3.2 Water Resources

3.2.1 Existing Groundwater Resources

Surface water on the property is present in limited amounts and is associated with the wetland and its outflow or with temporary ponding associated with the storm water runoff from the site. Therefore, groundwater in the vicinity of the project area is largely contained in bedrock although the local glacial till soils will also contain shallow groundwater aquifers. There are no wells indicated on the survey of the site (see Figure 2-1).

3.2.2 Existing Wetlands

After a review of the National Wetland Inventory (NWI) and New York State Department of Environmental Conservation (NYSDEC) mapping resource materials to determine the approximate locations of the wetlands on the property, the actual field boundaries of the existing on site wetland was delineated by Jim Bates of Tim Miller Associates, on March 23 and 31, 2005. The wetland delineation was conducted in accordance with the methodology set forth in the US Army Corps of Engineers (ACOE) Wetlands Delineation Manual[1]. The wetland boundaries were field verified and validated by the ACOE on April 19, 2006. Appendix B includes a copy of the letter from the ACOE regarding their jurisdictional determination (JD). A wetland report is included with this DEIS in Appendix E. The delineated on-site wetlands are depicted in Figure 3.2-1. On-site wetlands total approximately 3.68 acres. Refer to section 3.3 of this DEIS for a detailed discussion of the wetland habitats. The applicant has no reason to believe that the wetland boundaries have changed since the delineation was conducted. Per the ACOE regulations, a JD is good for a period of five years from the date of issuance, thus if the project is not complete prior to April 19, 2011, it will be necessary for the ACOE to reissue the JD.

3.2.3 Existing Surface Water Resources

Existing Stormwater Runoff Conditions

Existing surface water features and drainage areas are shown on Figure 3.2-1. The site contains a 3.68-acre wetland area interior to the site as previously discussed.

The topography of the site generally runs from two highpoints (Elev. 600 and Elev. 597) in the northeast portion of the site down towards the on-site wetland (Elev. 484), and towards the northwest of the property along Route 17M (Elev. 452). Under present-day conditions stormwater discharges at four major locations:

1. existing culvert within Route 17M at the northwest corner of the site,
2. existing basins to the west,
3. towards adjacent northeast properties, and
4. towards adjacent properties at the northern corner of the site.

Based on survey information, aerial photographs, site visits and supplemental topographic information taken from record mapping sources, the site was divided into four watershed areas; A, B, C and D, with discharge points as noted above. Watershed D is very small portion (±0.42 acres) of the overall site and the proposed development will have no negative impact on this

[1] U.S. Army Corps of Engineers, 1987. Wetlands Delineation Manual, Technical Report Y-87-1.

watershed. Therefore, the stormwater management report does not discuss or compare this watershed any further detail. Watersheds A, B and C were analyzed at their respective analysis points.

Existing runoff rates and volumes from the project site have been calculated for the 1-year, 2-year, 10-year, and 100-year storm events. All assumptions for land cover types, soil groups, slopes and curve number calculations are provided in the project engineer's Preliminary Stormwater Management Plan (PSMP) (Appendix D). Under existing conditions, the site contributes a peak flow of approximately 58.03 cubic feet per second (cfs) for a one-year storm event, to in excess of 493.19 cfs for the 100-year storm event (Table 3.2-1)

Table 3.2-1
Peak Pre-Development Flow Summary for 24-Hour Design Storms
(Cubic Feet per Second)

Design Point	1-Year	2-Year	10-Year	100-Year
DA-A	23.96	33.08	65.40	106.87
DA-B	29.97	45.35	104.17	184.91
DA-C	11.99	17.10	35.71	60.10

Source: Preliminary Stormwater Management Plan, Langan Engineering, 2009

Detailed information pertaining to the existing watersheds and site drainage features is provided in the Preliminary SWPPP report prepared for this project (Appendix D). Figure 3.2-1 depicts the existing (pre-development) drainage areas on the project site.

