

F. VEHICULAR TRAFFIC AND ROADWAYS

F.1 Existing Conditions

The project site will be provided direct access to Creek Bend Road. A description of this and other area roadways is provided below.

NYS Route 82 - is a two-lane roadway under the jurisdiction of the New York State Department of Transportation that runs throughout Dutchess County. In the immediate vicinity of the site, it consists of one lane in each direction plus paved shoulders of approximately 3-4 feet and has a signalized intersection with Beekman Road. The roadway has a posted speed limit of 35mph that increases to 45mph north of Beekman Road.

Beekman Road (C.R. 9) - is generally a two lane County roadway that originates at a signalized intersection with NYS Route 82. It traverses in easterly direction intersecting with other roadways including Foster Road, Clove Branch Road, and Augusta Drive and has an interchange with the Taconic State Parkway. The roadway consists of one travel lane in each direction plus approximately 2-foot wide shoulders. It has a posted speed limit of 45mph.

Foster Road - is generally a two-lane roadway that originates at a "STOP" sign controlled intersection with Beekman Road opposite Martin Road. The roadway continues in a north and then westerly direction terminating at a "STOP" sign controlled intersection with NYS Route 82. The pavement width varies from approximately 20-22 feet and there is no centerline striping.

Martin Road - is a local Town road that originates to the west at a "STOP" sign controlled "T" intersection with NYS Route 82. The roadway continues in an easterly direction as a narrow roadway consisting of approximately 16 feet. Immediately to the east, the roadway widens and continues in a varying alignment and intersects at a "STOP" controlled intersection with Carol Drive. In this area, the roadway has a pavement width of approximately 20 feet.

Clove Branch Road (C.R. 29) - runs in a generally northwest/southeast direction. It intersects at a signalized intersection with NYS Route 82 and with Beekman Road opposite Carpenter Road. Clove Brand Road has a speed limit of 40mph and consists of one lane in each direction plus approximately 4-foot shoulders.

Carol Drive - is a two-lane Town roadway that originates at a "STOP" sign controlled intersection with Martin Road. The roadway currently provides access to several residential homes and has a pavement width that varies from approximately 21 to 24 feet. This roadway also intersects with Oak Ridge Road.

Existing Traffic Volume Conditions

Detailed turning movement traffic counts were collected during the AM (6:30-9:30) and PM (3:30-6:30) peak hours during October 2005. The Traffic Analysis was updated based upon the 2012 9th edition of the Institute Transportation Engineers manual and the capacity analysis was updated based upon the 2010 highway Capacity Manual and submitted March, 20, 2013. According to the Traffic Study the traffic counts during these peak hours were in accordance with data published by the New York State Department of Transportation. Locations that were surveyed included the following:

1. Martin Road and Carol Drive
2. Martin Road and Foster Road and Beekman Road (C.R. 9)
3. Beekman Road and NYS Route 82
4. Beekman Road (C.R. 9) and Carpenter Road and Clove Branch Road (C.R. 29)
5. Martin Road and NYS Route 82
6. Turner Street and NYS Route 82
7. Foster Road and NYS Route 82

These traffic counts were also compared with historical data obtained from the New York State Department of Transportation and from other studies completed in the area. Based upon a review of the traffic counts, the peak hours were determined as follows:

Weekday AM Peak Hour -- 7:45 AM to 8:45 AM

Weekday PM Peak Hour -- 5:00 PM to 6:00 PM

The resulting Existing Traffic Volumes are shown in Figures F.1-1 and F.1-2 for each of these time periods.

A SYNCHRO analysis was performed for the signalized study area intersections. The analysis includes queue lengths as well as storage capacity for each of the approaches to the intersections and is included in Appendix 2 – Traffic Impact Study.

The project site road will intersect the Creek Bend Road at an unsignalized “T” shaped intersection. The site access approach will be controlled by a “STOP” sign. With sufficient clearing of vegetation, a minimum of 300 feet of sight distance will be provided from the site driveway onto Creek Bend Road and is adequate given the speed limit on this roadway.

Site Access

Access to the site is proposed from Creek Bend Road over property owned by the Applicant. All questions of the Applicant’s contiguity with Creek Bend Road have been resolved in favor of the applicant by Michael Dalbo, Land Surveyor, who was hired by the Town of East Fishkill to investigate and report to the Town of East Fishkill as to that question raised by certain property owners on Creek Bend Road (Appendix 1 – Correspondence).

