

The SWPPP identifies seed mixes for temporary and permanent planting for the stabilization of exposed slopes and graded areas. The seeding rate and schedule are also provided.

A detailed construction schedule is provided in the SWPPP which describes the proposed phases of construction, areas, erosion control methods and construction milestones (see Appendix 4, SWPPP Section VI Construction Schedule). The construction schedule consists of eleven (11) phases.

The stormwater analysis demonstrates that the proposed system will function properly, provide water quality enhancements, and require minimal maintenance to insure continued performance. Given the proposed stormwater management features and mitigation measures, no significant impacts to surface water are anticipated.

D. GROUND WATER RESOURCES

D.1 Existing Ground Water Resources

Ground-Water Demand

A four-bedroom, single-family residence is conservatively estimated to require a water supply of 520 gpd (gallons per day). This demand is based on the assumptions that each bedroom in a single-family residence will require 130 gpd. For the 21 proposed residences, the 520 gpd implies that the average withdrawal from the underlying bedrock aquifer would total approximately 11,960 gpd or about 8.3 gpm (gallons per minute). Updated results of recent pump testing has been included in Appendix 5.

Because each residence will be served by a septic system, approximately 85 percent of the ground water withdrawn would be returned to the aquifer through percolation from the septic-system leach fields. Some of the water returned through the septic- system leach fields will recharge the bedrock aquifer with renovated wastewater. As a result, the total consumptive use (or water lost) from the ground-water system would be primarily through evapotranspiration, landscape irrigation, car washing and recreational uses. The total consumptive use (or water lost) of ground water would be approximately 1,795 gpd (about 1.2 gpm) for the proposed development, or about 78 gpd per individual residence.

Bedrock Aquifer

The bedrock aquifer that underlies the entire study region is the principal source of ground water in the area where sand and gravel aquifers are not available for development of water supply. The bedrock aquifer is the typical supply source for domestic wells in rural settings. LBG indicates that the prolific bedrock aquifer in the study region consists of sedimentary rock types.

Wappingers Group (OEw)

A majority of the study parcel and study region is underlain by the Wappingers Group (OEw) that consists of dark gray to gray-black limestone-dolomite units. This unit is sometimes locally referred to as the “Stockbridge Limestone”. There is significant data on wells completed in this unit in the County. There are several wells in Dutchess County that produce between 100 to 300 gpm from the Wappingers Group, and this unit offers large potential for ground-water development where this rock occurs within the Town. Several wells recently drilled in the Town of East Fishkill under the supervision of Leggette, Brashears & Graham, Inc. (LBG) are reported to yield as high as 150 gpm. Similar to other carbonate units, the unit is relatively brittle and contains numerous open fractures. The carbonate units are relatively soluble and, consequently, some fractures have been widened by dissolution. The carbonate units likely exhibit low to moderate permeability based on the porosity of the bedrock unit and secondary permeability caused by the presence of many interconnected fractures and dissolution cavities can be low to high. Water is contained in fractures, joints, bedding planes, solution cavities and other secondary openings in the bedrock units.

Wells completed in the limestone units in this bedrock unit would likely yield in the higher range of the estimate due to enlargement of fractures, joints and bedding planes in the formation by solution activity. The aquifer is suitable for development of domestic wells requiring yields of about 5 gpm.

The water table below the study parcel ranges from 25 to 85 feet in depth. The following summarizes the ranges in depth to water reported at respective lots drilled to date.

Table D.1-1 Hilltop Manor Water Table

Lot	Depth to Water (ft)
4	60-65
8	35-55
13	60-75
19	25-35

Ground-Water Balance

A ground-water balance compares the available recharge to a property with the estimated water-supply demand of a proposed development. This comparison determines if the property is self-sufficient in providing the water that will be required by the proposed development, or whether the proposed water demand exceeds the available recharge. If the projected demand exceeds the estimated available recharge, periodically ground-water recharge would have to be drawn from beyond the property boundaries. For sites with tight water balances, water availability within the watershed becomes important to determine if the proposed demand would oversubscribe the available resource. If onsite recharge meets or exceeds the proposed demand, the water supply should be reliable and not adversely affect the aquifer in offsite areas. The region within a 2,500-foot radius from the Hilltop Manor parcel utilizes rural water supply sources developed from individual domestic wells and utilizes septic-system leach fields that recharge water to the aquifer system. No significant consumptive water use was inventoried within a 2,500-foot radius of the site.