Existing Storm Water Quality

The majority of the project site is vegetated with little development, resulting in limited soil erosion by rainfall and resultant limited amounts of suspended solids in storm water runoff from the site. As the project site is primarily old agricultural fields, there would be some dissolution and subsequent transport of dissolved nutrients (including nitrogen and phosphorous compounds) into the on-site wetland from the existing vegetation and soils on the site.

3.2.4 Potential Impacts - Groundwater Resources

The project site currently has no demand for groundwater use. With the annexation to the Village of Chester, the Project proposes to utilize the Village public water system to meet anticipated water demands. As such there will be no change in groundwater use or demand with the Proposed Action.

This development will not be withdrawing water from the aquifer underlying the project site. The majority of local residents and businesses in the Village of Chester are connected to municipal water and do not utilize individual wells. Refer to DEIS section 3.10 Utilities for a detailed discussion on water demand, anticipated uses as well as potential water saving and drought measures. Groundwater in the vicinity of the project area is primarily found in the bedrock.

There is no anticipated impact to groundwater with the construction of basements or foundations. Structures would have footing drains installed to intercept and direct groundwater away from the structures as needed.

The Proposed Action involves a development that would disturb 56.61 acres of the site for buildings, parking and roadways, or for landscaped areas and stormwater management.

Of the 68.4 acre site, 24.65 acres of impervious coverage is proposed with this development including roads, parking areas, and buildings. Storm water from these areas will be directed to on-site storm water management facilities. This surface water will continue to be available to recharge the local aquifer, both on-site and off-site.

Groundwater recharge would continue to occur in the 44 acres that will not have impervious surface coverages, which includes a stormwater basins that will serve to recharge the aquifer and the jurisdictional wetland area. The project is not expected to adversely affect local groundwater quality or quantity.

3.2.5 Mitigation - Groundwater Resources

As more fully described in Section 3.10.2 utilities, the project will not be relying on groundwater resources, thus no mitigation measures are necessary or proposed.

3.2.6 Potential Impacts - Wetlands

The proposed internal access road would impact 0.098 acres of the ACOE jurisdictional wetland. Where the crossing occurs the Applicant proposes to install multiple open bottom culverts. The culverts will retain the existing wetland connection and flow characteristics and will allow for contiguous habitat throughout the wetland. The minor disturbance impact with the roadway crossing will have little effect on the functionality of the wetland.

The wetland delineation was conducted preceding the design plans being completed. The Wetland Report indicates that Army Corp. involvement is not required only if no activities are proposed within the delineated wetland. As discussed above, the proposed plans anticipate a minor loss of wetland in the vicinity of the proposed roadway.

Aside from the minor loss of wetland habitat in connection with the roadway crossing, no other impacts to the wetland are anticipated. Wetland vegetation and wildlife will continue to exist in a manner similar to the existing condition.

3.2.7 Potential Impacts - Surface Water Resources

Disturbance and Grading

According to the project engineer, the total impervious surface area of the BT Holdings development would be 24.65 acres, which includes 14.27 acres of roads, parking areas, driveways and walkways and 10.38 acres of building footprints. Lawn and landscaped area would cover 31.85 acres of the developed site. Therefore the total area of disturbance would be 56.50 acres and 11.82 acres would remain undisturbed.

Of the 46 acres of existing field, meadow and brushy areas on the site, approximately 40.5 acres will be disturbed. And of the 19 acres of wooded area, approximately 15.9 acres will be disturbed. As noted above, the site contains 3.68 acres of federally-regulated freshwater wetlands of which one tenth (0.1) acre will be disturbed.

Future Runoff Conditions

The proposed overall increase in impervious coverage on the project site will result in increases in the rate and volume of stormwater runoff in the absence of appropriate stormwater controls. Changes to the existing drainage patterns of the site will also occur as the land is re-graded to construct buildings, parking areas, and roads. If not properly mitigated, these activities could cause stream erosion and flooding due to uncontrolled stormwater increases. In order to offset these changes, the design of the development incorporates three stormwater management basins (ponds) to control and convey stormwater runoff.

