
- [ ] Forested – Deciduous – Needle-leaved
- [ ] Scrub Shrub – Evergreen – Broad-leaved
- [ ] Scrub Shrub – Evergreen – Needle-leaved
- [ ] Scrub Shrub – Deciduous – Broad-leaved
- [ ] Scrub Shrub – Decisuous – Needle-leaved
- [x] Emergent – Persistent
- [ ] Emergent – Non-persistent
- [x] Aquatic Bed

Number of Types & Relative Proportions:

Number of Types:

- [ ] Actual #
- [ ] 5
- [ ] 4
- [ ] 3
- [x] 2
- [ ] 1

Evenness of Distribution:

- [ ] Even Distribution
- [x] Moderately Even Distribution
- [ ] Highly Uneven Distribution

Vegetation Density/Dominance:

- [ ] Sparce (0-20%)
- [ ] Low Density (20-40%)
- [x] Medium Density (40-60%)
- [ ] High Density (60-80%)
- [ ] Very High Density (80-100%)

Vegetation Interspersion:

- [ ] High (small groupings, diverse and interspersed)
- [x] Moderate (broken irregular rings)
- [ ] Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers:

- [ ] 6 or > (actual #)
- [ ] 5
- [x] 4
- [ ] 3
- [ ] 2
- [ ] 1

Percent Cover:

- [x] Submergents: 25
- [x] Floating: 5
- [ ] Moss-lichen:
- [x] Short Herb: 5
- [x] Tall Herb: 40
- [ ] Dwarf shrub:
- [ ] Short shrub:
- [ ] Tall shrub:
- [ ] Sapling:
- [ ] Tree:

Plant Species Diversity:

- [ ] Low 1-2 plots sampled
- [x] Medium 3-4 plots sampled
- [ ] High 5 or more plots sampled

Proportion of Animal Plant Foods:

- [ ] Low (5-25%)
- [x] Medium (25-50%)
- [ ] High (> 50%)

Cover Distribution:

- [ ] Continuous Cover
- [ ] Small Scattered Patches
- [x] 1 or More Large Patches; Parts of Site Open
- [ ] Solitary, Scattered Stems

Dead Woody Material:

- [ ] Abundant (50% of wetland surface)
- [ ] Moderately Abundant (25-50% of surface)
- [x] Low Abundance (0-25% of surface)

Interspersion of Cover and Open Water:

- [ ] < 25% Scattered or Peripheral
- [x] 26-75 % Scattered or Peripheral
- [ ] > 75% Scattered or Peripheral
- [ ] 100% Cover or Open Water

Stream Sinuosity:

- [ ] Highly Convoluted (Index 1.50 or >)
- [ ] Moderately Convoluted (Index 1.25-1.50)
- [x] Straight/Slightly Irregular (Index 1.10-1.25)

Presence of Islands:

- [ ] Several to Many
- [ ] One or Few
- [x] Absent

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

MODIFICATION OF GROUNDWATER DISCHARGE									
Wetland ID(s): Drainage System 3 HGM Type: D		HGM TYPES:							
VARIABLES	CONDITIONS	D		S		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction									
Inlet/Outlet Class	perennial inlet/no outlet	0		0		0		0	
Nested Piezometer Data	recharge	0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0	
Direct Indicators of Function									
Presence of Springs and Seeps	evidence of perennial steeps or springs	18		15		15		18	
Neated Piezometer Data	discharge condition	18		15		15		18	
Relationship to Regional Piezometric Surface	wetland substrate elevation below piezometric surface	18		15		15		18	
Inlet/Outlet Class	no inlet/perennial outlet	18		15		15		18	
Primary Variables									
Microrelief of Wetland Surfaces	pronounced well developed poorly developed absent	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Inlet/Outlet Class	perennial inlet/perennial outlet intermittent inlet/perennial outlet all other classes	3 2 0		3 2 0		0 0 0		3 2 0	
pH	alkaline circumneutral acid no water present	3 2 0 0		3 2 0 0		3 2 0 0		3 2 0 0	
Surficial Geologic Deposit Under Wetland	high permeability stratified deposits low permeability stratified deposits glacial till	3 2 1		3 2 1		3 2 1		3 2 1	
Wetland water regime	wet; permanently flooded, intermittently exposed semipermanently, flooded drier; seasonally flooded, temporarily flooded, saturated	3 1		0 0		3 1		3 1	
Soil Type	histosol mineral hydric soil both	3 1 2		3 1		3 1		3 1	
	Total Score: Functional Capacity Index:	10/18 0.55							
	Model Range Index Range:	3-18 .19-1.0		2-15 .16-1.0		3-15 .22-1.0		3-18 .19-1.0	

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

MODIFICATION OF GROUNDWATER RECHARGE											
Wetland ID(s): Drainage System 3 HGM Type: D		HGM TYPES:									
VARIABLES	CONDITIONS	D		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction											
Inlet/Outlet Class	no inlet/perennial outlet; intermittent inlet/perennial outlet	0								0	
Nested Piezometer Data:	discharge condtion	0		0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0		0	
Presence of Seeps and Springs	presence of seeps or springs	0		0		0		0		0	
Direct Indicators of Function											
Inlet/Outlet Class	perennial inlet/no outlet	21								21	
Nested Piezometer Data	recharge condition	21								21	
Relationship to Regional Peizometeric Surface	wetland substrate elevation below piezometric surface	21								21	
Primary Variables											
Microrelief of Wetland Surface	poorly developed absent well developed pronounced	3 3 2 1		3 3 2 1		1 1 2 3		3 3 2 1		3 3 2 1	
Inlet/Outlet Class	perennial inlet/intermittent outlet all other classes	3 0		0 0		0 0		0 0		3 0	
pH	acid circumneutral alkaline no water present	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Surficial Geologic Deposit Under Wetland	glacial till low permeability stratified deposits high permeability stratified deposits	3 2 1		1 2 3		1 2 3		1 2 3		3 2 1	
Surface Water Level Fluctuation of the Wetland	high fluctuation low fluctuation never inundated	3 2 1		3 2 1		0 0 0		3 2 1		3 2 1	

Hampshire CC - Golf Course Drainage System 3

Wetland ID(s): Drainage System 3 HGM Type: D		HGM TYPES:									
VARIABLES	CONDITIONS	D		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated	3		3		0		3		3	
	wet; permanently flooded, intermittently exposed, semipermanently flooded	1		1		0		1		1	
Soil Type ~25%	gravelly or sandy mineral hydric	3		3		0		3		3	
	silty or clayey mineral hydric	2		2		0		2		2	
	sapric histosol	1		1		0		1		1	
	fibric or hemic histosol ~75%	0		0		3		0		0	
	Total Score:	13/21									
	Model Score:	4-21		4-18		2-12		4-18		4-21	
	Functional Capacity Index:	0.62									
	Index Range:	.19-1.0		.22-1.0		0.16-1.0		.22-1.0		.19-1.0	

* This model should be applied to both year long and seasonal recharge wetlands

* If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half of the year

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

STORM AND FLOOD-WATER STORAGE

Wetland ID(s): Drainage System 3
HGM Type: D

HGM TYPES:

VARIABLES	CONDITIONS	D Wgt	D Scr	S Wgt	S Scr	L Wgt	L Scr	EP Wgt	EP Scr	R Wgt	R Scr	F Wgt	F Scr
Indicators of disfunction	none												
Direct Indicators of Function	no outlet	27		21								30	
Primary Variables Inlet/Outlet Class	perennial inlet/intermittent outlet	3		3		0		0		0		3	
	intermittent inlet/intermittent outlet	2		2		0		0		0		2	
	non-inlet/intermittent outlet	1		1		0		0		0		1	
	non-inlet/perennial outlet	1		1		0		0		0		1	
	intermittent inlet/perennial outlet	1		1		0		0		0		1	
	perennial inlet/perennial outlet	1		1		0		0		0		1	
Degree of Outlet Restriction	restricted	3		0		0		0		0		3	
	unrestricted	0		0		0		0		0		0	
Basin Topographic Gradient	low gradient	3		3		0		3		3		3	
	high gradient	1		1		0		0		1		1	
Wetland Water Regime	drier: seasonally flooded, temporarily flooded, saturated	3		3		3		0		3		3	
	wet: permanently flooded, intermittently exposed, semipermanently flooded	1		1		1		0		1		1	
Surface Water Level Fluctuation of the Wetland	high fluctuation	3		0		3		0		3		3	
	low fluctuation	2		0		2		0		2		2	
	never inundated	0		0		0		0		0		0	
Ratio of Wetland Area to Watershed Area	large	3		3		3		0		3		3	
	small	1		1		1		0		1		1	
Microrelief of Wetland Surface	prounounced	3		3		3		3		3		3	
	well developed	2		2		2		2		2		2	
	poorly developed	1		1		1		1		1		1	
	absent	0		0		0		0		0		0	

Hampshire CC - Golf Course Drainage System 3

STORM AND FLOOD-WATER STORAGE

Wetland ID(s): Drainage System 3
HGM Type: D

HGM TYPES:

VARIABLES	CONDITIONS	D Wgt Scr	S Wgt Scr	L Wgt Scr	EP Wgt Scr	R Wgt Scr	F Wgt Scr
Frequency of Overbank Flooding	overbank flooding absent	0	0	0	0	0	0
	return interval of >5 yrs.	0	0	1	0	1	1
	return interval of 2-5 yrs.	0	0	2	0	2	2
	return interval of 1-2 yrs.	0	0	3	0	3	3
Vegetation Density/Dominance	high/very high	3	3	3	3	3	3
	moderate	2	2	2	2	2	2
	sparse/low	1	1	1	1	1	1
	no vegetation	0	0	0	0	0	0
Dead Woody Material	abundant	3	3	3	3	3	3
	moderately abundant	2	2	2	2	2	2
	sparse	1	1	1	1	1	1
	absent	0	0	0	0	0	0
	Total Score:	14/27					
	Functional Capacity Index:	0.52					
	Model Range:	4-27	4-21	2-21	0-12	3-24	4-30
	Index Range:	0.15-1.0	0.19-1.0	0.09-1.0	0-1.0	0.12-1.0	0.13-1.0

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

MODIFICATION OF STREAM FLOW (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Outlet	0
Direct Indicators of Function	None	

Primary Variables

Storm and Flood Water Storage Function Model Score X Modification of Groundwater Discharge Function Model Score

Total Score: 4

High*	3	X	High	3	=	9
Mod	2	X	High	3	=	6
Low	1	X	High	3	=	3
High	3	X	Mod	2	=	6
Mod	2	X	Mod	2	=	4
Low	1	X	Mod	2	=	2
High	3	X	Low	1	=	3
Mod	2	X	Low	1	=	2
Low	1	X	Low	1	=	1

Total Score: 4/9

Model Range: 1-9

Function Capacity Index: 0.44

Index Range: 0.11-1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

MODIFICATION OF WATER QUALITY								
Wetland ID(s): Drainage System 3 HGM Type: D		HGM TYPES:						
VARIABLES	CONDITIONS	D Wgt Scr	S Wgt Scr	L Wgt Scr	EP Wgt Scr	R Wgt Scr	F Wgt Scr
Indicators of disfunction	None						
Direct Indicators of Function	Evidence of Sedimentation	18	15	12	12	12	18
Primary Variables Wetland Land Use	low intensity moderate intensity high intensity	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1
Degree of Outlet Restriction	restricted outflow no outlet unrestricted outflow	3 2 1	0 0 0	0 0 0	0 0 0	0 0 0	3 2 1
Inlet/Outlet Type	no outlet intermittent outlet perennial outlet	3 2 1	3 2 1	0 0 0	0 0 0	0 0 0	3 2 1
Dominant Wetland Type	forested wetland scrub-shrub emergent wetland aquatic bed no vegetation	3 2 2 1 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0
Cover Distribution	forming a continuous cover growing in small scattered patches one or more large patches solitary scattered stems no vegetation	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0
Soil Type	histosol or clayey soil silty soil sandy or gravelly soil	3 2 1	3 2 1	3 2 1	3 0 0	3 2 1	3 2 1
	Total Score: Functional Capacity Index:	18/18 1.0					
	Model Range: Index Range:	4-18 0.22-1.0	3-15 0.20-1.0	2-12 0.16-1.0	1-12 0.8-1.0	2-12 0.16-1.0	4-18 0.22-1.0

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

EXPORT OF DETRITUS								
Wetland ID(s): Drainage System 3 HGM Type: D		HGM TYPES:						
VARIABLES	CONDITIONS	D	S	L	EP	R	F	
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	
Indicators of Disfunction	no outlet	0	0		0		0	
Direct Indicators of Function	none							
Primary Variables Wetland Land Use	moderate intensity low intensity high intensity	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1	
Degree of Outlet Restriction	unrestricted outflow restricted outflow	3 1	0 0	0 0	0 0	0 0	3 1	
Inlet/Outlet Class	perennial outlet intermittent outlet	3 1	3 1	0 0	0 0	0 0	3 1	
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated wet; permanently flooded, intermittently exposed, semipermanently flooded	3 1	3 1	3 1	0 1	3 1	3 1	
Vegetation Density/Dominance	high/very high medium sparse/low no vegetation	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	
Soil type	mineral hydric soil histosol both	3 1 2	3 1	3 1	3 1	3 1	3 1	
	Total Score:	8/18						
	Functional Capacity Index:	0.44						
	Model Range:	5-18	4-15	3-12	2-10	3-12	5-18	
	Index Range:	0.27-1.0	0.26-1.0	0.25-1.0	0.20-1.0	0.25-1.0	0.27-1.0	

PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND VEGETATION (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Vegetation	0
Direct Indicators of Function	None	
Primary Variables		Score:
Plant Species Diversity	high diversity 5 medium diversity 3 low diversity 1	
Vegetation Density/Dominance	high/very high 5 medium 3 sparse/low 1	
Wetland Juxtaposition	connected to upstream and downstream 5 connected above or below 3 other wetlands nearby but not connected (400 m or closer) 1 isolated 0	
		Total Score: 7/15 Model Range: 2-15
		Functional Capacity Index: 0.46 Index Range: 0.13-1.0

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PROJECT NAME: Hampshire CC - Golf Course Drainage System 3

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Direct Indicators of Disfunction	None	
Direct Indicators of Function	None	
Primary Variables Watershed Land Use	low intensity (0-25% urbanized) moderate intensity (25-50% urbanized) high intensity (>50% urbanized)	3 2 1
Wetland Land Use	low intensity moderate intensity high intensity	3 2 1
Wetland Water Regime	wet: permanently flooded, intermittently exposed, semipermanently flooded drier: seasonally flooded, temporarily flooded, saturated	3 1
Microrelief of Wetland Surface	pronounced well developed poorly developed absent	3 2 1 0
Number of Wetland Types and Relative Proportions	5 or more types 3-4 types 1-2 types no vegetation	3 2 1 0
	even distribution moderately even distribution highly uneven distribution no vegetation	3 2 1 0
Vegetation Interspersion	high interspersion moderate interspersion low interspersion no vegetation	3 2 1 0

Hampshire CC - Golf Course Drainage System 3

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (CONT'D)		
Variables	**Conditions**	**Weights**
Number of Layers and Percent Cover	5 or more layers 3-4 layers 1-2 layers no vegetation	3 2 1 0
	layers well developed (>50% cover) layers with moderate cover (26-50% cover) layers poorly distinguishible (<25% cover) no vegetation	3 2 1 0
Interspersion of Vegetation Cover and Open Water	26-75%scattered or peripheral >75% scattered or peripheral <25% scattered or peripheral 100% cover or open water no vegetation	3 2 1 1 0
Size	large (>100 acres) medium (10-100 acres) small (<10 acres)	3 2 1
Wetland Juxtaposition	other wetlands within 400 m and connected above or below other wetlands within 400 m but not connected wetland isolated (culvert)	3 1 0
Slope Wetlands: Model Range: 4-33 Functional Capacity Index: Index Range: 0.12-1.0	All other HGM types: Total Score: 20/36 Model Range: 4-36 Functional Capacity Index: 0.55 Index Range: 0.11-1.0	

WETLAND INVENTORY DATA - CHARACTERIZATION OF WETLAND

Project Name: Hampshire Country Club Date: 5/17/16

Field Investigators: David Kennedy, MS, Project Scientist, VHB

Isolated Wetland A (northwestern portion of property)

SURFACE WATER FLOW VECTORS

- ☒ Depressional - 100% Percent/Acreage
- ☐ Slope - ______ Perecent/Acreage
- ☐ Extensive Peatland - ____ Percent/Acreage
- ☐ Lacustrine Fringe - ____ Percent/Acreage
- ☐ Riverine - _____ Percent/Acreage

VEGETATION TYPES

Forested Wetland

- ☐ Evergreen Needle-leaved - ______________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ______________ Percent/Acreage

Scrub Shrub

- ☐ Evergreen Needle-leaved - ______________ Percent/Acreage
- ☐ Evergreen Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Broad-leaved - ______________ Percent/Acreage
- ☐ Deciduous Needle-leaved - ______________ Percent/Acreage

Emergent Wetland

- ☒ Persistent - 100% Percent/Acreage
- ☐ Non-persistent - ___________ Percent/acreage
- ☐ Aquatic Bed - ___________ Percent/Acreage

Total - 100%

SOIL TYPES

Histosol:

- ☐ Fibric
- ☒ Hemic
- ☐ Sapric

Mineral Hydric Soil:

- ☒ Gravelly
- ☐ Sandy
- ☐ Silty
- ☒ Clayey

GEOLOGY

Surficial: glacial till

Bedrock: pelitic schists

Hampshire CC - Isolated Wetland A

PRE-EMPTIVE STATUS

- ☐ Public Ownership
- ☐ Wildlife Management Area
- ☐ Fisheries Management Area
- ☐ Designated State or Federal Protected Wetland
- ☐ Documented Habitat for State or Federal Listed Species
- ☐ Regionally Scarce Wetland Category
- ☐ Historic/Archaeological Area

PLANT SPECIES

NAME	OW	FW	F	FU	DOM	C	S	TS	LS	H
Phragmites australis		X			X					X
Vitis riparia			X		X					
Polygonum pensylvanicum		X			X					X
Calestegia sepium			X		X					X
Rosa multiflora				X			X			
Polygonum cuspidatum				X						X
Salix babylonica		X				X				
Salix discolor		X				X				

OW-Obligate Wetland
FW- Facultative Wetland
F – Facultative
FU – Facultative Upland

Dom – Dominant
C- Canopy
S- Sapling
TS – Tall Shrub

LS- Low Shrub
H - Herb

Hampshire CC - Isolated Wetland A

WETLAND INVENTORY DATA - CHARACTERIZATION OF MODEL VARIABLES

LANDSCAPE VARIABLES

Size:

- ☒ Small (< 10 ACRES)
- ☐ Medium (10-100 ACRES)
- ☐ Large (> 100 ACRES)

Wetland Juxtaposition:

- ☐ Connected Upstream and Downstream
- ☐ Only Connected Above
- ☐ Only Connected Below
- ☐ Other wetlands Nearby But Not Connected
- ☒ Wetland Isolated

Fire Occurrence and Frequency:

- ☐ Natural; Predictable Frequency
- ☐ Natural; Sporadic Frequency
- ☐ Human-Caused; Predictable
- ☐ Human-Caused; Sporadic
- ☐ Rare Event
- ☒ No Evidence

Regional Scarcity:

- ☒ Not Scarce (> 5% of total wetland area of region)
- ☐ Scarce (< 5% of total wetland areas of region)

Watershed Land Use:

- ☒ > 50% Urbanized
- ☐ 25-50% Urbanized
- ☐ 0-25% Urbanized

HYDROLOGICAL VARIABLES

Surface Water Level Fluctuation of Wetlands:

- ☐ High Fluctuation
- ☒ Low Fluctuation
- ☐ Never Inundated

Frequency of Overbank Flooding:

- ☒ Return Interval > 5 years
- ☐ Return Interval 2-5 Yeasts
- ☐ Return Interval 1-2 Years
- ☐ No Overbank Flooding

pH:

- ☐ Acid <5.5
- ☐ Circumneutral 5.5-7.4
- ☐ Alkaline > 7.4
- ☒ No Water

Surficial Geologic Deposit Under Wetland:

- ☐ Low Permeability Stratified Deposits
- ☐ High Permeability Stratified Deposits
- ☒ Glacial Till

Wetland Land Use:

- ☒ High Intensity (i.e. agriculture) evidence of clearing, runoff from golf course
- ☐ Moderate Intensity (i.e. forestry)
- ☐ Low Intensity (i.e. open space)

Wetland Water Regime:

- ☐ Wet: Permanently Flooded, Intermittently Exposed, Semi-Permanently Flooded
- ☒ Drier: Seasonally Flooded, Temporarily Flooded, Saturated

Basin Topographic Gradient:

- ☐ High Gradient > 2%
- ☒ Low Gradient < 2%

Degree of Outlet Restriction:

- ☐ Restricted Outflow
- ☐ Unrestricted Outflow
- ☒ No Outflow

Ratio of Wetland Area to Watershed Area:

- ☒ High > 10%
- ☐ Low < 10%

Microrelief of Wetland Surface:

- ☐ Pronounced > 45 cm
- ☐ Well Developed 15-45 cm
- ☒ Poorly Developed < 15 cm
- ☐ Absent

Inlet/Outlet Class:

- ☒ No Inlet/No Outlet
- ☐ No Inlet/Intermittent Outlet
- ☐ No Inlet/Perennial Outlet
- ☐ Intermittent Inlet/No Outlet
- ☐ Intermittent Inlet/Intermittent Outlet
- ☐ Intermittent Outlet/Perennial Outlet
- ☐ Perennial Inlet/No Outlet
- ☐ Perennial Inlet/Intermittent Outlet
- ☐ Perennial Inlet/Perennial Outlet

Nested Piezometer Data:

- ☐ Recharge
- ☐ Discharge
- ☐ Horizontal Flow
- ☒ Not Available

Relations of Wetlands' Substrate Elevation to Regional Piezometric Surface:

- ☐ Piezometer Surface Above or at Substrate Elevation
- ☐ Piezometer Surface Below Substrate Elevation
- ☒ Not Available

Evidence of Sedimentation:

- ☒ No Evidence Observed
- ☐ Sediment Observed on Wetland Substrate
- ☐ Fluvaquent Soils

Evidence of Seeps and Springs:

- ☒ No Seeps or Springs
- ☐ Seeps Observed
- ☐ Perennial Spring
- ☐ Intermittent Spring

SOIL VARIABLES

Soil Lacking:

- ☐

Histosol:

- ☐ Fibric
- ☒ Hemic
- ☐ Sapric

Hampshire CC - Isolated Wetland A

Mineral Hydric Soil:

- ☒ Gravelly
- ☐ Sandy
- ☐ Silty
- ☒ Clayey

VEGETATION VARIABLES

Vegetation Lacking:

- ☐

Dominant Wetland Type:

- ☐ Forested – Evergreen – Needle-leaved
- ☐ Forested – Deciduous – Broad-leaved
- ☐ Forested – Deciduous – Needle-leaved
- ☐ Scrub Shrub – Evergreen – Broad-leaved
- ☐ Scrub Shrub – Evergreen – Needle-leaved
- ☐ Scrub Shrub – Deciduous – Broad-leaved
- ☐ Scrub Shrub – Decisuous – Needle-leaved
- ☒ Emergent – Persistent
- ☐ Emergent – Non-persistent
- ☐ Aquatic Bed

Number of Types & Relative Proportions:

Number of Types:

- ☐ Actual #
- ☐ 5
- ☐ 4
- ☐ 3
- ☐ 2
- ☒ 1

Evenness of Distribution:

- ☐ Even Distribution
- ☐ Moderately Even Distribution
- ☒ Highly Uneven Distribution

Vegetation Density/Dominance:

- ☐ Sparce (0-20%)
- ☐ Low Density (20-40%)
- ☐ Medium Density (40-60%)
- ☒ High Density (60-80%)
- ☐ Very High Density (80-100%)

Vegetation Interspersion:

- ☐ High (small groupings, diverse and interspersed)
- ☒ Moderate (broken irregular rings)
- ☐ Low (large patches, concentric rings)

Number of Layers and Percent Cover:

Number of Layers:

- ☐ 6 or > (actual #)
- ☐ 5
- ☐ 4
- ☒ 3
- ☐ 2
- ☐ 1

Percent Cover:

- ☐ Submergents:
- ☐ Floating:
- ☐ Moss-lichen:
- ☒ Short Herb: 15
- ☒ Tall Herb: 80
- ☐ Dwarf shrub:
- ☐ Short shrub:
- ☐ Tall shrub:
- ☐ Sapling:
- ☒ Tree: 5

Plant Species Diversity:

- ☐ Low 1-2 plots sampled
- ☒ Medium 3-4 plots sampled
- ☐ High 5 or more plots sampled

Proportion of Animal Plant Foods:

- ☒ Low (5-25%)
- ☐ Medium (25-50%)
- ☐ High (> 50%)

Cover Distribution:

- ☒ Continuous Cover
- ☐ Small Scattered Patches
- ☐ 1 or More Large Patches; Parts of Site Open
- ☐ Solitary, Scattered Stems

Dead Woody Material:

- ☐ Abundant (50% of wetland surface)
- ☐ Moderately Abundant (25-50% of surface)
- ☒ Low Abundance (0-25% of surface)

Interspersion of Cover and Open Water:

- ☐ < 25% Scattered or Peripheral
- ☐ 26-75 % Scattered or Peripheral
- ☐ > 75% Scattered or Peripheral
- ☒ 100% Cover or Open Water

Stream Sinuosity: N/A

- ☐ Highly Convoluted (Index 1.50 or >)
- ☐ Moderately Convoluted (Index 1.25-1.50)
- ☐ Straight/Slightly Irregular (Index 1.10-1.25)