Ground-Water Recharge Analysis

The annual precipitation for Dutchess County is about 43 inches. A large portion of the precipitation is returned to the atmosphere by evaporation, transpired by vegetation and returned to streams and lakes as surface runoff. Only a small portion of the total precipitation infiltrates the soil to eventually reach and recharge the ground-water system in the bedrock. Recharge rates determined from long-duration studies in New York and western Connecticut has been used to estimate the available recharge to the Hilltop Manor development. LBG estimates the recharge to the 40.95-acre study parcel to be about 25,000 gpd under normal precipitation and 17,250 gpd under drought conditions. The recharge to the property is more than sufficient to support the consumptive use (1,795 gpd) of the proposed subdivision under normal and drought conditions. Based on the drought scenario, the consumption demand would be less than 10.4 percent of the total recharge to the property.

Test Wells

Five test wells were completed in December 2005 on Lots 4, 8, 13, 16 and 19. A summary of the well completion reports is located in Appendix 5 – Groundwater Report.

Table D.1-2 Test Well Summary

Well	Depth (ft)	Yield (gpm)
Lot 4	305	10
Lot 8	325	8
Lot 13	610	1
Lot 16	305	10
Lot19	200	7

The objective of the pumping test was to pump the wells at rates that would equal or exceed 1.5 times the estimated total subdivision water demands over a 24-hour duration. Each well was pumped at a rate of 7 gpm for the entire test, for a total combined yield of 14 gpm or about 20,160 gpd. The total ground-water withdrawal from the test wells was about 1.7 times the water demands of the proposed subdivision.

Pumping Test

The wells were pumped at a constant rate of 7 gpm and demonstrate a stabilized yield and drawdown for the last four hours of the test as required. The pumps in each well were shut down following a 24-hour pumping duration. After the test was terminated, recovery measurements were made in the wells for a period of about 24 hours. The water-level plots show the water level recovered adequately and was fully recovered in less than 24 hours of shutdown of the test (Appendix 5 – Groundwater Report).

Water Quality

The wells were sampled on January 19, 2006 and resampled in 2013, following the 24-hour pumping duration to obtain representative water samples from the respective wells. The wells were sampled for the parameters required by the DCDOH for individual domestic wells. The water-quality reports are located in Appendix 5 – Groundwater Report. The water-quality analysis completed for Lots 8 and 16 suggests that these wells contain water that meets NYSDOH drinking water standards.

D.2 Impacts to Ground Water Resources

Well Monitoring Program

During the 24-hour pumping test on the wells on Hilltop Manor, a well monitoring program was conducted involving 7 wells located adjacent to the study parcel; and 3 onsite monitoring wells located on lots 4, 13 and 19. The offsite well monitoring program was conducted to determine potential water-level interference effects, if any, from the 24-hour pumping test on the wells on the Hilltop Manor property at rates which exceeded the estimated water demands of the proposed 21 individual wells on the subdivision parcel.

Between January 16 and January 20, 2006, a water-level interference study was conducted of the offsite wells. The hydrographs of the offsite wells indicate many fluctuations in water level from their own domestic use (example, showering, laundry, etc.). Typical fluctuation from domestic water use show a rapid decline (drawdown) in the water level from the pumping of the well for domestic use, followed by a steady rise in the water level after the pump turns off. The 12 Hammer Drive hydrograph shows a good example of the water-level fluctuations from use. A majority of the off site wells indicate a 1 to 6-foot rise in the water level from a significant rain event shortly after the start of the test on January 18, 2006. Following the end of the rain event, the water levels for the respective hydrographs resume a slight region water-level decline prior to shut down of the test and following completion of the test events. This trend continues without any discernable change following shut down of the test. It is likely a noticeable rise in the water-level of the monitoring wells would be observed on the respective hydrographs following shut down of the test, if offsite wells were hydraulically- connected to onsite Hilltop Manor pumping wells and impacted from ground-water withdrawals during the test event. The hydrographs for the seven-offsite wells indicates no discernable drawdown interference effects from pumping the wells on the Hilltop Manor property. Similarly, the hydrographs for onsite wells indicate no discernable drawdown interference effects.