Figure 3.2-2 illustrates the post-development drainage areas. The direction of flow the post developed watershed is shown on the Developed Condition Watershed Map (Appendix D) and will be influenced by the final grading of the site.

The three proposed detention ponds would be located at the low points for the respective drainage areas.

Each of the stormwater basins will ultimately discharge via outlet control structures that will reduce all post-development peak outflows from the basins and lower the overall site peak runoff to less than the pre-development peak runoff of the unconstrained watersheds (Table 3.2-2), thus satisfying the "zero net increase of peak flow" provisions of state stormwater regulations.

Table 3.2-2
Pre- and Post- Development Peak Flow for 24-Hour Design Storms
(Cubic Feet per Second)

Design Point	1-Year	2-Year	10-Year	100-Year
DA-A pre	23.96	33.08	65.40	106.87
DA-A post	10.12	14.32	36.07	103.84
DA-B pre	29.97	45.35	104.17	184.91
DA-B post	12.56	19.33	46.03	179.74
DA-C pre	11.99	17.10	35.71	60.10
DA-C post	2.83	10.20	35.00	57.57

Source: Preliminary Stormwater Management Plan, Langan Engineering, 2009

The Preliminary (SWPPP) provides details on the post-development drainage basins resulting from the proposed development of the project site. Drawings included with the report depict drainage areas associated with the development and provide information on basin sizing and flow control structures.

Water Quality

The introduction of impervious surfaces and residential or commercial uses may influence the quality of stormwater runoff compared to a site's undeveloped condition. Concentrations and types of pollutants introduced from automobiles, pet waste, herbicide and pesticide application and atmospheric deposition could increase.

The stormwater management plan is required to incorporate structures and methods designed to satisfy provisions specified in the most recent (April 2008) version of the NYSDEC Stormwater Management Design Manual that incorporates Phase II stormwater regulations.

The NYSDEC Stormwater Management Design Manual presents sizing and performance criteria for developing site-specific stormwater management practices (SMP) that can provide acceptable water quality treatment for stormwater runoff. An acceptable SMP will capture and treat 90 percent of the average annual runoff volume from stormwater and be capable of removing 80 percent of the Total Suspended Solids and 40 percent of the Total Phosphorous in the runoff water.

As the NYSDEC manual requires that 90% of the average annual runoff volume be treated, this requirement was used to determine the water quality storage volumes for the project site. The sizing and design of the water quality ponds and the conveyance systems were based on these calculated volumes.

The use of an approved erosion and sediment control plan will incorporate Best Management Practices to comply with NYS regulations for suspended sediment control in runoff water from construction sites. With proper stormwater management and the use of erosion control BMPs, site development can occur while minimizing or avoiding impacts to downstream receiving waters. The proposed plans are designed to comply with the requirements of the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges (GP-0-08-001) so that such potential impacts are mitigated prior to stormwater discharge into the receiving stream.

As described below, the proposal has been designed to mitigate against potential soil erosion and sedimentation through the phasing of site construction, use of rapid site stabilization after grading, provision of lawn and landscaping in disturbed areas, and the use of extended detention basins and other BMPs. These basins are designed to remove up to 80 percent of the remaining suspended sediment load after site stabilization. Based upon implementation of these measures Sediment loading post construction is not expected to create an adverse environmental impact to the receiving waters.

Stormwater Runoff Quality Treatment Measures

The applicant has submitted plans that conform to the criteria established by the NYSDEC. These plans include the use of erosion controls, phased site development and stormwater management practices (SMPs) that are acceptable to the NYSDEC and described in their Stormwater Management Design Manual (April 2008).