Presence of Islands:

- ☐ Several to Many
- ☐ One or Few
- ☒ Absent

PROJECT NAME: Hampshire CC - Isolated Wetland A

MODIFICATION OF GROUNDWATER DISCHARGE										
Wetland ID(s): Isolated Wetland A HGM Type: D		HGM TYPES:								
VARIABLES	CONDITIONS	D		S		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction									
Inlet/Outlet Class	perennial inlet/no outlet	0		0		0		0	
Nested Piezometer Data	recharge	0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0	
Direct Indicators of Function									
Presence of Springs and Seeps	evidence of perennial steeps or springs	18		15		15		18	
Neated Piezometer Data	discharge condition	18		15		15		18	
Relationship to Regional Piezometric Surface	wetland substrate elevation below piezometric surface	18		15		15		18	
Inlet/Outlet Class	no inlet/perennial outlet	18		15		15		18	
Primary Variables									
Microrelief of Wetland Surfaces	pronounced well developed poorly developed absent	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Inlet/Outlet Class	perennial inlet/perennial outlet intermittent inlet/perennial outlet all other classes	3 2 0		3 2 0		0 0 0		3 2 0	
pH	alkaline circumneutral acid no water present	3 2 0 0		3 2 0 0		3 2 0 0		3 2 0 0	
Surficial Geologic Deposit Under Wetland	high permeability stratified deposits low permeability stratified deposits glacial till	3 2 1		3 2 1		3 2 1		3 2 1	
Wetland water regime	wet; permanently flooded, intermittently exposed semipermanently, flooded drier; seasonally flooded, temporarily flooded, saturated	3 1		0 0		3 1		3 1	
Soil Type	histosol mineral hydric soil both	3 1 2		3 1		3 1		3 1	
	Total Score: Functional Capacity Index:	5/18 0.28							
	Model Range Index Range:	3-18 .19-1.0		2-15 .16-1.0		3-15 .22-1.0		3-18 .19-1.0	

PROJECT NAME: Hampshire CC

MODIFICATION OF GROUNDWATER RECHARGE											
Wetland ID(s): Isolated Wetland A HGM Type: D		HGM TYPES:									
VARIABLES	CONDITIONS	D		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction											
Inlet/Outlet Class	no inlet/perennial outlet; intermittent inlet/perennial outlet	0								0	
Nested Piezometer Data:	discharge condtion	0		0		0		0		0	
Relationship to Regional Piezometric Surface	wetland substrate elevation above piezometric surface	0		0		0		0		0	
Presence of Seeps and Springs	presence of seeps or springs	0		0		0		0		0	
Direct Indicators of Function											
Inlet/Outlet Class	perennial inlet/no outlet	21								21	
Nested Piezometer Data	recharge condition	21								21	
Relationship to Regional Peizometeric Surface	wetland substrate elevation below piezometric surface	21								21	
Primary Variables											
Microrelief of Wetland Surface	poorly developed absent well developed pronounced	3 3 2 1		3 3 2 1		1 1 2 3		3 3 2 1		3 3 2 1	
Inlet/Outlet Class	perennial inlet/intermittent outlet all other classes	3 0		0 0		0 0		0 0		3 0	
pH	acid circumneutral alkaline no water present	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Surficial Geologic Deposit Under Wetland	glacial till low permeability stratified deposits high permeability stratified deposits	3 2 1		1 2 3		1 2 3		1 2 3		3 2 1	
Surface Water Level Fluctuation of the Wetland	high fluctuation low fluctuation never inundated	3 2 1		3 2 1		0 0 0		3 2 1		3 2 1	

Hampshire CC

Wetland ID(s): Isolated Wetland A HGM Type: D		HGM TYPES:				
VARIABLES	CONDITIONS	D	L	EP	R	F
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated	3	3	0	3	3
	wet; permanently flooded, intermittently exposed, semipermanently flooded	1	1	0	1	1
Soil Type	gravelly or sandy mineral hydric	3	3	0	3	3
	silty or clayey mineral hydric	2	2	0	2	2
	sapric histosol 2	1	1	0	1	1
	fibric or hemic histosol	0	0	3	0	0
	Total Score:	13/21				
	Model Score:	4-21	4-18	2-12	4-18	4-21
	Functional Capacity Index:	0.62				
	Index Range:	.19-1.0	.22-1.0	0.16-1.0	.22-1.0	.19-1.0

* This model should be applied to both year long and seasonal recharge wetlands

* If the wetland is seasonally fluctuating between recharge and discharge, then reduce the above score by one half (1/2), because the wetland only functions in a recharge mode for roughly half of the year

PROJECT NAME: Hampshire CC

STORM AND FLOOD-WATER STORAGE													
Wetland ID(s): Isolated Wetland A HGM Type: D		HGM TYPES:											
VARIABLES	CONDITIONS	D		S		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of disfunction	none												
Direct Indicators of Function	no outlet	27		21								30	
Primary Variables Inlet/Outlet Class	perennial inlet/intermittent outlet	3		3		0		0		0		3	
	intermittent inlet/intermittent outlet	2		2		0		0		0		2	
	non-inlet/intermittent outlet	1		1		0		0		0		1	
	non-inlet/perennial outlet	1		1		0		0		0		1	
	intermittent inlet/perennial outlet	1		1		0		0		0		1	
	perennial inlet/perennial outlet	1		1		0		0		0		1	
Degree of Outlet Restriction	restricted	3		0		0		0		0		3	
	unrestricted	0		0		0		0		0		0	
Basin Topographic Gradient	low gradient	3		3		0		3		3		3	
	high gradient	1		1		0		0		1		1	
Wetland Water Regime	drier: seasonally flooded, temporarily flooded, saturated	3		3		3		0		3		3	
	wet: permanently flooded, intermittently exposed, semipermanently flooded	1		1		1		0		1		1	
Surface Water Level Fluctuation of the Wetland	high fluctuation	3		0		3		0		3		3	
	low fluctuation	2		0		2		0		2		2	
	never inundated	0		0		0		0		0		0	
Ratio of Wetland Area to Watershed Area	large	3		3		3		0		3		3	
	small	1		1		1		0		1		1	
Microrelief of Wetland Surface	prounounced	3		3		3		3		3		3	
	well developed	2		2		2		2		2		2	
	poorly developed	1		1		1		1		1		1	
	absent	0		0		0		0		0		0	

Hampshire CC

STORM AND FLOOD-WATER STORAGE

Wetland ID(s): Isolated Wetland A
HGM Type: A

HGM TYPES:

VARIABLES	CONDITIONS	D Wgt	D Scr	S Wgt	S Scr	L Wgt	L Scr	EP Wgt	EP Scr	R Wgt	R Scr	F Wgt	F Scr
Frequency of Overbank Flooding	overbank flooding absent	0		0		0		0		0		0	
	return interval of >5 yrs.	0		0		1		0		1		1	
	return interval of 2-5 yrs.	0		0		2		0		2		2	
	return interval of 1-2 yrs.	0		0		3		0		3		3	
Vegetation Density/Dominance	high/very high	3		3		3		3		3		3	
	moderate	2		2		2		2		2		2	
	sparse/low	1		1		1		1		1		1	
	no vegetation	0		0		0		0		0		0	
Dead Woody Material	abundant	3		3		3		3		3		3	
	moderately abundant	2		2		2		2		2		2	
	sparse	1		1		1		1		1		1	
	absent	0		0		0		0		0		0	
	Total Score:	27/27											
	Functional Capacity Index:	1.0											
	Model Range:	4-27		4-21		2-21		0-12		3-24		4-30	
	Index Range:	0.15-1.0		0.19-1.0		0.09-1.0		0-1.0		0.12-1.0		0.13-1.0	

PROJECT NAME: Hampshire CC - Isolated Wetland A

MODIFICATION OF STREAM FLOW (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Outlet	0
Direct Indicators of Function	None	

Primary Variables

Storm and Flood Water Storage Function Model Score		X	Modification of Groundwater Discharge Function Model Score				Total Score:
High*	3	X	High	3	=	9	
Mod	2	X	High	3	=	6	
Low	1	X	High	3	=	3	
High	3	X	Mod	2	=	6	
Mod	2	X	Mod	2	=	4	
Low	1	X	Mod	2	=	2	
High	3	X	Low	1	=	3	
Mod	2	X	Low	1	=	2	
Low	1	X	Low	1	=	1	

Total Score: 0/9

Model Range: 1-9

Function Capacity Index: 0.0

Index Range: 0.0 - 1.0

*High = FCI of 0.67-1.0, Mod = FCI of 0.34-0.66, Low = FCI of 0-0.33 for the Storm and Flood Water Storage and Modification of Ground Water Discharge Function Model Scores.

PROJECT NAME: Hampshire CC

MODIFICATION OF WATER QUALITY								
Wetland ID(s): Isolated Wetland A HGM Type: D		HGM TYPES:						
VARIABLES	CONDITIONS	D	S	L	EP	R	F
		Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr	Wgt Scr
Indicators of disfunction	None						
Direct Indicators of Function	Evidence of Sedimentation	18	15	12	12	12	18
Primary Variables Wetland Land Use	low intensity moderate intensity high intensity	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1	3 2 1
Degree of Outlet Restriction	restricted outflow no outlet unrestricted outflow	3 2 1	0 0 0	0 0 0	0 0 0	0 0 0	3 2 1
Inlet/Outlet Type	no outlet intermittent outlet perennial outlet	3 2 1	3 2 1	0 0 0	0 0 0	0 0 0	3 2 1
Dominant Wetland Type	forested wetland scrub-shrub emergent wetland aquatic bed no vegetation	3 2 2 1 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0	3 2 2 0 0
Cover Distribution	forming a continuous cover growing in small scattered patches one or more large patches solitary scattered stems no vegetation	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0	3 2 1 1 0
Soil Type	histosol or clayey soil silty soil sandy or gravelly soil	3 2 1	3 2 1	3 2 1	3 0 0	3 2 1	3 2 1
	Total Score:	14/18					
	Functional Capacity Index:	0.77					
	Model Range:	4-18	3-15	2-12	1-12	2-12	4-18
	Index Range:	0.22-1.0	0.20-1.0	0.16-1.0	0.8-1.0	0.16-1.0	0.22-1.0

PROJECT NAME: Hampshire CC

EXPORT OF DETRITUS													
Wetland ID(s): Isolated Wetland A HGM Type: D		HGM TYPES:											
VARIABLES	CONDITIONS	D		S		L		EP		R		F	
		Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr	Wgt	Scr
Indicators of Disfunction	no outlet	0		0				0				0	
Direct Indicators of Function	none												
Primary Variables Wetland Land Use	moderate intensity low intensity high intensity	3 2 1		3 2 1		3 2 1		3 2 1		3 2 1		3 2 1	
Degree of Outlet Restriction	unrestricted outflow restricted outflow	3 1		0 0		0 0		0 0		0 0		3 1	
Inlet/Outlet Class	perennial outlet intermittent outlet	3 1		3 1		0 0		0 0		0 0		3 1	
Wetland Water Regime	drier; seasonally flooded, temporarily flooded, saturated wet; permanently flooded, intermittently exposed, semipermanently flooded	3 1		3 1		3 1		0 1		3 1		3 1	
Vegetation Density/Dominance	high/very high medium sparse/low no vegetation	3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0		3 2 1 0	
Soil type	mineral hydric soil histosol	3 1		3 1		3 1		3 1		3 1		3 1	
	Total Score:	0											
	Functional Capacity Index:	0.0											
	Model Range:	5-18		4-15		3-12		2-10		3-12		5-18	
	Index Range:	0.27-1.0		0.26-1.0		0.25-1.0		0.20-1.0		0.25-1.0		0.27-1.0	

PROJECT NAME: Hampshire CC - Isolated Wetland A

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND VEGETATION (This model is identical for all HGM types)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Indicators of Disfunction	No Vegetation	0
Direct Indicators of Function	None	
Primary Variables		Score:
Plant Species Diversity	high diversity 5 medium diversity 3 low diversity 1	
Vegetation Density/Dominance	high/very high 5 medium 3 sparse/low 1	
Wetland Juxtaposition	connected to upstream and downstream 5 connected above or below 3 other wetlands nearby but not connected (400 m or closer) 1 isolated 0	
		Total Score: 9/15 Model Range: 2-15
		Functional Capacity Index: 0.60 Index Range: 0.13-1.0

s

PROJECT NAME: Hampshire CC - Isolated Wetland A

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (This model is identical for all HGM types except Slope Wetlands for which "Interspersion of Vegetation Cover and Open Water" does not apply)		
VARIABLES	**CONDITIONS**	**WEIGHTS**
Direct Indicators of Disfunction	None	
Direct Indicators of Function	None	
Primary Variables Watershed Land Use	low intensity (0-25% urbanized) moderate intensity (25-50% urbanized) high intensity (>50% urbanized)	3 2 1
Wetland Land Use	low intensity moderate intensity high intensity	3 2 1
Wetland Water Regime	wet: permanently flooded, intermittently exposed, semipermanently flooded drier: seasonally flooded, temporarily flooded, saturated	3 1
Microrelief of Wetland Surface	pronounced well developed poorly developed absent	3 2 1 0
Number of Wetland Types and Relative Proportions	5 or more types 3-4 types 1-2 types no vegetation	3 2 1 0
	even distribution moderately even distribution highly uneven distribution no vegetation	3 2 1 0
Vegetation Interspersion	high interspersion moderate interspersion low interspersion no vegetation	3 2 1 0