D.3 Mitigation For Ground Water Resource Impacts

Seasonal water-level changes in Dutchess County in the bedrock fluctuate about 15 to 20 feet in depth. Deeper water levels are exhibited during long-term drought conditions, as higher water levels are exhibited during above average precipitation events. The depth to water will not impact onsite construction of basements, roads, storm-water detention ponds, etc.

The bedrock aquifer underlying the study parcel has good potential to yield adequate water (5 gpm) for the proposed domestic wells. Four of the five wells exceed the 5-gpm criteria. The well on Lot 13 yielded 1 gpm at the completed depth of 610 feet. The well will be hydro-fractured to attempt to open the water-bearing fractures to increase the yield of the well. If this procedure is not successful, the well will be deepened to increase the yield above the minimum yield requirement of 2 gpm. The New York State Department of Health guidelines for “individual domestic wells” recommends that wells servicing a private dwelling have a minimum yield of 5 gpm. When the yield for an individual

well is less than 5 gpm, but greater than or equal to 2 gpm, supplemental storage coupled with repumping at 5 gpm is recommended. Well yields less than 2 gpm should not be utilized.

Recharge to the property is more than sufficient to support the consumptive use of the proposed subdivision under normal and drought conditions. The data strongly indicate ground-water withdrawals from the 21-lot Hilltop Manor subdivision would have no significant water-level interference effects on neighboring offsite wells.

E. TERRESTRIAL ECOLOGY

E.1 Existing Conditions

Ecological Solutions, LLC conducted natural resource surveys to identify species and habitats that are present on the subject property and to evaluate the potential impacts of the project development on these species and habitats. The ability of the site to support endangered, threatened or special concern status species was also evaluated. The surveys were conducted on April 8, 23, May 7, 18, 28, June 15, 22, July 15, August 6, September 8, October 8 and November 1, 2005.

Vegetation

The vegetation inventory included identification of ecological communities or habitat cover types. Cover type surveys were conducted by first reviewing aerial photographs of the parcels and adjacent parcels and subsequently by investigating the habitats on the site to identify and classify each. A tree survey was completed on the site by Robert Oswald, PLS and identified approximately 285 trees 12 inches diameter at breast height and larger (*Figure E.1-2 Tree Survey*). About 120 of these larger trees, or 42 percent, will be removed for development activities.

No rare, threatened, or endangered plant species or significant habitats or plant communities were identified on the site. There are only two distinct cover types identified on the site. These cover types are outlined in Table E.1-1 and (*Figure E.1-1, Vegetative Cover Types*).

Table E.1-1 Habitat Types Identified on the Hilltop Manor Property

NO.	EDINGER 2002
1	Hemlock-Northern Hardwood Forest
2	Appalachian Oak-Hickory Forest

Hemlock - Northern Hardwood Forest Community

Southern Portion of Property – As shown in Figure E.1-1, this habitat is generally a mixed forest that occurs on middle and lower slopes of ravines, on cool, mid-elevation slopes, and on moist, well-drained sites at the margins of wetlands. Eastern hemlock (*Tsuga canadensis*) is co-dominant with any one to three of the following: beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), white pine (*Pinus strobus*), yellow birch (*Betula alleghaniensis*), black birch (*Betula lenta*), red oak (*Quercus rubra*), and basswood (*Tilia*

americana). The relative cover of hemlock is quite variable, ranging from nearly pure stands in some steep ravines to as little as 20% of the canopy cover. These trees are generally of the same age class 5-12-inch dbh with some trees being slightly larger in the 20 – 24 inch dbh range. On the Hilltop Manor site, this community dominates the southern portion of the site as shown on Figure E.1-1