The proposed stormwater management design utilizes SMPs to best provide acceptable water quality treatment prior to the stormwater runoff being discharged from the project site. The project proposes to utilize three separate wet extended detention ponds. As detailed in

Appendix D, each of these stormwater ponds would employ forebays, permanent pools and flow control structures at each pond drain. All three of these wet extended detention ponds were designed in accordance with NYSDEC sizing criteria to treat a portion of the water quality volume (WQv) by detaining storm flows above a permanent pool for a specified minimum detention time. Also, the proposed wet extended detention ponds are capable of achieving the desired goals for pollutant removal (80 percent for suspended solids and 40 percent for phosphorous), have exhibited acceptable longevity in the field, and possess pretreatment mechanisms. These structures were also designed to provide channel protection as well as overbank and extreme flood attenuation by moderating runoff flow rates. The proposed pond discharge outlet points, where the collected stormwater runoff will be discharged from the ponds, will have rip rap aprons as to dissipate energy and prevent erosion.

Erosion and Sediment Control Measures

A comprehensive erosion control plan will be employed to minimize the potential adverse impacts resulting from the proposed clearing, excavation and grading necessary to undertake the proposed project. Erosion control plans for this project are included as part of the site plan and presented in Appendix D. The plan will incorporate various measures to reduce erosion during construction and trap sediment to prevent it from being carried from areas being actively graded. The measures will be installed in accordance with the New York "Standards and Specifications for Erosion and Sediment Control", dated April 2005. Several key measures that are proposed to improve the quality of stormwater discharged from the site and reduce the impact on downstream waters or other off-site areas incorporate methods to improve soil stabilization, runoff control, sediment control, and fugitive dust control including:

1. Soil covers/temporary seeding
2. Silt fences
3. Sediment Basins
4. Curb inlet protections
5. A stabilized construction entrance
6. Check dams
7. Dust control measures

- Soil Covers/Temporary Seeding. Any exposed soils that are exposed and left bare and are not under active construction will be temporarily stabilized within seven days. Mulching or hydroseeding will be applied to ground with low slopes that have been stripped of natural vegetation. Riprapping, matting or sodding will be applied to soils for permanent stabilization if conditions warrant;
- Silt Fences. Silt fence will be installed at the toe of slopes below areas to be graded as per the site plans. Silt fence allows water to pass through the fabric while trapping most of the sediment in the runoff;
- Sediment Basins. Three temporary sediment basins have been conceptually designed to intercept sediment laden runoff in order to trap and retain the sediment to reduce the total suspended sediment leaving the site. After adequate settling time the runoff will be discharged via a de-watering device consisting of filter-wrapped perforated pipe connected to the outlet control structure;
- Curb Inlet Protections. All proposed drain inlets will be provided with drain inlet protection during construction. Stone, hay bales, fabric or excavated depressions will be established around inlets to filter sediments from the runoff;

- Stabilized Construction Entrance. The construction entrance will be provided with a lined stone pad of appropriate dimensions to reduce the transport of soil to adjacent roadways;
- Check Dams. Temporary check dams may be proposed at locations across the site as needed and will limit erosion by temporarily reducing discharge velocities and capturing sediments within the over-excavated pond storage areas;
- Dust Control Measures. Dust during construction activities will be controlled through a combination of temporary stabilization measures, including the use of vegetative covers or spray-on tackifiers for disturbed areas not subject to traffic, mulching (including gravel mulch) and seeding, compaction of disturbed soil, water sprinkling, wind screens erected at right angles to prevailing wind currents and the use of stone covers (crushed stone or coarse gravel) on construction roads. Dust generation will also be limited through phasing of the project that will limit the overall area of exposed soils in each phase. All on-site vehicle speeds will be limited to 15 MPH on unpaved construction roads through the use of traffic controls. When wind gusts exceed 25 MPH all hauling operations would be stopped until high wind conditions subside.

Topsoil will be spread following final grading operations and the ground surface will be promptly revegetated using trees, shrubs, ground covers and grasses as set forth in the landscape plan.

The sediment and erosion control plan will be part of the site plan approval and construction bid documents. Therefore, the contractor will be obligated to provide weekly inspections by a qualified professional to assure the maintenance of each sediment and erosion control measures throughout all construction phases of the project as specified in the New York "Standards and Specifications for Erosion and Sediment Control." The inspections will continue until the site has undergone final stabilization and the designated project operator has filed a "Notice of Termination" with the NYSDEC.