Access to Hilltop Manor will be provided from one access point on Creek Bend Road and access to individual lots will be provided via individual driveways. The location of Fishkill Creek and the Metro North Freight Rail line limit access availability to this neighborhood and requires access over the Carol Drive Bridge. The Carol Drive Bridge is owned by the Town of East Fishkill and the Town of East Fishkill is solely responsible for its maintenance repair and improvement. At its meeting of October 24, 2013 as referred to below, the Town Board acknowledged its responsibility for the maintenance, repair and improvement of the Carol Drive Bridge.

A review of the structural capacity of the Carole Drive Bridge was conducted by Hudson Valley Engineering Associates and is (hereinafter referred to as the “HVEA Study”) which has been included in Appendix 10 for reference. The report confirms that the bridge in its current condition is appropriate for posting a capacity of 22 tons. At its meeting of October 24, 2013, the Town Board reviewed the report and based upon the HVEA study, the Town Board adopted a resolution setting a weight limit of 22 tons, while acknowledging the existence of a safety factor with respect to such weight limitation. As discussed in the HVEA Study, the next step in determining the extent of

necessary repairs, if any, would be to conduct pile tests and determine what remedial measures are necessary. The applicant does not presently know the status of any planned testing. A representative of the Town Highway Department confirmed that the existing 22 ton capacity of the bridge is sufficient to accommodate any equipment utilized by the Highway Department as well as other heavy vehicles presently utilizing the bridge to service existing homes such as oil delivery trucks. The Town Highway Department representative further indicated that Fire trucks may exceed the posted 22 ton limit, but on a limited basis and only in emergency circumstances, thus it would be safe to pass over it. He indicated that it was repetitive use of the bridge by vehicles exceeding the weight limit that becomes a problem. In view of the content of the HVEA Study, the applicant contacted an excavation contractor to confirm that the equipment necessary to construct the homes and roadways would be compliant with the weight limitation imposed by the Town Board. Accordingly, the existing capacity of the bridge is sufficient for necessary and appropriate excavation equipment and other construction vehicles.

In summation, based upon the content of the HVEA Study, the bridge is capable of accommodating all vehicles which would be necessary to facilitate the construction of the infrastructure for the applicant's subdivision as well as to accommodate all vehicles related to the completed subdivision.

Accordingly, even without any modifications, as the construction associated with the proposed project can be completed with equipment weighing less than 22 tons, there will be no impact as a result of utilization of the Bridge.

It is the Town of East Fishkill which has the responsibility to maintain and improve the bridge and therefore the Town has sole authority to authorize investigation of the pilings and any improvements based upon such inspection. Should the Town of East Fishkill elect to move forward to investigate and implement the repair of the pilings as described, the applicant will agree to participate, in like manner to any other property owner utilizing that bridge for access, in any improvement district which the Town of East Fishkill may create in order to finance such improvements.

Emergency Access

The project site is located in the north central portion of East Fishkill, in immediate proximity to the Fishkill Creek. As discussed above, access to the site is off Creek Bend Road. The location of Fishkill Creek and the Metro North Freight Rail line isolates this neighborhood and requires access over the Carol Drive Bridge as discussed above.

The Town of East Fishkill has expressed a desire to investigate a means to provide alternate or secondary access for the benefit of all users of the Carol Drive Bridge. The Hilltop Manor subdivision property is owned by ECFM Inc., which such entity does not own any other property in proximity to the Hilltop Manor property. One of the principals of ECFM Inc., Frank Marinaro, owns property located to the north of the Hilltop Manor property across the Central Hudson right-of-way, and has made known his willingness to consider alternate access through his property. However, such alternate access is infeasible utilizing only the Hilltop Manor land, the Central Hudson right-of-way and Mr. Marinaro's property.