The shrub layer here is sparse and likely due to the dense canopy; characteristic shrubs are hobblebush (*Viburnum lantanoides*), mapleleaf viburnum (*Viburnum acerifolium*), and raspberries (*Rubus* spp.). Characteristic ground layer plants are Canada mayflower (*Maianthemum canadense*), shining clubmoss (*Lycopodium lucidulum*), common wood fern (*Dryopteris intermedia*), christmas fern (*Polystichum acrostichoides*), bellwort (*Uvularia sessilifolia*), common wood-sorrel (*Oxalis acetosella*), partridge berry (*Mitchella repens*), foamflower (*Tiarella cordifolia*), round-leaf violet (*Viola rotundifolia*), garlic mustard (*Alliaria petiolata*), purple trillium (*Trillium erectum*), beech-drops (*Epifagus virginiana*), and trout lilly (*Erythronium americanum*). Barberry (*Berberis thunbergii*) and Christmas fern (*Polystichum acrostichoides*) are common.

Appalachian Oak-Hickory Forest Community

Remaining Portion of Property (Northern ridge and east and west facing slopes) – As Figure E.1-1 shows, this hardwood forest occurs on well-drained portions of the parcels generally on the ridgetops, upper slopes, or east- and west-facing slopes. The soils are shallow loams or sandy loams. The dominant trees include one or more of the following oaks: red oak (*Quercus rubra*), white oak (*Quercus alba*), or black oak (*Quercus velutina*). Mixed with the oaks, usually at lower densities, are one or more of the following hickories: pignut (*Carya glabra*) and shagbark (*Carya ovata*). Common associates are white ash (*Fraxinus americana*), red maple (*Acer rubrum*), and Eastern hop hornbeam (*Ostrya virginiana*). The trees are generally in same age class with small-young trees in the 4-6 inch dbh range with only a few individuals in the 20 – 24 inch bh range. The subcanopy stratum contains small trees and tall shrubs including flowering dogwood (*Cornus florida*), witch hazel (*Hamamelis virginiana*), and shadbush (*Amelanchier arborea*). Common low shrubs include maple-leaf viburnum (*Viburnum acerifolium*), blueberries (*Vaccinium angustifolium*), red raspberry (*Rubus idaeus*), and gray dogwood (*Cornus racemosa*). The shrub layer and groundlayer flora are more diverse. Characteristic groundlayer herbs are false Solomon's seal (*Smilacina racemosa*), Pennsylvania sedge (*Carex pennsylvanica*), tick-trefoil (*Desmodium glutinosum*, *D. paniculatum*), rattlesnake root (*Prenanthes alba*), white goldenrod (*Solidago bicolor*), and hepatica (*Hepatica americana*).

Wildlife

Extensive field surveys were conducted for wildlife species including mammals, birds, and herpetiles (reptiles and amphibians). Special surveys were also conducted to identify and locate seasonally active species of special concern such as the marbled salamander (*Ambystoma maculatum*) and Jefferson salamander (*Ambystoma laterale*).

In addition, updated letters of inquiry (February 5, 2013) regarding the presence or absence of endangered and threatened species on the project site were sent to NYSDEC and the US Fish and Wildlife Service (USFWS) and the correspondence is contained in Appendix 1 - Correspondence.

In their most recent reply letter dated February 19, 2013, the DEC Natural Heritage Program indicated that there was a known Blanding's turtle habitat within 0.5 miles of the project site and an Indiana Bat Maternity colony also within 0.5 miles of the project site. In their most recent reply letter

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dated February 19, 2013, the Fish and Wildlife Service noted that an Indiana bat maternity colony was documented within a half mile of the site. (included in Appendix 1, Correspondence).

A list of species observed on site is included in the Natural Resources Survey Report in Appendix 3 which also evaluates the potential of the property to support Blanding's Turtle, Bog Turtle, and Indiana Bats. No other federally listed threatened or endangered species (Dwarf Wedge mussel or Arctic Peregrine Falcon) could be located on the property due to the lack of suitable habitat.