Hampshire CC - Isolated Wetland A

CONTRIBUTION TO ABUNDANCE AND DIVERSITY OF WETLAND FAUNA (CONT'D)		
Variables	**Conditions**	**Weights**
Number of Layers and Percent Cover	5 or more layers	3
	3-4 layers	2
	1-2 layers	1
	no vegetation	0
	layers well developed (>50% cover)	3
	layers with moderate cover (26-50% cover)	2
	layers poorly distinguishible (<25% cover)	1
	no vegetation	0
Interspersion of Vegetation Cover and Open Water	26-75%scattered or peripheral	3
	>75% scattered or peripheral	2
	<25% scattered or peripheral	1
	100% cover or open water	1
	no vegetation	0
Size	large (>100 acres)	3
	medium (10-100 acres)	2
	small (<10 acres)	1
Wetland Juxtaposition	other wetlands within 400 m and connected above or below	3
	other wetlands within 400 m but not connected	1
	wetland isolated	0
Slope Wetlands: Model Range: 4-33 Functional Capacity Index: Index Range: 0.12-1.0	All other HGM types: Total Score: 16/36 Model Range: 4-36 Functional Capacity Index: 0.44 Index Range: 0.11-1.0	

Attachment D

HAMPSHIRE COUNTRY CLUB

Mamaroneck, New York

WETLANDS CHARACTERIZATION ASSESSMENT

Prepared for:	New World Realty Advisors, LLC c/o Daniel Pfeffer 1500 Broadway, 25th Floor New York, NY 10036
Prepared by:	Nelson, Pope & Voorhis, LLC 572 Walt Whitman Road Melville, New York 11747
Date:	May 3, 2010
Revised:	*September 17, 2012*

1.0 INTRODUCTION AND REGULATORY FRAMEWORK

The above-referenced property was inspected by Sara N. da Silva on April 30 and May 2, 2010 for the purpose of delineating wetlands in accordance with the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (3 parameter approach). The subject property is occupied by an 18-hole golf course with a newly renovated clubhouse, outdoor dining patio, golf and swimming pool pavilion, tennis pavilion with two (2) tennis courts, and associated maintenance buildings (see aerial photograph in **Figure 1**). The property consists of fairways and greens for the golf course, seven (7) ponds, three (3) associated man-made stream systems, and two additional vegetated wetland areas. The golf course has been in operation since 1944.

Field observations of the property found that there is an extensive drainage system throughout the property that is comprised of a series of underdrain pipes that feed into the on-site ponds and associated man-made streams within the low-lying areas of the site. The boundaries of the ponds and man made streams on the property were determined to be at the well-defined edge of surface water, where the ponds and streams are either rock-lined or quickly transition from surface water to bank and then to maintained turf vegetation. Two vegetated wetland areas were identified; one in the northwest corner of the property and the second in the southwest corner of the property (see **Figure 4**).

In accordance with the Village of Mamaroneck and Town of Mamaroneck wetlands regulations (Chapters 192 and 114, respectively), field methods for delineating wetlands followed those methods that (a) meet the definition provided in Article 25-0103 of the New York State (NYS) Environmental Conservation Law (tidal wetlands), and (b) include all other areas 2,500 square feet or larger that can be defined as wetlands in accordance with the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (**1989**) (hereafter "Federal Manual"). The Federal Manual utilizes hydrology, hydric soils and hydrophytic vegetation as the three essential criteria which must be met for an area to be identified as a wetland. The Village and Town of Mamaroneck both reference the 1989 Federal Manual as the technical source for delineating jurisdictional wetlands. The Federal Manual provides technical criteria, field indicators, and recommended procedures to be followed in determining a jurisdictional wetland, as well as in determining the location of wetland boundaries. Data was recorded in the field on standard data collection sheets.

According to the Federal Manual, when more than 50 percent of the dominant species in a sampling area have an indicator status of obligate, facultative wetland, and/or facultative species, hydrophytic vegetation is present. If the vegetation fails to be dominated by these types of species, the area is usually not a wetland. However, field indicators for one or more of the three technical criteria for wetland identification are usually absent in disturbed areas. For instance, disturbed areas may not contain hydrophytic vegetation or hydrology under certain circumstances if the vegetation and/or hydrology have been significantly altered by human activities (i.e. filling, clearing, draining, mowing, other landscape maintenance, etc.). As per the Federal Manual, "if the [disturbance] activity occurred prior to the effective date of regulation or other jurisdiction, it may not be necessary to make a wetland determination for regulatory purposes" (page 50).

On the subject property, much of the low-lying areas exhibit wetland hydrology and hydric soils, but do not possess hydrophytic vegetation. These areas have been and continue to be maintained as fairways and greens with the assistance of an extensive underdrain system and turf maintenance typical of a golf course, and therefore are currently vegetated with associated upland grasses (e.g. Kentucky bluegrass). Review of historic aerial photographs going back to 1966 (*www.historicaerials.com*) reveal the site has been maintained as a golf course since prior to the effective date of State and Federal regulation in the 1970's. According to the Hampshire Country Club's website, the golf course was organized in 1944 and further supports the fact that the turf areas of the golf course have existed since prior to regulations.

To facilitate on-site gathering of data, preliminary information collected included the existing site survey (**PEAPC, undated**), the existing property boundary survey (**Richard A. Spinelli, L.S., 2010**), the Topographic Map of the Clubhouse area (**Gabriel E. Senor, P.C., March 13, 2012**), Federal Emergency Management Agency flood map data (**FEMA, 2009**), NYS Department of Environmental Conservation (NYSDEC) Freshwater and Tidal Wetlands Maps (**Westchester GIS, 2004**), National Wetlands Inventory Map (**Westchester GIS, 2009**) of the Mamaroneck quadrangle, soil survey data from the Westchester County Soil Survey (**Westchester GIS, 2006**), the Westchester hydric soils data (**Westchester GIS, 2006**), and spring 2007 and 2009 aerial photographs from the NYSGIS Orthophotoimagery Program.

As per FEMA, the property is located within a designated flood zone, Flood Zone AE (EL 12) (see **Figure 2**). Pursuant to NYS Building Code, this special flood hazard area requires that the bottom of the horizontal structural members (for multi-family structures) be located a minimum of 12 feet above mean sea level; or, for single family dwellings, a minimum freeboard of two feet be provided above the established base flood elevation (EL. 12 for the subject property). Any new structures situated within the Flood Zone would need to be appropriately designed for such conditions.

The New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetlands Maps indicate that the ponds and associated streams currently on the property are not regulated by New York State. However, the National Wetlands Inventory indicates four (4) wetland areas on the site, including three ponds and one emergent marsh area (see **Figure 4**). Additionally, the Westchester Soil Survey information indicates the presence of hydric soils throughout low lying areas of the site (see **Figure 3**). Modifications to jurisdictional wetlands on the property and within 100 feet of the wetland boundary will require approvals by the Village of Mamaroneck, the Town of Mamaroneck, and the U.S. Army Corps of Engineers. Delancy Cove, located immediately off-site to the south of the subject property, is a regulated tidal wetland pursuant to Article 25 of the NYS Environmental Conservation Law (see **Figure 4**). Therefore pursuant to Article 25 of the NYS Environmental Conservation Law, the NYSDEC may regulate any new disturbance activities within 300 feet or up to the 10-foot elevation contour (whichever is farthest seaward) adjacent to the tidal wetlands. The Village of Mamaroneck and the Town of Mamaroneck both regulate activities within 100 feet of designated tidal wetlands.

2.0 EXISTING CONDITIONS ANALYSIS

The ponds and man made streams on the property appear to be ground and surface water fed features which function as part of the drainage system as well as water hazards for the golf course. No liners were observed along the edges of these features and it is evident that they are influenced by the underlying groundwater table. The ponds and man made streams/drainage ditches have well defined edges, and are largely rock lined. The water features on the property all appear to be interconnected via a network of underground pipes which serve to alleviate ponding conditions throughout low-lying areas of the property.

Based on field observations and information provided by the Hampshire Country Club's course superintendent, Tony Campanella, the golf course has three separate drainage systems that interconnect the man made system of streams and ponds, either through physical connections or via subsurface pipe conveyances. Two of these systems ultimately discharge to Delancy Cove, located immediately off-site to the south of the subject property. **Figure 5** illustrates the three drainage systems and connectivity of the various ponds and man made streams throughout the property, which is described in further detail below.

Drainage System 1: This system is comprised of Ponds #13 and #16 and associated subsurface and surface drainage connections. Pond #16 straddles the northwest property line between the golf course and the adjacent multi-family development. This pond is connected to Pond #13 via underground piping, which day-lights approximately mid-way between Pond #16 to the north side of Pond #13. A similar man-made stream/drainage ditch collects water from the north-central portion of the golf course and transitions to underground piping approximately mid-way to Pond #13, where it ultimately discharges. Pond #13 has a piped overflow under Hommocks Road and underneath the athletic field located on the west side of Hommocks Road to a subsurface vault. This vault then discharges to the tidal wetland located southwest of the vault.

Drainage System 2: This system consists of Ponds #5 and #6 in the northeastern portion of the course. In the early 1990's Pond #5 was modified and Pond #6 was created for storage of irrigation water. A well is located adjacent to these ponds that supplies the course's irrigation water. Stormwater from the immediately surrounding area is directed to these two ponds via overland flow. Additionally, it has been noted that at least one discharge pipe from the residences to the east of the ponds is directed to Pond #6.

Drainage System 3: This system consists of Ponds #10 and #11 and associated collection streams/ditches. Beginning in approximately the mid-points of both fairways #5 and #6, water is directed south toward a collection stream/drainage ditch located south of Pond #5. This stream continues south through the golf course, past Pond #18 and beneath Eagle Knolls Road. A stream/drainage ditch located on the west side of Eagle Knolls Road connects the system from the east side of the road and empties into Pond #10. It is noted that this stream/drainage ditch does not empty into Pond #18; rather it is directed to a subsurface pipe below Eagle Knolls Road. Pond #10 contains a tidal valve that controls the input and output of water between this pond and the adjacent tidal wetlands. Additionally, water from the area northeast of Pond #10 is directed to Pond #10, including a piped overflow from Pond #11.

Pond #18: Pond #18 is an isolated drainage system. The pond receives stormwater from inlets located within the Macadam Driveway and parking area adjacent to the pro shop, which is piped to a manhole for sediment removal prior to overflowing into the Upper Pond (southern portion of Pond #18). An emergency overflow pipe is located in the northeast corner of the Lower Pond (northern portion of Pond #18), which discharges into Drainage System 3 during significant rainfall events.

Further details regarding each pond are provided below.


Rock-lined stream

Review of historic aerials suggest that Pond #13 was a naturally occurring system that was modified and expanded between 1960 and 1976. Pond #13's connection to the athletic field on the west side of Hommocks Road is apparent as a pipe beneath Hommocks Road was visible at the western edge of this pond.


Pond #13

Fairway Green Townhouses pond (Pond #16).

The connection between Pond #13 and Pond #16 was evident also during field inspections. Underground piping and culverts from the Pond #16 were found to be contiguous with the stream which enters Pond #13. Pond #16 was reportedly built in 1982 for use by both the townhomes to the north and the golf course. This pond has notable silt and organic sediment build-up. An illicit discharge from a commercial use located to the north was previously detected and was contributing to the silt and organic inputs to the pond. This discharge has since been removed.

Ponds #5 and #6 were both artificially created, as historic aerials reveal that Pond #5 was constructed between 1960 and 1976 and Pond #6 was constructed between 1976 and 1994. As noted above, it is believed that Pond #5 was modified and Pond #6 was constructed in the early 1990s. These ponds are utilized for storage of irrigation water, and a pump is located in the vicinity of the ponds to provide water to the irrigation system. It is noted that a permit was issued by the Village in 2008 for the expansion of these ponds, but the work was never completed.

Pond #11 was reportedly created between 1997 and 1998 in an area that was identified as having poor drainage. As previously stated, this pond overflows to Pond #10 via subsurface piping.

The southern pond, identified on the survey as "Prickly Pear Inlet," or Pond #10 has a concrete control structure which separates it from the tidal wetlands of Delancey Cove immediately south of the property. The control structure contains two pipes which are set at different elevations so that one is partially submerged during low tides, while the other is raised higher though still within the range of tidal influence. On the landward side of this control structure, the lower pipe appeared to be closed, but the higher elevation pipe is currently in the open position. This pond is also a naturally occurring feature that has been modified over time.