The installation of erosion control measures would begin with the establishment of protective features at the bottom of existing slopes on the undisturbed site, followed by the sequential placement of any upslope ESC measures. When installing the erosion control measures, the sequence would generally be as follows:

- Prior to the commencement of construction activities, the limits of clearing and grading would be clearly marked. Perimeter silt fence and the stabilized construction entrance would initially be installed.
- Prior to commencing earth moving activities, temporary erosion control devices would be installed. This would include the initial installation of the initial temporary sediment traps, diversion swales, and drainage channel check dams.
- Upon completion of clearing and grubbing activities during each construction phase, topsoil would be stripped from all disturbed areas and stockpiled. Stockpiled topsoil would be stabilized by temporary seeding and surrounded with a perimeter silt fence.
- Immediately after completion of rough grading, any remaining temporary erosion controls would be installed as specified, including any additional silt fences, diversion swales or check dams. Any areas not requiring further earth work would be fine graded, topsoiled and stabilized as early as possible.

Stormwater Pollution Prevention Plan

As noted, the applicant will submit a Stormwater Pollution Prevention Plan (SWPPP) to the Village for review and approval at the time of detailed Site Plan review. The objective of the SWPPP is to control runoff of pollutants from the project site during and after construction activities by complying with the NY State Pollutant Discharge Elimination System (SPDES) Stormwater Permit for construction activities. The SWPPP will implement the following practices:

- Reduction or elimination of erosion and sediment loading to waterbodies during construction;
- Control of the impact of stormwater runoff on the water quality of the receiving waters;
- Control of the increased volume and peak rate of runoff during and after construction; and
- Maintenance of stormwater controls during and after completion of construction.

The SWPPP will specify the selection, sizing and siting of the SMPs to protect water resources from stormwater impacts. The designs of the proposed SMPs were determined using current engineering methodologies that apply appropriate sizing criteria to avoid the overburdening of stormwater conveyance structures.

Construction and Phasing

The phasing for the BT Holdings development is shown on the Overall Phasing Plan, prepared by Langan Engineering and Environmental Services, included herein as Figure 2-12. In addition, erosion and sedimentation control and construction sequence information is shown on the Soil Erosion and Sediment Control Plan, prepared by Langan Engineering and Environmental Services, included herein as Figure 2-13. Additional discussion of grading, earthwork and soil erosion and sedimentation control plans and practices is provided in DEIS section 3.1.

The engineer's phasing plan indicates that there will be five phases to the proposed development to limit the extent of disturbance to discrete areas of the site related to certain sets of improvements, which will aid in the control of erosion and sedimentation.

Long Term Operation, Maintenance, and Inspection

SMP Stormwater Ponds must be properly operated and maintained if they are to function as intended over a long period of time. Typical SMP maintenance tasks include routine inspections for structural conditions, debris removal, mowing, structural repairs as well as control of nuisance plant and animal species. Plans can be based on and developed by reference to recent standard regulatory documents, including the 2008 NYSDEC Stormwater Management Design Manual (April, 2008) and the US EPA National Management Measures to Control Nonpoint Source Pollution from Urban Areas (November 2005).

Each of the three detention ponds should be inspected monthly for the first six months of operation after construction and on an annual basis thereafter. The structures should also be inspected following any major storm rainfall event. Inspection priorities should include checking the embankments for subsidence, erosion, cracking, tree growth, and the presence of

burrowing animals. Also to be inspected should be the condition of the emergency spillways and drains, sediment accumulations, clogging of outlets, erosion control measures in the contributory drainages and channel erosion control measures at the outlet.

Establishment of trees and woody shrubs would be prevented on embankments, emergency spillways and buffer areas through periodic mowing (a minimum of six times per year). Debris and litter should be removed from the surface of the pond, surrounding buffer areas, and riser and outlet areas in conjunction with the mowing operations. Accumulated debris and litter should also be removed following any major storm event.