Species observed within the Hemlock - Northern Hardwood Forest Community include red eft (*Notophthalmus viridescens*), eastern wild turkey (*Meleagris gallopavo*), pileated woodpecker (*Dryocopus pileatus*), common flicker (*Colaptes auratus*), great horned owl (*Bubo virginiana*), golden-crowned kinglet (*Regulus satrapa*), ovenbird (*Seiurus aurocapillus*), scarlet tanager (*Piranga olivacea*), wood thrush (*Hylocichla mustelina*), and blackthroated green warbler (*Dendroica virens*). Other year round species also noted include common crow, bluejay, eastern robin, black capped chickadee, eastern phoebe, tufted titmouse, dark eyed junco, northern cardinal, nuthatches, gray squirrel, chipmunk, white footed mouse, raccoon, opossum, striped skunk, woodchuck, shrew, and eastern mole.

Characteristic birds and mammals within the Appalachian Oak-Hickory Forest Community include red-bellied woodpecker (*Melanerpes carolinus*), little brown bat (*Myotis lucifugus*), and eastern wild turkey (*Meleagris gallopavo*) as well as most of those mentioned in the other upland habitat.

Bird Species

The subject site lies within Block 5960D of the 2000-2005 New York State Breeding Bird Atlas. A total of 79 species are known or expected to use the landscape around Hopewell Junction as breeding habitat; 40 species were confirmed during the five years of the atlas surveys. The following 20 species were observed on the site during the wildlife surveys conducted in 2005. The entire list of species from the Breeding Bird Atlas is presented in Appendix 3.

Observed Bird Species – Hilltop Manor	
Eastern wild turkey	<i>Meleagris gallopavo</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Common flicker	<i>Colaptes auratus</i>
Great horned owl	<i>Bubo virginiana</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Ovenbird	<i>Seiurus aurocapillus</i>
Scarlet tanager	<i>Piranga olivacea</i>
Wood thrush	<i>Hylocichla mustelina</i>
Blackthroated green warbler	<i>Dendroica virens</i>
Common crow	<i>Corvus brachyrhynchos</i>
Bluejay	<i>Cyanocitta cristata</i>
Eastern robin	<i>Turdus migratorius</i>
Black-capped chickadee	<i>Poecile atropurpureus</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Nuthatches	<i>Sitta spp.</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>

Threatened and Endangered Species

Blanding's Turtle - The techniques used to evaluate the site for Blanding's Turtle (*Emys blandingii*) habitat included visual assessment of habitat cover types to determine if primary or nesting habitat exists on the site. Primary habitat includes shallow weedy ponds, marshes, swamps, and lake inlets and coves. Blanding's in this region of New York prefer slow-moving, shallow water and a muddy bottom with plenty of vegetation. Excellent habitat for this species in Dutchess County typically consists of a scrub/shrub swamp dominated by buttonbush (*Cephalanthus occidentalis*) with a 2-3 foot water column and a sparse canopy or tree layer. Nesting habitat consists of open meadow areas or open canopy areas or areas with disturbance with gravelly/sandy soil usually Hoosic soils.

No primary habitat for Blanding Turtles is located on the property and no adjacent parcel contains potential primary Blanding's Turtle habitat.

Bog Turtle - The potential for Bog Turtle (*Glyptemys muhlenbergii*) habitat was also reviewed. Bog turtle habitat is recognized by three criteria:

1. Suitable hydrology. Bog Turtle wetlands are typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow. In addition, shallow rivulets (less than 4 inches deep) or pseudo-rivulets are often present.

2. Suitable soils. Usually a bottom substrate of permanently saturated organic or mineral soils. These are often soft, mucky-like soils (this does not refer to a technical soil type); you will usually sink to your ankles (3-5 inches) or deeper in muck, although in degraded wetlands or summers of dry years this may be limited to areas near spring heads or drainage ditches. In some portions of the species' range, the soft substrate consists of scattered pockets of peat instead of muck.