Pond #10 control structure

On the seaward side, this higher elevation pipe also appears to potentially be partially open and may allow some restricted connection of tidal flow. Though primarily freshwater, Prickly Pear Inlet does appear to have some evidence of saltwater influence based upon macroalgae characteristics observed in the lower portion of the inlet stream to the pond and trace evidence of what appeared to be former salt marsh vegetation (currently dead) along the inner fringe of the pond near the control structure.

Cove side of control structure

Pond #18 located to the northwest of the existing clubhouse (individually referred to as "Upper Pond" and "Lower Pond") are the water features in closest proximity to the clubhouse. Lower Pond was constructed in 1998 and is not lined. Upper Pond was added in 2005 with a waterfall feature that spills to Lower Pond and is also unlined. The maximum depth encountered in each pond is approximately 6 feet. Water levels within these ponds are periodically supplemented with additional water from on-site wells as the ponds appear to have no connection to the network of ponds and ditches on the site and therefore have no input of water from this system. No natural vegetation exists within or along the perimeter of these ponds as turf for the golf course is managed up to the edge of each pond. A soil boring (B-1) was installed east of the ponds, which indicated the depth to groundwater in the vicinity of these ponds is approximately 10 feet.


View of the waterfall structure on Pond 18

The ponds and streams were all found to contain fish. Frogs were observed in the northern most Fairway Green pond. A few pairs of ducks and two egrets were also observed utilizing the ponds, though to a much lesser degree than the numerous pairs of Canada Geese observed throughout the property. There was substantial evidence of heavy use by Canada geese on the turf leading up to the pond edges.

Plant identification was performed and wetland indicators assigned using the Region 1 USDA-NRCS plant list. No floating or submerged aquatic plants were observed in the ponds, although all contained some degree of unicellar algae typically associated with freshwater ponds. The southernmost stream flowing into Prickly Pear Inlet also contained macroalgae along its rocky bottom.

Adjacent to the west of Prickly Pear Inlet, an additional wetlands area was identified and field located with a hand-held Geographic Positioning System (GPS). This area is best characterized as an emergent marsh dominated by the invasive strain of common reed (*Phragmites australis*), a common wetland plant. The wetland area exhibited varying degrees of saturated soils and standing water, organic hydric soils and hydrophytic vegetation contiguous with the adjacent pond. Several specimens of bastard oak (*Quercus sinuata*), which is a southern tree characteristic of moist habitats, were also observed growing upon the drier hummocks within this marsh area.

Southern vegetated marsh

The vegetated wetland area in the northwestern corner of the site is also an emergent marsh dominated by *Phragmites australis* as well as jewelweed (*Impatiens capensis*), another hydrophytic species. This marsh also contained black willow (*Salix nigra*) and pussy willow (*Salix discolor*), both of which are characteristic of wetland conditions.

Northern vegetated marsh

The ponds appear to vary in depth and are capable of supporting fish populations. During the time of the site visit, all of the streams on the property were observed to contain standing or slowly flowing water that was a minimum of 2-3 inches deep or more. The last rain event occurred four days prior to the site visit, when nearly two inches of rain was reported to have fallen in the Mamaroneck area during the previous weekend (as per www.weather.com, accessed on 5/3/10).

Soil observations were performed around the perimeter of the ponds and in low-lying areas of the property using a hand held spade and soil auger. Observations revealed turf growing up to the edge of the ponds and streams, and hydric soil conditions occurring throughout these low-lying areas. Hydric organic soils (histosols) were evidenced by a variety of indicators, predominantly well-decomposed low-chroma organic soils immediately beneath the turf surface. In turf areas with these very poorly drained soils, groundwater was often observed within 6 to 12 inches of the surface, and saturated soils were often observed within 0 to 10 inches of the surface. Indicators of a fluctuating water table were also frequently observed as oxidized root channels within the upper 2 to 12 inches of the soil, and occasional patches of water stained leaves and lack of vegetation within the lowest lying areas of turf.

The boundaries of the ponds, streams/drainage ditches and two additional vegetated wetland areas on the property are illustrated in by **Figure 4.**

3.0 FINDINGS OF THIS ASSESSMENT

Review of available information as well as on-site observations have verified that the freshwater ponds currently on the property can be characterized as Town, Village and Federally-regulated wetlands, though they are not State-regulated wetlands. There are two areas of NYSDEC regulated tidal wetlands associated with Delancy Cove (located immediately off-site to the south of the subject property). Additionally, based on field observations and discussions with the golf course superintendent, Drainage System 1 and Drainage System 3 have physical connections to the tidal wetlands associated with Delancy Cove (see **Figure 5**).

Despite the presence of hydrology and hydric soils indicative of wetlands throughout low-lying areas of the property, these areas have been maintained as golf course and have been supporting turf vegetation for more than 60 years with the constant maintenance/mowing and turf management practices, as well as the installation and upkeep of the site's underlying drainage system. This maintenance has precluded the establishment of any hydrophitic vegetation surrounding all of the ponds, with the exception of Pond #10. As a result, the on-site ponds (with the exception of Pond #10) would not meet the requirements of the Federal Manual 3-parameter approach for wetland delineation. Even though the ponds do not support hydrophitic vegetation, it is noted that the Village has historically asserted jurisdiction over these ponds pursuant to Chapter 192. It is noted that the Village and Town definition for freshwater wetlands (Chapter 192 and 114, respectively) includes wetlands identified on the NYSDEC regulatory maps and wetlands 2,500 SF or larger, even if they are not located on the NYSDEC regulatory maps. As a result, the drainage ditches located between the ponds would not be considered regulated under the Village and Town definition as each are less than 2,500 SF in size.

In accordance with the Village and Town Code, the regulatory adjacent area/buffer area surrounding a jurisdictional wetland (tidal or freshwater) or watercourse extends 100 feet horizontally away from its outermost boundary. A wetland/watercourse permit is therefore required to conduct regulated activities, including subdivision of land, within these buffer areas. The U.S. Army Corps of Engineers only regulates activities conducted within the boundaries of the jurisdictional wetlands and waterways. The NYSDEC would regulate any new disturbance activities within 300 feet or up to the 10-foot elevation contour (whichever is farthest seaward) adjacent to the Delancy Cove tidal wetlands (located immediately off-site to the south of the subject property) (see **Figure 4**). Note that NYSDEC tidal wetlands jurisdiction would not extend landward of Eagle Knolls Road or Hommocks Road as it is an existing substantial roadway existing since prior to 1977.

Future development may be permitted within the regulated wetland adjacent areas, particularly within those areas currently maintained turf/golf course. Neither the Town nor the Village wetland regulations specify a required setback for structures, sanitary systems or other proposed improvements; just that a permit is required for disturbance within 100 feet of the regulated wetland boundary (tidal and freshwater wetlands). Therefore, development setbacks will be subject to negotiations with the Village and the Town during the permit process and will likely depend on the type of use and other environmental benefits that may be proposed in association with the project (i.e., mitigation measures such as adjacent area vegetated buffers, wetland creation, stormwater management, etc.).

Pursuant to Article 25 of the NYSECL, NYSDEC standards for development within the regulated tidal wetlands adjacent area [i.e., 300 feet landward of the tidal wetlands boundary <u>or</u> to the 10 foot contour (whichever is more seaward) and not extending beyond the seaward edge of pavement associated with Eagle Knolls Road and Hommocks Road] include the following:

- 75 foot setback from the wetland boundary for principle buildings;
- Not more than 20 percent impervious coverage within the regulated wetland adjacent area;
- 20,000 SF minimum lot area for principle buildings served by public/community sewage disposal systems (however, clustering of principle buildings for multiple family dwellings is permitted).

The high groundwater table and organic soils throughout the low-lying areas of the property in conjunction with rock outcrops and underlying bedrock throughout the remainder of the site present significant constraints to development. These conditions require thoughtful planning and engineering of an extensive drainage system (meeting NYS stormwater management requirements) for any proposed development on the property. Allowances for the jurisdictional wetland areas and adjacent buffers, as well as planning for stormwater management practices, should be considered in the development of a yield map for the property, as well as for future development planning.

FIGURES

FIGURE 1
AERIAL PHOTOGRAPH

Source: NYSGIS Orthophotoimagery Program, 2007;
NPV GIS Library;
Scale: 1 inch = 500 feet

Hampshire Country Club, Mamaronek

Wetland Feasibility Assessment

FIGURE 2
FEMA FLOOD MAP

Source: NYSGIS Orthophotoimagery Program, 2007;
NPV GIS Library;
Scale: 1 inch = 500 feet

Hampshire Country Club,
Mamaronek

Wetland Feasibility Assessment

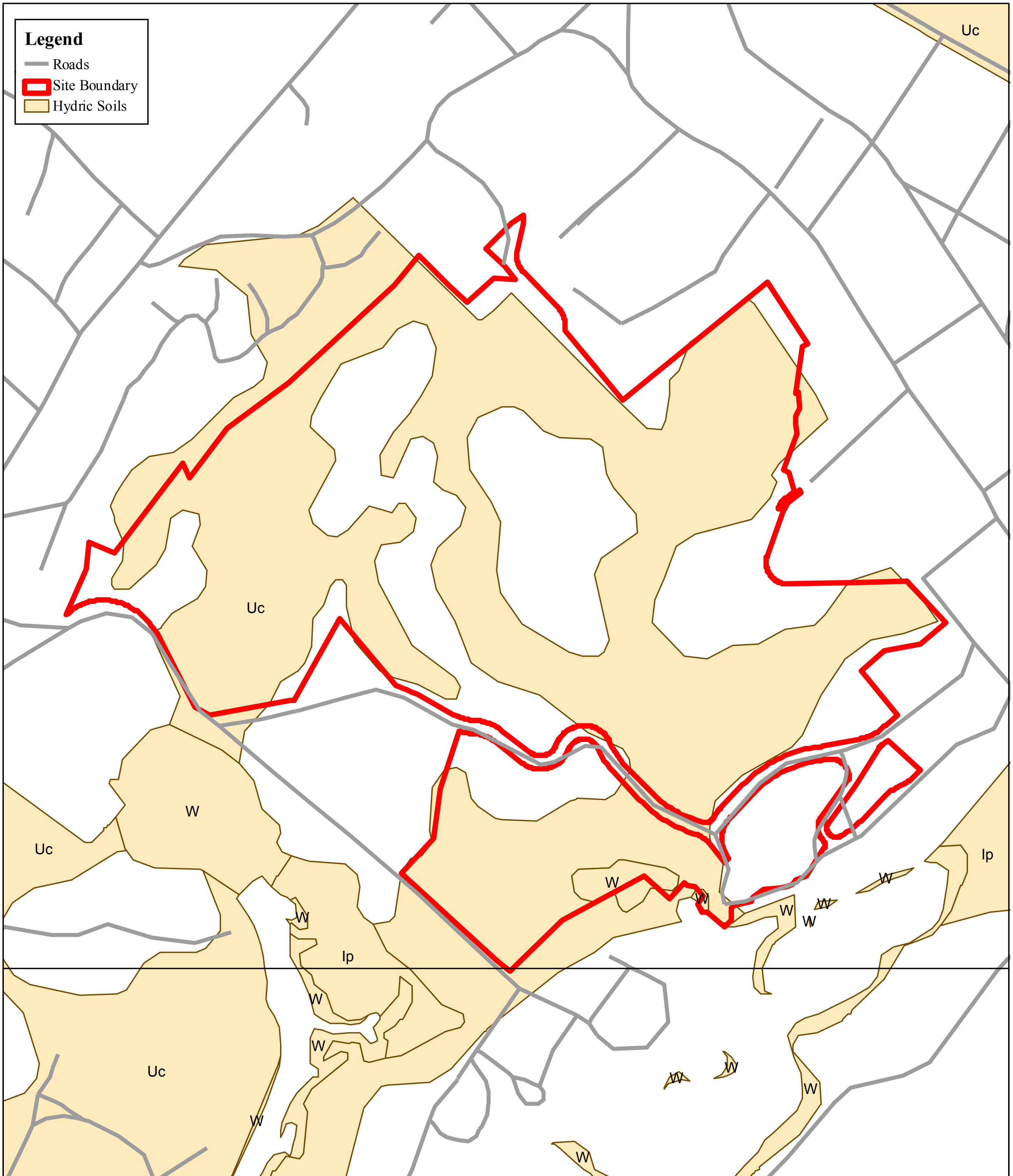

FIGURE 3
HYDRIC SOIL MAP

Source: NYSGIS Orthophotoimagery Program, 2007;
SSURGO, 2006;
Scale: 1 inch = 500 feet