Eroding soils in the drainage area that are contributing to the wet ponds should be stabilized immediately with vegetation or other erosion control practices. Soils may slump in buffer areas outside the edges of the wet ponds, from the wet pond embankments or emergency spillways. When soils are exposed by erosion or slumping, corrective measures such as regrading and revegetation may be necessary. Similarly, the riprap protecting the channel downstream of the outlet channel may have to be repositioned and stabilized as necessary.

Significant quantities of sediment can accumulate in an extended detention facility. Sediment buildup should be properly removed from the forebay areas prior to accumulations reaching twenty-five percent of the design depth in order to preserve the available stormwater management capacity of the pond. While more frequent clean-out may be needed in the forebays and around outlet control structures, a typical clean-out cycle for the lower stages of an extended detention facility should range from 5 to 10 years.

With the implementation of SWMP measures described in this section, Appendix D or detailed on the final project Storm Water Pollution Prevention Plan drawings for the *BT Holdings/Chester Development*, no significant adverse impacts to on-site or downstream water resources are anticipated.

3.2.8 Groundwater Resources Mitigation

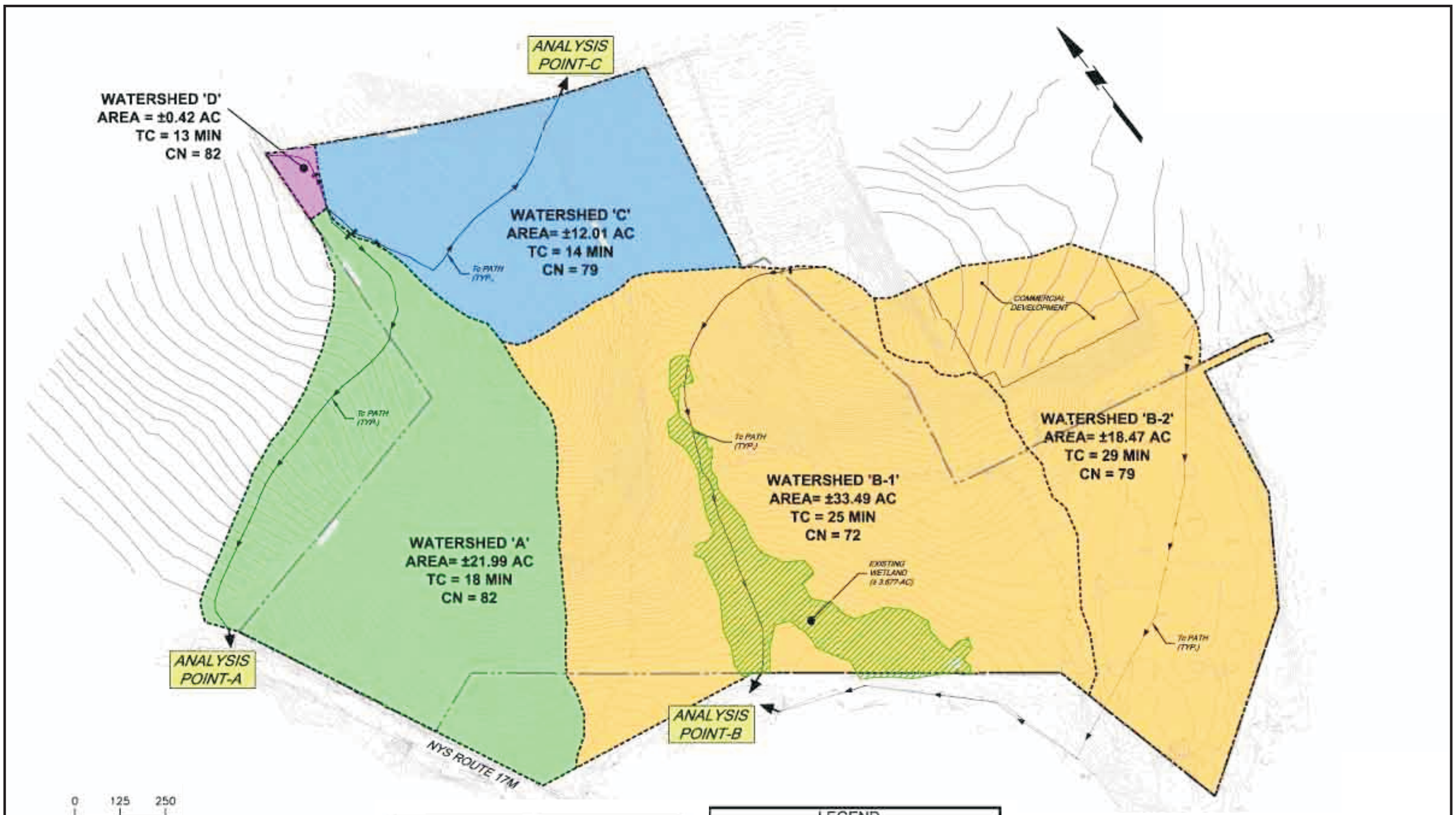
Since the BT Holdings development is not anticipated to have any significant adverse impacts to groundwater resources, no mitigation measures are proposed. Refer to section 3.10, Utilities for further information regarding water supply and use.