3. Suitable vegetation. Dominant vegetation of low grasses and sedges (in emergent wetlands), often with a scrub-shrub wetland component. Common emergent vegetation includes, but is not limited to: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum spp.*), jewelweeds (*Impatiens spp.*), arrowheads (*Sagittaria spp.*), skunk cabbage (*Symplocarpus foetidus*), panic grasses (*Panicum spp.*), other sedges (*Carex spp.*), spike rushes (*Eleocharis spp.*), grass-of-Parnassus (*Parnassia glauca*), shrubby cinquefoil (*Dasiphora fruticosa*), sweet-flag (*Acorus calamus*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Common scrub- shrub species include alder (*Alnus spp.*), red maple (*Acer rubrum*), willow (*Salix spp.*), tamarack (*Larix laricina*), and in disturbed sites, multiflora rose (*Rosa multiflora*). Some forested wetland habitats are suitable given hydrology, soils and/or historic land use. These forested wetlands include red maple, tamarack, and cedar swamps.

Based on the habitat indicators **there is no potential Bog Turtle habitat on the property** or within 300 feet of the property.

Indiana Bat - The property was also evaluated for potential Indiana Bat (*Myotis sodalis*) roosting or maternal colony trees. Outside the hibernation period, Indiana bats are very mobile and use both live and dead standing trees equal to or greater than 9 inches dbh with exfoliating bark, crevices, holes, dead wood, and southern or western exposure. The property reviewed in the field, like most raw land in East Fishkill, possesses trees that meet the minimum criteria for use by this species during the summer months for roosting and possibly maternal colony formation. This parcel also generally possess to some degree the forest structure and habitat associations (upland forest/wetland/open water interface) utilized by Indiana Bats for foraging. It appears that the most likely areas for use by this species would be concentrated in the older growth oak-hickory forest.

E.2 Potential Impacts

The proposed development and its appurtenant features will necessarily require clearing substantial portions of both the Hemlock–Northern Hardwood Forest community and the Appalachian Oak-Hickory Forest community.

Earth moving (excavation, filling, and grading), operation of heavy machinery, construction, alterations to existing drainage patterns, addition of impervious surfaces, changes in traffic patterns, and increased human activity will occur on the subject property.

As shown in Table E.2-1 - Existing and Proposed Vegetation, the proposed project would cause the removal of existing vegetation for site grading, roads, and construction of new dwellings on approximately 28.75 acres (70% of the project area). As shown in Figure E.1-1 *Vegetative Cover Map*, grading of the site, construction of the roads, and development of dwellings will result in the removal of approximately 28.75 acres of forest. Loss of vegetation and wildlife habitat is the unavoidable result of the removal of topsoil and vegetative cover and replacement of by impervious surfaces. Natural areas will be replaced with urban habitat types, such as mowed lawn with trees, paved road, and other impervious surfaces.

The construction of impervious surfaces on the property has several impacts that include reducing the available on-site vegetative habitat; compaction of soil layers; increasing the velocity of stormwater runoff; and, preventing the infiltration of water.

Loss of topsoil and vegetative cover removes the ability of the soil to retain nutrients. This can result in a reduction of the area’s ability to recover from disturbances. Residential landscaping practices usually tend to replace native species with cultivars and ornamental plants that require more management than native species and may result in an unstable habitat. These resulting new community types tend to favor non-native plants and wildlife.

Table E.2-1 Existing and Proposed Habitat Cover Types

NO.	EDINGER 2002	ACRES IDENTIFIED ON PROPERTY	PROPOSED IMPACTS
1	Hemlock Northern Hardwood Forest	8.50	3.50
2	Appalachian Oak-Hickory Forest	32.45	25.25
Total		40.95	28.75

All Species. Direct impacts to wildlife from the proposed developments will primarily be displacement and some direct loss especially to species that spend a large percentage of their life cycle underground. Most species found on the parcels are typically found in suburban settings especially in East Fishkill and may have already adapted to proximal human habitation. These species will remain on the developed portion of the parcels, though possibly in fewer numbers, as availability of basic habitat features (food, cover, and space) may be decreased in the developed areas.