Hampshire Country Club, Mamaronek

Wetland Feasibility Assessment

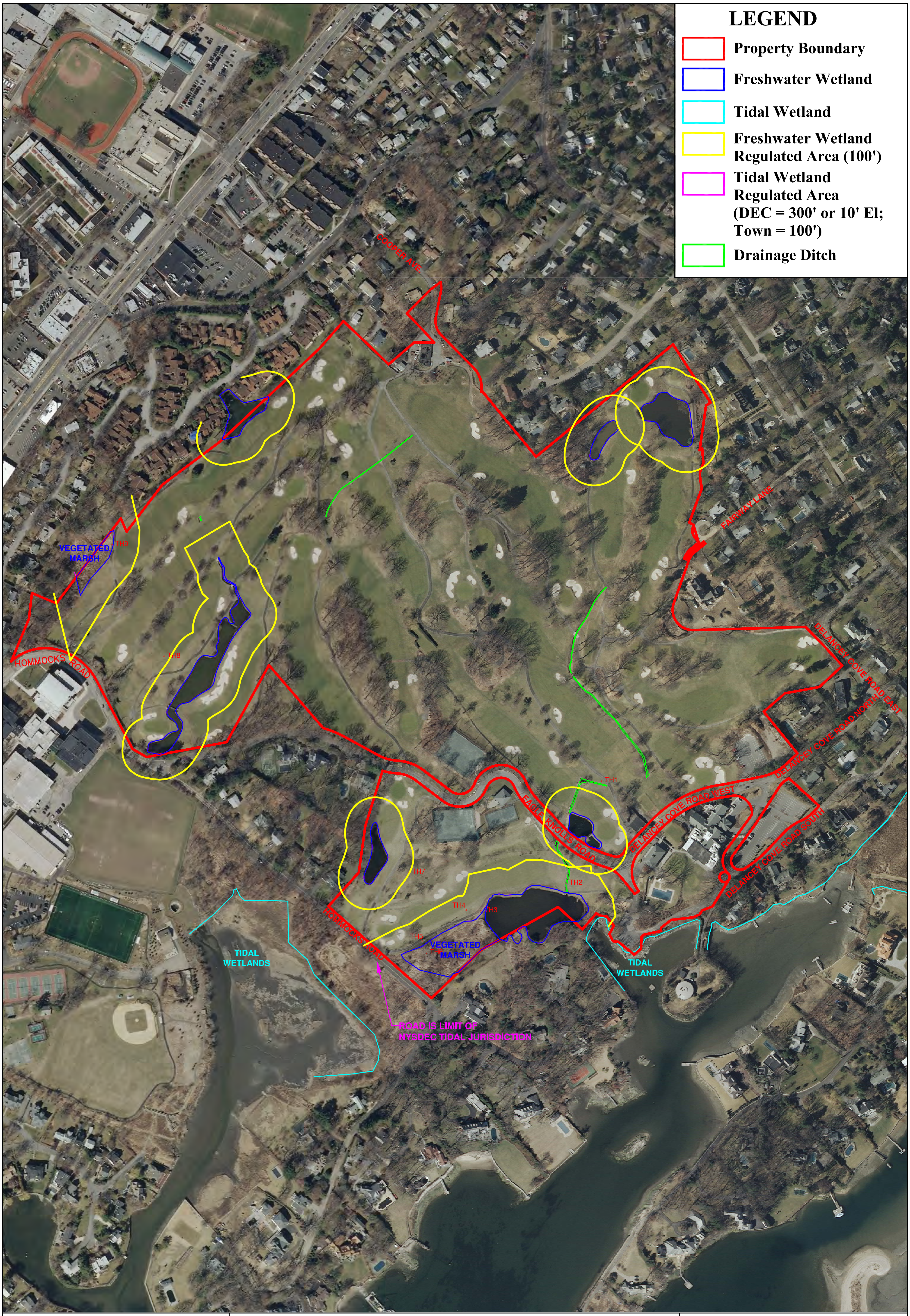

FIGURE 4
REGULATED WETLAND AREAS

Source: NYSGIS Orthophotoimagery Program, 2009
Scale: 1" = 350'

NORTH

Hampshire Country Club, Mamaroneck

Wetland Feasibility Assessment

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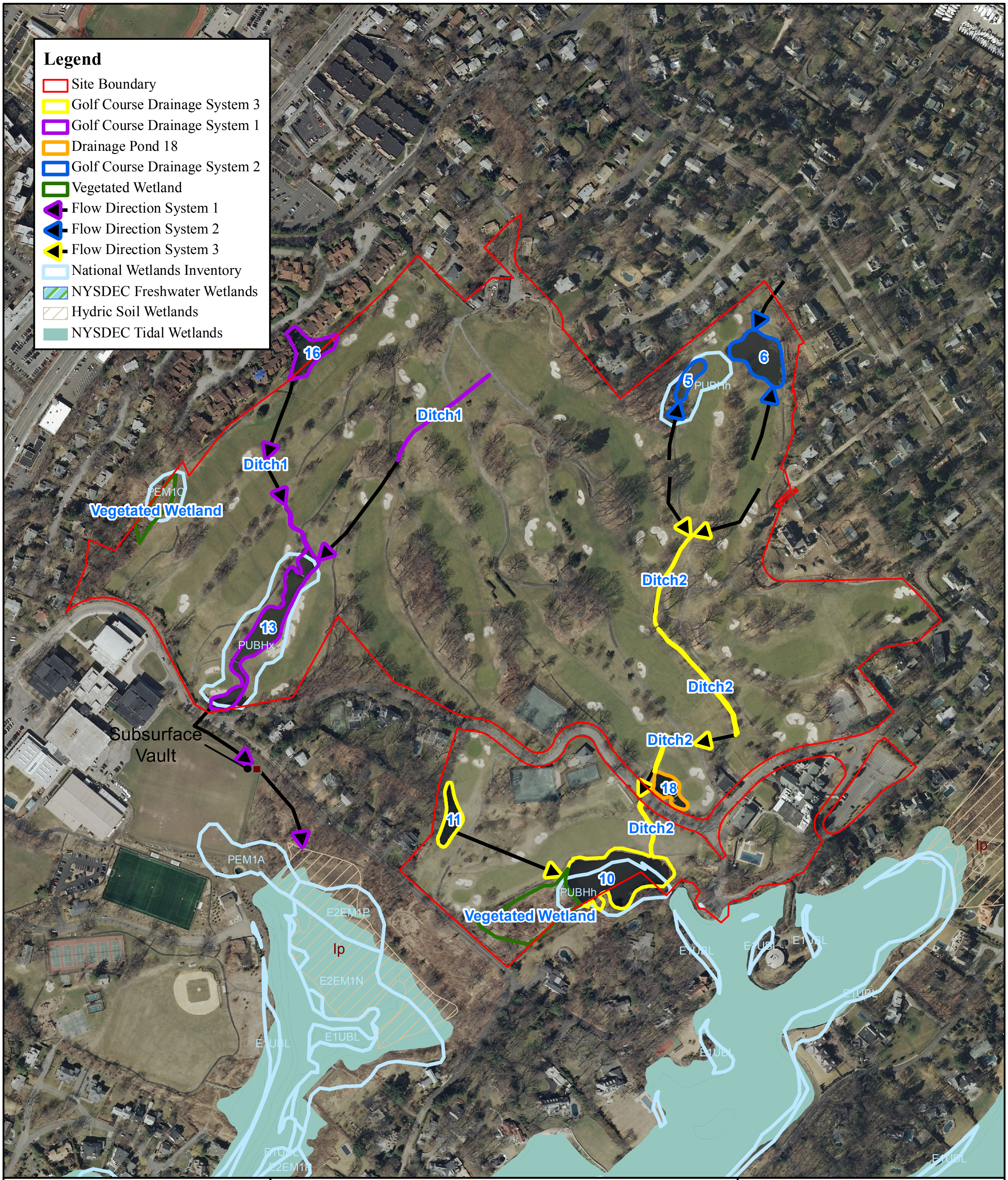

NP&V NELSON, POPE & VOORHIS, LLC ENVIRONMENTAL • PLANNING • CONSULTING	**FIGURE 5** **GOLF COURSE DRAINAGE** Source: NYSGIS Orthophotoimagery Program, 2009; NPV GIS Library; Scale: 1 inch = 500 feet	**Hampshire Country Club, Mamaronek** **Wetland Feasibility Assessment**

Attachment E

David Kennedy

Project Scientist

Education

MS, Geosciences, University of Arizona, 2005

BS, Environmental Science, Paul Smith's College, 2003

Training

NYSDEC iMap Invasive Species Training, 2016

Quality Parks Long Island Master Naturalist Program Graduate, 2015

New York State Wetland Forum Phase I Bog Turtle Habitat Assessment Training Course, 2015

Massachusetts Audubon Society Wetland Construction and Restoration Workshop, 2013

Winter Vegetation Identification for Wetland Delineation, Rutgers University, 2012

Summer Vegetation Identification for Wetland Delineation, Rutgers University, 2011

United States Army Corp of Engineers 38 Hour Wetland Delineation Training Program, 2010

Rutgers University Wetland Delineation Training Program, 2007

The Nyanza Project Tropical Lakes Research Program Graduate, Tanzania, East Africa, 2003-2004

OSHA Hazardous Waste Operations and Emergency Response Training, 2006-2014

David is an environmental and wetland scientist who conducts ecological surveys, habitat assessments, species inventories and rare/protected species evaluations. He also performs freshwater and tidal wetland delineations and provides wetland permitting services for clients with federal, state and local government agencies. David also conducts Phase I and Phase II Environmental Site Assessments, oversees environmental remediation projects and designs and oversees soil management plans.

11 years of professional experience

Silo Ridge Resort Community, Ecological and Wetland Services, Amenia, NY

David performed various tasks in association with the construction of the Silo Ridge Resort Community at a 670-acre property located in Dutchess County, NY and comprised of an existing golf course and extensive mountainous, forested, wetland and old field habitats. As part of the State Environmental Quality Review Act (SEQRA) and Town of Amenia review process, David prepared evaluations of the potential project impacts on existing ecological resources, including endangered and threatened species such as northern long-eared bat (*Myotis septentrionalis*), Indiana bat (*Myotis sodalis*) and bog turtle (*Glyptemys muhlenbergii*). As part of this effort, David initiated consultations with the United States Fish and Wildlife Service (USFWS) and prepared a federally-listed species assessment and avoidance/minimization/mitigation plan that was subsequently approved by the USFWS. The plan included preservation of extensive existing habitat, seasonal clearing restrictions, site lighting requirements and a pesticide management plan, as well as the creation of new species habitat and improvements to existing habitat. David further obtained United States Army Corps of Engineers (USACE) and New York State Department of Environmental Conservation (NYSDEC) wetlands permits in for the alteration of existing wetlands and creation of new wetlands, as well as impacts and mitigation measures associated with the construction of a site wastewater treatment plant. David also conducted a comprehensive ecological survey of a 188-acre adjoining parcel being considered for future expansion of the facility. The survey included vegetation and wildlife inventories, habitat identification and assessment, and rare/protected species evaluations. In association with this effort, David conducted vernal pool amphibian surveys and a breeding bird survey at the property. David further delineated multiple acres of wetland habitats at the property, pursuant to USACE and NYSDEC protocols.

Dredging, Bulkhead Replacement and Revetment Construction Project, Tidal Wetland Delineation and Permitting, East Marion, NY

David performed a tidal wetland delineation and ecological survey at an 18-acre former oyster processing facility for a proposed dredging, bulkhead replacement and revetment construction project located on Gardiners Bay in the Town of Southold, NY. David also obtained a Tidal Wetlands Permit from the New York State Department of Environmental Conservation (NYSDEC) and a United States Army Corps of Engineers (USACE) Individual Permit for the project. As part of the federal wetland permitting process, David also prepared and Essential Fish Habitat assessment for the National Oceanographic and Atmospheric Administration (NOAA) and endangered species assessment for the United States Fish and Wildlife Service (USFWS). In association with the NYSDEC and USACE permitting processes, David designed a wetland mitigation/ smooth cordgrass *(Spartina alterniflora*) planting plan that was approved by both agencies. The plan includes provisions for monitoring and ongoing maintenance of the planted wetland area. Additionally, David prepared a consistency analysis with New York State Department of State (NYSDOS) Coastal Policies, and subsequently received a Coastal Concurrence letter from the NYSDOS. David also prepared a consistency analysis Town of Southold Local Waterfront Revitalization Program (LWRP) Coastal Policies.