3.2.9 Wetlands Mitigation

The *BT Holdings development* has been designed to avoid the on-site wetland areas to minimize adverse impacts on wetlands. However, as mitigation for the minor wetland disturbance, the installation of open bottom culverts is proposed.

3.2.10 Surface Water Resources Mitigation

Since the *BT Holdings development* project intends to incorporate the above described stormwater management and erosion and sedimentation controls, to avoid significant adverse impacts to on-site or downstream water resources, no further mitigation measures are proposed.



ANALYSIS POINT	EXISTING DISCHARGE RATE		
	1-YEAR	10-YEAR	100-YEAR
A	23.96 CFS	65.40 CFS	106.87 CFS
B	29.97 CFS	104.17 CFS	184.91 CFS
C	11.99 CFS	35.71 CFS	60.10 CFS

LEGEND

WATERSHED LIMITS

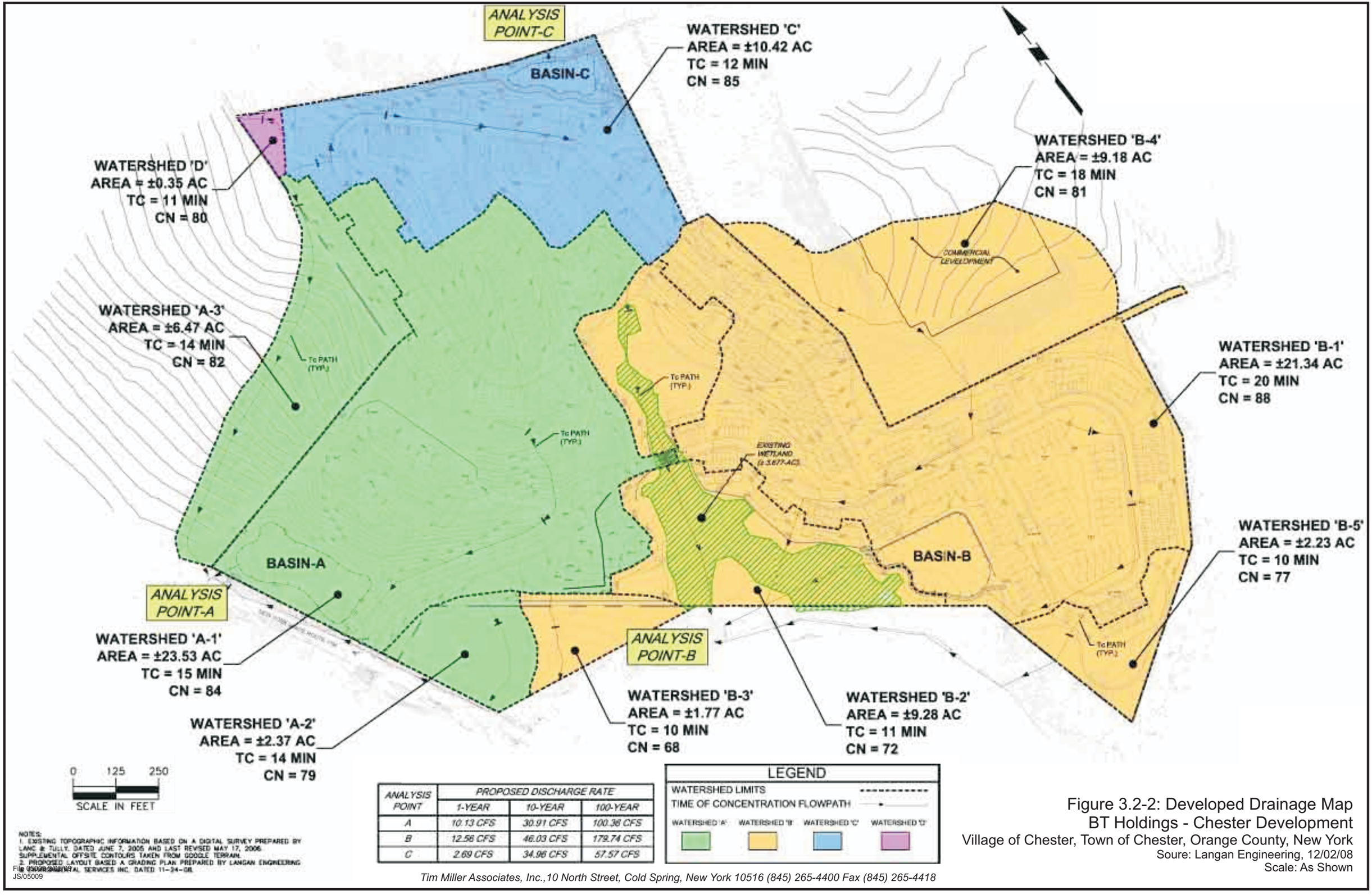
TIME OF CONCENTRATION FLOWPATH

WATERSHED 'A' WATERSHED 'B' WATERSHED 'C' WATERSHED 'D'

NOTES:
1. EXISTING TOPOGRAPHIC INFORMATION BASED ON A DIGITAL SURVEY PREPARED BY LANC & TULLY, DATED JUNE 7, 2005 AND LAST REVISED MAY 17, 2006. SUPPLEMENTAL OFFSITE CONTOURS TAKEN FROM GOOGLE TERRAIN.