Threatened/Endangered Species. No state or federally listed threatened or endangered species were observed on the parcels. However, potential Indiana Bat roosting and maternal colony habitat was observed on the property and will likely be impacted as a result of tree clearing activities. The applicant will coordinate with the DEC through the SEQRA process to determine if that agency will require any additional information or studies related to Indiana bat.

E.3 Mitigation Measures

Removal of existing vegetation is an unavoidable impact of developing this site. As proposed, approximately 12.2 acres of vegetation on the 40.95-acre parcel will remain undisturbed. There is no conclusive method to fully mitigate for the direct loss of acres of forested area. However, the developer of the property can minimize impacts by establishing undisturbed, naturally vegetated zones demarcated in the field by orange construction fencing and by clearing only areas within outlined building envelopes on each lot.

The upland forest areas impacted by the development will not be fully replaced but can be enhanced with individual landscape plans that use native plant material only. Certainly, contiguous forested areas will be saved to continue to provide natural habitat in the landscape. Native plantings may provide wildlife with some habitat and food source. Overall, however, a decrease in natural wildlife habitat value will be the likely result, and the species richness of the local wildlife community may reflect those changes.

Other habitat aspects of the parcels should be preserved and include existing stonewalls and standing dead trees (snags). Old stonewalls provide microhabitats for small mammals, herptiles, and invertebrates. Snags provide perching, nesting, and feeding sites for a wide variety of wildlife. These elements or parts thereof should be protected where possible. Impacts from habitat and forest fragmentation cannot be fully avoided but can be minimized by maintaining substantial corridors between natural habitat areas. Connecting corridors do not have to be entirely unbroken, as long as breaks in the natural vegetation are not excessive.

The property provides year-round habitat for most of the species located there. The parcels should continue to be “connected” to adjacent undeveloped properties so that potential wildlife migratory routes remain.

The following habitats and characteristics should be left intact wherever practical:

- Woody debris in forested areas,
- Canopy wherever possible,
- Leaf litter for moisture retention and feeding,
- Woody debris (standing and down),
- Small open patches for basking, mixed with well shaded areas during drought periods, and

- Undisturbed areas in and around wetlands for feeding and breeding.

Temporary wildlife displacement during construction is a short-term impact that will occur.

The limits of disturbance will be clearly marked in the field to delineate those areas to remain undisturbed. Earth moving and tree clearing activities shall be limited to the (October 1 to March 31) time period to avoid any direct impacts to potential Indiana Bats utilizing the parcel.

In addition, the US Fish and Wildlife Service in conjunction with the NYSDEC have suggested that no dyes or chemicals be placed in stormwater detention facilities that could result in wildlife impacts. The applicant is willing to comply with this recommendation.

It is possible that some wildlife habitat enhancement can occur if desired by the Town Planning Board. Dens, pits, and other "structures" such as nest boxes could be constructed in select locations for use by wildlife.

In addition, the plan proposes to maintain the trees that currently exist along the property boundaries will provide screening for the residents adjacent to the site.

Within the subdivision, the Applicant will provide street trees on both sides of the street that will be spaced approximately 50 feet on center. Street trees will be 2-3 inches caliper and include a combination of the following trees:

Acer saccharum - Sugar Maple

Fraxinus americana greenspire - Greenspire American Ash

- A wetland permit will be needed from the Town for stream buffer disturbance on the Dutcher Parcel as a result of Stormwater drainage over the easement.

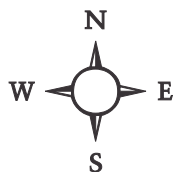


Figure E.1-1: Vegetative Cover Types
Hilltop Manor Subdivision
Town of East Fishkill, Dutchess County, New York
Aerial Photo Source: Dutchess County GIS, 2009 photo



Figure E.1-2: Tree Survey
 Hilltop Manor Residential Subdivision
 Town of East Fishkill, Dutchess County, New York
 Source: M. Gillespie & Associates Consulting Engineers, PLLC.
 NTS