Enterprise Park at Calverton (EPCAL), DSGEIS Ecological Assessment and Comprehensive Habitat Protection Plan, Town of Riverhead, NY

David performed an ecological assessment in association with the Draft Supplemental Environmental Impact Statement (DSGEIS) for the proposed development of the 2,323.9-acre Enterprise Park at Calverton (EPCAL) property, which consists of portions of land formerly owned by the United States Department of the Navy (U.S. Navy) and known as the Naval Weapons Industrial Reserve Plant (NWIRP). The site supports extensive wooded wetland and surface water communities, and also includes the largest remaining native grassland habitat on Long Island. The site provides habitat for a number of rare wildlife and plant species, including several NYS-Endangered, -Threatened and Special Concern species. The DSGEIS ecological assessment included habitat characterization, species inventories and rare species assessments. David also performed an evaluation of potential impacts of the proposed action to on-site ecological resources for the DSGEIS and further prepared a comprehensive habitat protection plan (CHPP) for the site for approval by the New York State Department of Environmental Conservation (NYSDEC). The CHHP includes measures to protect and preserve existing habitats for resident wildlife and plant species, including the NYS-Endangered short-eared owl (*Asio flammeus*) and eastern tiger salamander (*Ambystoma tigrinum*) as well as the NYS-Threatened northern harrier (*Circus cyaneus*). The CHPP further provides for the preservation, creation, maintenance and enhancement of 596.4 acres of native grassland habitat as a wildlife preserve for grassland birds and other species.

enXco Solar Generating Facilities, Freshwater Wetlands and Wild, Scenic and Recreational Rivers Permitting, Various Locations, Long Island, NY

David coordinated with the New York State Department of Environmental Conservation (NYSDEC) and obtained NYSDEC Freshwater Wetlands Permits for the construction of solar generating facilities at government-owned properties in the Towns of Islip, Smithtown, and Riverhead, New York. David also obtained NYSDEC Wild, Scenic and Recreational Rivers (WSRR) Permits for the latter two facility locations. The permitting effort also include the approval of mitigation planting plans designed by David.

Proposed Natural Gas Facility, Freshwater Wetland Delineation, Towns of Monroe and Montgomery, NY

David performed a freshwater wetland delineation at a currently undeveloped, 107-acre property that is proposed for development with a natural gas facility. The property supports extensive palustrine, scrub/shrub, emergent, lacustrine and riverine wetland habitats. The delineation was performed over the course of three weeks, according to United States Army Corps of Engineers USACE) and New York State Department of Environmental Conservation (NYSDEC)-required protocols. Prior to the wetland delineation, David coordinated a pre-application meeting with NYSDEC biologists at the property, in order to determine those portions of the site wetlands that are under NYSDEC jurisdiction and to discuss potential project mitigation measures.

Rosehill Residential Development Project, Breeding Bird Survey, New Castle, NY

As part of an existing ecological conditions analysis for a proposed redevelopment plan, David performed a breeding bird survey on this 96-acre wooded property featuring ridgeline, wooded, old field, riverine, wetland and lacustrine habitats. The breeding bird survey was conducted according to Audubon, NY protocols and in accordance with Town of New Castle requirements. A total of 57 avian species were identified by David at various survey point locations during three separate surveys of the property during the spring migration/breeding season.

NSTAR Right-of-Way, Freshwater Wetland Delineations, Eastern MA

David was a contributing scientist in a delineation of freshwater wetlands along an approximately five-mile section of this utility company right-of-way, for which additional power transmission lines are proposed.

Landmark Colony, Ecological and Wetland Services, Staten Island, NY

David conducted an ecological survey for the preparation of an EAS and supplemental environmental studies for a new senior-age residential community in the Willowbrook area of Staten Island. The project site, which supports both woodland and developed habitats, is a 46-acre parcel owned by the City of New York and located within the New York City (NYC) Farm Colony-Sea View Hospital Historic District. The ecological survey included a habitat assessment, observed/expected vegetation and wildlife species inventories and an evaluation for the presence of rare/protected species and ecological communities. Existing conditions, potential impacts of the proposed project and mitigation measures were also addressed. As part of the NYC Environmental Quality Review (CEQR) of the project, David addressed comments from the NYC Department of Environmental Protection (DEP) and the NYC Department of Parks and Recreation. In addition, David performed a wetland delineation and secured a non-jurisdictional determination from the United States Army Corps of Engineers (USACE) for the project. David further conducted a Phase II Environmental Site Assessment, in order to evaluate the impacts of past site usage on soils and groundwater. The Phase II ESA included a geophysical survey, as well as soil, soil vapor and groundwater sampling and impact assessment.

NYSDOT Accelerated Bridge Program, Freshwater Wetland Permitting, Albany, NY

As part of a $31.3 million Accelerated Bridge Program to rehabilitate bridges in the Capital District and northern New York State, the New York State Department of Transportation designated 13 bridges as below par due to deteriorating bridge decks. Listed on the deficient bridge list, the structures range from 30-foot-long, two-lane bridges in rural environments to a 2,000-foot-long, four-lane bridge in an urban environment. David conducted wetland assessments and delineations, as well as USACE and NYSDEC wetland permitting associated with this bridge rehabilitation project.

St. Vincent's Hospital Property, Freshwater Wetland Delineation, Town of Harrison, NY

David performed a freshwater wetland delineation at this 79-acre hospital campus property, the majority of which is comprised of undeveloped woodlands. The woodland areas support extensive palustrine, riverine and emergent wetland habitats. The delineation was performed according to United States Army Corps of Engineers USACE) and New York State Department of Environmental Conservation (NYSDEC) wetland delineation protocols.

Heritage at Cutchogue, Existing Conditions, Impact Assessment and Mitigation Plan, Cutchogue, NY

David conducted a comprehensive ecological survey of this undeveloped 46 acre property, which supports woodland, shrubland, and old field habitats. The survey included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David further prepared an Ecology Resources section for the Draft Environmental Impact Statement (DEIS) for a proposed condominium development. Existing conditions, potential impacts and mitigation measures were addressed.

Sunshine Children's Home and Rehabilitation Center, Wetland Functional Assessment and Mitigation Plan, Ossining, NY

David conducted a wetland functional assessment for three freshwater wetland habitats at this 33 acre, predominantly wooded property, which is the site of a rehabilitation center for sick children. The functional assessment was performed according to the Magee-Hollands method, which examines the functional capacity for each of eight principal wetland functions, based primarily upon field observations and measurements of hydrological, geological and biological characteristics of the wetland, the surrounding watershed and local land uses. David further provided technical assistance and wrote a summary report for a wetland mitigation plan for a proposed facility expansion. The functional assessment and mitigation plan were subsequently approved by the Town of New Castle.

Port Authority of New York and New Jersey Airport Capacity Study, Existing Ecological Conditions Assessment

David performed a comprehensive assessment of existing natural resources at the five Port Authority of New York and New Jersey airport properties (John F. Kennedy, LaGuardia, Newark, Stewart and Teterboro airports. The assessment included a summary of observed and expected flora and fauna, rare/protected species and wetland resources at the five airport properties.

Olivet Redevelopment Project, Freshwater Wetland Delineation and Permitting, Wingdale, NY

In association with a proposed residential development at a currently vacant municipal property, David delineated approximately 15 acres of freshwater wetlands, including palustrine, scrub/shrub, emergent, lacustrine and riverine wetland habitats. The delineation was performed over the course of a week, according to United States Army Corps of Engineers (USACE) and New York State Department of Environmental Conservation (NYSDEC)-required protocols.

Residences at Corporate Park, Existing Ecological Conditions and Impact Assessment and Freshwater Wetland Permitting, Town of Harrison, NY

In association with a proposed residential development at this 10.35 acre property, David conducted an ecological survey of observed and expected flora and fauna, as well as rare/protected species. David summarized the results of the ecological survey and provided an impact assessment and mitigation analysis of the proposed action in a Draft Environmental Impact Statement (DEIS). Mr. Kennedy further performed a wetland functional assessment and obtained a wetland permit for the project from the Town of Harrison.

Northwoods Property Existing Ecological Conditions Assessment, Manorville, NY

David performed an ecological assessment on this 662-acre wooded property located within the Long Island Central Pine Barrens. The ecological assessment included observed and expected plant and wildlife species inventories, as well as habitat characterization and evaluation. David additionally conducted a rare/protected species survey for several New York State-listed plant and wildlife species known to occur in the vicinity of the property, based upon New York State Natural Heritage Program (NYNHP) records. During field surveys, several of these species were identified on-site. David prepared a report and graphics which details the species locations and the existing habitat conditions. The report further identifies potential threats and mitigation efforts for the identified species.

Proposed Wireless Communications Facility, USFWS Coordination, South Farmingdale, NY

David prepared and submitted a protected species habitat evaluation to the United States Fish and wildlife Service for a proposed wireless communications facility at municipal water district property comprised of developed and undeveloped habitats. The evaluation included an assessment of potential northern long-eared bat (*Myotis septentrionalis*) habitat at the site and a request for concurrence with a proposed no effect determination for this mammal species. The USFWS subsequently issued a concurrence letter indicating that the project could proceed as planned with no further agency consultation or coordination.

Building Renovation Project, Wetland Delineation, Permitting and Mitigation Plan, Brooklyn, NY

In association with the New York State Department of Environmental Conservation (NYSDEC) Tidal Wetlands permitting process for this building renovation project, David delineated wetlands and obtained an NYSDEC Tidal Wetlands Permit. As part of the permitting process, David designed an upland native planting plan for the NYSDEC-regulated adjacent area of English Kills/Newtown Creek. The planting plan, which was approved and permitted by the NYSDEC, includes an appropriate native trees, shrubs and herbaceous plants that were noted by David within the general surrounding area of the project site.

Westchester County Airport Master Plan, Existing Ecological Conditions, Impact and Mitigation Assessment, Westchester County, NY

David performed a review of existing biological and wetland resources at Westchester County Airport, as part of the Westchester County Airport Master Plan. The review included research of government agency records and prior ecological assessments of the site. David further identified and characterized various terrestrial, palustrine and aquatic ecological communities and wildlife species during a field survey of the airport property.

Seaford Union Free School District, Tidal Wetland Permitting/Mitigation and Ecological Survey, Seaford, NY

David obtained tidal wetland permits from the New York State Department of Environmental Conservation (NYSDEC) and the United States Army Corps of Engineers (USACE) for the construction of an access driveway on an undeveloped parcel adjacent to the Seaford Harbor School. As part of this effort, David prepared a wetland mitigation and planting plan a mitigation for filling within portions of a tidal wetland habitat at the property. The mitigation plan, which was approved by the USACE and NYSDEC, included creation and planting of new tidal wetland habitat. David also conducted an ecological survey and prepared an ecology resources report for the subject property. The survey included an assessment of existing wooded and wetland habitats, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. Potential impacts of the proposed action and wetland mitigation measures were also addressed.

LaGuardia Airport Runway Area Safety Enhancements, Ecological Assessment and Impact Analysis, Queens, NY

David served as a project scientist for preparation of an Environmental Assessment for the construction of runway safety area improvements at LaGuardia Airport in accordance with NEPA and SEQRA requirements. The Environmental Assessment addressed the airport's unique environmental conditions along the Flushing Bay and Bowery Bay waterfronts in Queens. David performed an assessment of existing terrestrial ecological resources, including an inventory of observed and expected flora and fauna and an assessment of rare species and habitats, as well as an impact analysis on these natural resources.

Verizon Wireless Communications Site, Tidal Wetland Permitting and Phase I ESA, Captree Island, NY

David performed a wetland delineation and obtained a tidal wetland permit from the New York State Department of Environmental Conservation for the construction of a wireless communications facility located within and adjacent to regulated tidal wetlands. The permit included the approval of a wetland mitigation/planting plan designed by David. David further secured permit amendments from the New York State Department of Environmental Conservation in response to project design changes by the site engineer. Additionally, David completed a Phase I ESA of the site.

Proposed Solar Energy Generation Facility, Ecological Survey and Wetland Permitting, Calverton, NY

David conducted an ecological survey of this 45-acre site, which supports agricultural, woodland and wetland/aquatic habitats. The ecological survey included a habitat assessment, observed/expected vegetation and wildlife species inventories and an evaluation for the presence of rare/protected species and ecological communities. David further performed a wetland delineation at the site and secured a Determination of Non-Jurisdiction from the New York State Department of Environmental Conservation for a proposed solar power generating facility at the site. Additionally, David conducted a Phase I Environmental Site Assessment of the property, which included an evaluation of recognized environmental conditions and recommendations for further evaluation and remedial action.

City of White Plains, Existing Ecological Conditions and Impact Assessment and Open Space Study DGEIS, Westchester County, NY

As part of Draft Generic Environmental Impact Statement (DGEIS) to evaluate the potential impacts of the adoption of a new open space zoning classification within the City of White Plains, David performed an analysis of existing natural resources at five golf course properties. The analysis included field assessments and research of local, state and federal government agency records pertaining to wildlife, vegetation, protected species/habitats, wetlands and water resources at the five properties. David further performed an impact assessment of the proposed action and alternatives on the aforementioned resources.

Commercial Development Project, Wetland Mitigation, Riverhead, NY
As mitigation for the filling of an isolated freshwater wetland habitat, David designed a freshwater wetland restoration and planting plan in association with a proposed commercial development at an undeveloped property in Riverhead, NY. The plan, which was reviewed and approved by the Town of Riverhead, NY, included restoration of the original site hydrology, planting of native wetland trees, shrubs and herbaceous plants and provisions for monitoring and ongoing maintenance of the wetland habitat.

Arthur Kill Correctional Facility Redevelopment EAS, Existing Ecological Conditions, Impact and Mitigation Analysis, Staten Island, NY
David conducted an ecological survey for the preparation of an EAS and supplemental environmental studies for the redevelopment of this former prison facility. The 69-acre project site, which supports forested, early successional, tidal wetland, freshwater wetland and developed habitats. The ecological survey included a terrestrial and wetland habitat assessment, observed/expected vegetation and wildlife species inventories and an evaluation for the presence of rare/protected species and ecological communities. Existing conditions, potential impacts, and mitigation measures were also addressed.