File 05009 2/05/09
JS/05009

Figure 3.2-1: Existing Drainage Map
BT Holdings - Chester Development
Village of Chester, Town of Chester, Orange County, New York
Source: Langan Engineering, 12/02/08
Scale: As Shown



ANALYSIS POINT	PROPOSED DISCHARGE RATE		
	1-YEAR	10-YEAR	100-YEAR
A	10.13 CFS	30.91 CFS	100.36 CFS
B	12.56 CFS	46.03 CFS	179.74 CFS
C	2.69 CFS	34.96 CFS	57.57 CFS

NOTES:
1. EXISTING TOPOGRAPHIC INFORMATION BASED ON A DIGITAL SURVEY PREPARED BY LANC & TULLY, DATED JUNE 7, 2005 AND LAST REVISED MAY 17, 2006. SUPPLEMENTAL OFFSITE CONTOURS TAKEN FROM GOOGLE TERRAIN.
2. PROPOSED LAYOUT BASED A GRADING PLAN PREPARED BY LANGAN ENGINEERING & ENVIRONMENTAL SERVICES INC. DATED 11-24-08.

File: 05009-2-05009
JS/05009

Figure 3.2-2: Developed Drainage Map
BT Holdings - Chester Development
Village of Chester, Town of Chester, Orange County, New York
Soure: Langan Engineering, 12/02/08
Scale: As Shown

Tim Miller Associates, Inc.,10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418