Cold Spring Harbor Laboratory Waterfront Project, Tidal Wetland Delineation Mitigation and Permitting, Cold Spring Harbor, NY
David conducted a tidal wetland assessment for the proposed redevelopment of a waterfront property on the campus of Cold Spring Harbor Laboratory in the Village of Laurel Hollow, NY. David further delineated on-site wetlands, designed a wetland mitigation planting plan and obtained a tidal wetland permit from the New York State Department of Environmental Conservation (NYSDEC) for the project.

Country Pointe Development, Existing Conditions, Impact Assessment and Mitigation Plan, Plainview, NY
David conducted a comprehensive ecological survey of this 143 acre property, which supports woodland, meadow, landscaped and developed habitats. The survey included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David further prepared an Ecology Resources section for the Draft Environmental Impact Statement (DEIS) for this proposed residential development. Existing conditions, potential impacts and mitigation measures were addressed. David additionally addressed public and government agency comments in Final Environmental Impact Statement (FEIS) for the proposed project. As a result of a challenge to the findings of the FEIS filed in New York State

Supreme Court, David prepared a 30 page affidavit defending the methods and findings of the ecological survey. The challenge was subsequently dismissed by the court in December 2015.

Proposed Solar Energy Generation Facility, Ecological Survey and Wetland Delineation/Permitting, Calverton, NY

David conducted an ecological survey of this 45-acre site, which supports agricultural, woodland and wetland/aquatic habitats. The ecological survey included a habitat assessment, observed/expected vegetation and wildlife species inventories and an evaluation for the presence of rare/protected species and ecological communities. David further performed a wetland delineation at the site and secured a Determination of Non-Jurisdiction from the New York State Department of Environmental Conservation for a proposed solar power generating facility at the site. Additionally, David conducted a Phase I Environmental Site Assessment of the property, which included an evaluation of recognized environmental conditions and recommendations for further evaluation and remedial action.

Woodbury Crossing Commercial Development, Ecological Survey and USFWS Coordination, Plainview, NY

David prepared and submitted a protected species habitat evaluation to the United States Fish and wildlife Service for a proposed commercial development at a property consisting of an existing commercial use and undeveloped, wooded habitats. The evaluation included an assessment of potential northern long-eared bat (*Myotis septentrionalis*) habitat at the site and a request for concurrence with a proposed no effect determination for this mammal species. The USFWS subsequently issued a concurrence letter indicating that the project could proceed as planned with no further agency consultation or coordination. David further performed and ecological survey and impact assessment of the proposed project.

Town of Islip Landfill Site Investigation, Freshwater Wetland Delineation/Permitting and Ecological Survey, Bay Shore, NY

David performed a comprehensive Phase II Environmental Site Assessment of this 24 acre inactive municipal landfill, incinerator and sewage treatment facility, which is proposed for commercial redevelopment. The investigation included soil vapor monitoring, surficial soil sampling, test pit excavation and groundwater monitoring well installation. David also conducted a freshwater wetland delineation and assisted with securing a New York State Department of Environmental Conservation freshwater wetlands permit for the Phase II investigation. He designed and oversaw the site restoration and mitigation plan following completion of the investigation. David further conducted an ecological survey of the site which included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities.

Proposed Commercial Development, Rare/Protected Species Survey and USFWS Concurrence Request, Smithtown, NY

David performed an evaluation for the potential presence of federal and NYS protected species and communities at a 20-acre property that currently supports undeveloped woodlands and commercial/industrial operations. The assessment included a field survey for the NYS-Endangered plant slender crabgrass (*Digitaria filiformis*), which was identified in New York Natural Heritage Program (NYNHP) records for the site and vicinity. David further conducted a northern long-eared bat (*Myotis septentrionalis*) habitat evaluation and prepared a project review and no-effects concurrence request for United States Fish and Wildlife Service (USFWS) review.

Ronkonkoma Hub Transit-Oriented Development, Existing Ecological Conditions, Impact and Mitigation Assessment, Ronkonkoma, NY
David conducted an ecological survey of this 54 acre property. The survey included an assessment of both developed and undeveloped habitats, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David further prepared an Ecology Resources section for the Draft Generic Environmental Impact Statement for this proposed mixed use development. Existing conditions, potential impacts and mitigation measures were addressed.

Arboretum DEIS, Ecological Survey and Impact Assessment, Farmingville, NY
David conducted an ecological survey for the preparation of a Draft Environmental Impact Statement (DEIS) on this 65-acre property. The project site, which currently supports old field, shrubland, woodland, agricultural and developed habitats, is proposed for construction of a mixed-use development. The ecological survey included a habitat assessment, observed/expected vegetation and wildlife species inventories and an evaluation for the presence of rare/protected species and ecological communities. Existing conditions, potential impacts, and mitigation measures were also addressed.

East Hampton Airport Construction Project, Existing Ecological Conditions and Impact Assessment, Town of East Hampton, Suffolk County, New York
As part of an environmental assessment for a proposed seasonal air traffic control tower construction project, David performed field surveys and researched government agency records pertaining to flora, fauna, endangered/threatened species, wetlands, water resources, coastal resources, floodplains and farmlands. David further prepared an assessment of existing conditions and expected impacts of the proposed action on the aforementioned resources.

Costco Environmental Site Assessments, Wetland and Ecological Services, Town of Islip Landfill Site Investigation, Bay Shore, NY
David performed a comprehensive Phase II Environmental Site Assessment of this 24 acre inactive municipal landfill, incinerator and sewage treatment facility, which is proposed for commercial redevelopment. The investigation included soil vapor monitoring, surficial soil sampling, test pit excavation and groundwater monitoring well installation.   David also conducted a freshwater wetland delineation and assisted with securing a New York State Department of Environmental Conservation freshwater wetlands permit for the Phase II investigation. He designed and oversaw the site restoration and mitigation plan following completion of the investigation. David further conducted an ecological survey of the site which included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities.

Avalon at Huntington Station, Existing Ecological Conditions, Impacts and Mitigation Assessment, Huntington, NY
David conducted an ecological survey of this 27 acre undeveloped property, which is proposed for a residential subdivision. The survey included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David further prepared an Ecology Resources

section for the Draft Environmental Impact Statement for the proposed action. Existing conditions, potential impacts and mitigation measures were addressed.

Brookhaven Town Drainage Project, Freshwater and Tidal Wetland Permitting, Stony Brook, NY
David secured tidal and freshwater permits from the New York State Department of Environmental Conservation and the United States Army Corps of Engineers for the Town of Brookhaven for this highway drainage improvement project.

Brookhaven Village Square, Existing Ecological Conditions, Impact and Mitigation Assessment, Blumenfeld Development Group, Bellport, NY
David conducted an ecological survey of this 58 acre wooded property. The survey included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David further prepared an Ecology Resources section for the Expanded Environmental Assessment Form for this proposed commercial/industrial development. Existing conditions, potential impacts and mitigation measures were addressed.

Center Square Development (Zoumas Property) Existing Ecological Conditions, and Impact Assessment, Wading River, NY
David conducted an endangered/threatened species survey of this 18 acre fallow agricultural property, which is proposed for a mixed use commercial development and open space preservation. The survey included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David prepared a summary report which included conclusions and recommendations regarding the potential impacts of the proposed action.

Avalon at Great Neck Residential Development, Phase 1 and Phase 2 Environmental Site Assessments, Tidal Wetland Permitting, Great Neck, NY
David conducted Phase I and Phase II Environmental Site Assessments in order to assess impacts to soil and groundwater due to historic site usage at this marine terminal and major oil storage facility, which is proposed for residential redevelopment. The investigation included surficial and sub-surface soil sampling, groundwater monitoring well installation and sampling and an analysis of tidal influence on water table elevation beneath the site. David also conducted a wetland investigation and prepared a New York State Department of Environmental Conservation tidal wetland permit application package for the proposed residential redevelopment. David further provided technical support in the design of a wetland mitigation and restoration plan for the site

Proposed Wireless Communications Facility, Tidal Wetland Delineation and Permitting, West Gilgo Beach, NY
David performed tidal wetland delineations and permitting at two proposed locations for this public utility wireless communications facility.

Islip Pines Development, Existing Ecological Conditions, Impact and Mitigation Assessment, Holbrook, NY
David conducted an ecological survey of this 135 acre wooded property. The survey included a habitat assessment, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. David further prepared an Ecology Resources section for the Draft Environmental Impact Statement

for this proposed residential development. Existing conditions, potential impacts and mitigation measures were addressed.

LA Fitness, Freshwater Wetland Permitting Patchogue, NY
David performed wetland delineation and secured New York State Department of Environmental Conservation and Town of Brookhaven freshwater wetlands permits for the construction of a health club facility on this eight-acre wooded property. Preparation of a Town of Brookhaven Part 1 Environmental Assessment Form (EAF) for the proposed construction of a health club facility on this undeveloped property, which contains woodlands, a creek and freshwater wetlands.

Lowes Home Centers, Inc., Ecological Survey and Wetland Permitting, Commack, NY
David conducted an ecological survey of this 22 acre property as part of a retail home improvement center development project. The ecological assessment included wetland evaluation of a federally-regulated recharge basin located at the site. David further obtained a United States Army Corps of Engineers (USAC) Nationwide Permit for disturbance/expansion to the recharge basin. As part of this permitting effort, David designed a wetland mitigation/planting plan and coordinated with the New York State Department of Environmental Conservation (NYSDEC) to obtain a Water Quality Certificate, as required by the USACE. David also conducted Phase I and Phase II Environmental Site Assessments of the property, which included surficial and subsurface soil sampling, and bottom sediment sampling of underground injection control structures.

Proposed Wireless Communications Facility, Freshwater Wetland Delineation and Permitting, Islip, NY
David conducted freshwater wetland delineation and obtained a New York State Department of Environmental Conservation freshwater wetlands permit for this wireless communications facility site.

Highway Improvement Project, Freshwater and Tidal Wetlands Permitting, Incorporated Village of Lloyd Harbor, NY
David coordinated with the New York State Department of Environmental Conservation (NYSDEC) to secure freshwater and tidal wetlands permits for a traffic safety improvement project along six miles of public roadways within the Incorporated Village of Lloyd Harbor.

Silver Oak Stables, Freshwater Wetlands Permitting and Ecological Survey, Nissequogue, NY
David obtained a freshwater wetlands permit the New York State Department of Environmental for an extensive demolition and construction project at this 35 acre equestrian center and boarding facility. David also conducted an ecological survey and prepared an ecology resources report for the subject property. The survey included an assessment of existing meadow and wetland habitats, vegetation and wildlife species inventories and an evaluation for the presence of rare species and ecological communities. Potential impacts of the proposed action and wetland mitigation measures were also addressed in the report.

Solar Energy Generation Facility, Existing Ecological Conditions Assessment Southold, NY

David conducted an ecological survey of this 21 acre site, which supports agricultural, successional, woodland and wetland/aquatic habitats. The ecological survey included a habitat assessment, observed/expected vegetation and wildlife species inventories and an evaluation for the presence of rare/protected species and ecological communities. David further conducted a Phase I Environmental Site Inspection of the property, to identify and assess existing environmental concerns for future redevelopment.

Vintage Vines Development, Existing Ecological Conditions, Impact and Mitigation Assessment, Bridgehampton, NY

David performed an ecological assessment and tiger salamander survey for a proposed residential development on this 49 acre undeveloped property. He subsequently wrote the Ecology Resources section for the Draft Environmental Impact Statement, in which existing ecological conditions, potential impacts and mitigation measures were addressed. David also responded to public comments in the Final Environmental Impact Statement for the proposed action.

Prior Positions

Hydrogeologist, R&C Formation

Prior to VHB, David performed groundwater monitoring and evaluation activities at federal, state and local government sites, including the United States Department of Energy's Brookhaven National Laboratory facility.

Fish and Wildlife Technician, New York State Department of Environmental Conservation

Prior to VHB, David conducted biological assessments, population surveys, water quality evaluations and fish stocking of various local waters for the New York State Department of Environmental Conservation. David also participated in endangered species surveys, invasive species remediation projects, environmental education workshops and public outreach events.

Visiting Scientist Position, The Nyanza Project, Tanzania, East Africa

Prior to VHB, David performed multi-disciplinary scientific research activities as a student (2003) and visiting scientist/teaching assistant (2004) with The Nyanza Project, an international tropical lakes research program held annually at Lake Tanganyika, Tanzania, East Africa.

Publications

Eggermont, H., Kennedy, D., Hasiotis, S.T., Verschuren D. & Cohen, A. 2008. Distribution of living larval Chironomidae (Insecta: Diptera) along a depth transect at Kigoma Bay, Lake Tanganyika: implications for palaeoenvironmental reconstruction. African Entomology 16(2): 162-184.