The Applicant explored two alternate routes for access which, based upon engineering analysis, were determined to be completely infeasible due to steep road grades and excessive amounts of cut and fill as shown in Appendix 8. As can be seen by reference to the Appendix, one route involved traveling north over the Central Hudson right-of-way through Mr. Marinaro's property, directly to Carpenter Road. Another route involved exiting the subdivision and traveling east over the Central Hudson right-of-way to intersect with Carpenter Road. Both of these alternatives

Settings, Anticipated Impacts, and Mitigation

January 21, 2014

involved significant changes of grades and rock cuts which, in some cases were of a magnitude of approximately 50 feet, thereby rendering use of each of these alternatives to be completely infeasible. Additionally, there is no unity of ownership between the homestead parcel on Carpenter Road with the only commonality being that Frank Marinaro, a co-owner of the homestead parcel, is a minority shareholder in ECFM, Inc.

Additional suggestions for alternate access were made by Morris Associates in a letter dated May 10, 2013. These routes involve property owned by a totally unrelated third party and not under the Applicant's control. The Town of East Fishkill, vested with the power of eminent domain, solely has the ability to provide what would appear to be the only feasible means of alternate access based upon the information collected to date. However, as set forth in detail below, the Applicant and one of its principals is willing to participate in a most meaningful manner to assist the Town in creating the potential for alternate access for all users of the Carol Drive Bridge.

As shown in Appendix 8, which illustrates the area located to the north of the Hilltop Manor subdivision property, Mr. Marinaro's property is shown thereon as parcel 899807 (the phrase "East Fishkill" appears on Mr. Marinaro's property). The Central Hudson right-of-way is to the South thereof, contiguous to the Hilltop Manor property. The possibility exists for access to either Hammer Drive or Carpenter Road, however this access would be required to be implemented through a lot owned by a totally unrelated third party, which such lot is described as parcel number 960787 and consisting of approximately 1.15 acres as shown thereon.

Assuming that this parcel could be acquired, it may be feasible to construct an emergency access along a route leaving the site in the right of way between proposed lots 11 and 12, crossing the Central Hudson utility easement and then turning northeasterly across the Marinaro private parcel toward a currently vacant lot on Carpenter Road (Tax Map Parcel 960787) and from there through an unused right-of-way (Tax Map Parcel 948804) which could provide access to the turning circle on Hammer Drive. The route would continue down Hammer Drive, to Carpenter Road and then to Beekman Road. However, neither of these parcels which are necessary for access to Hammer Drive or Carpenter Road are owned by the Applicant or any of the principals thereof. The two parcels required to complete this access are owned by a third unrelated party and therefore, only the Town could acquire the rights to utilize this alignment.

Should the Town determine that a means of secondary access is essential for the benefit of the Carol Drive property owners, the Applicant is willing to assist in the provision of same as a condition of subdivision approval in the manner described as follows; the Hilltop Manor subdivision will provide for a right-of-way through the northerly portion of the subdivision, thereafter traversing the Central Hudson right-of-way. Mr. Marinaro will further agree to provide an easement across the southerly portion of his property to provide for a means of secondary access to parcel number 960787 in the event that the Town desires to subsequently (a) acquire parcel number 960787 to provide access to Carpenter Road or (b) acquire parcel number 960787 and parcel number 960787 to provide access to Hammer Drive.

The Town of East Fishkill may wish to consider creation of a road improvement district. All properties which currently rely on the Carol Drive Bridge for access (70 +existing homes plus the 21 new homes proposed at Hilltop Manor) would be included in the District. Payments would be made into the district on a cost sharing basis to fund a replacement of the Carol Drive Bridge when it becomes deficient to the point that it needs to be replaced. The applicant is willing to participate in the creation of such a district and to contribute a fair share portion of the necessary funds.

Accident Data

All available accident data was obtained from the New York State Department of Transportation for the area roadways for the latest available five-year period. These data were summarized by type, location and other contributing factors. All accident data is presented in Appendix 2 – Traffic Impact Study.

Public Transportation

The Dutchess County LOOP Bus System provides small-scale public transportation. The LOOP 4 bus route travels between Hopewell Junction Plaza at the intersection of Route 376/82 and the Dutchess Mall in Poughkeepsie, with two stops in the AM and two stops in the PM at Hopewell Junction and the IBM Office Park. Commuter buses leave from Poughkeepsie and Fishkill to take commuters south to New York City and White Plains. A commuter park-and-ride lot exists across from the Taconic State Parkway northbound ramp. A sample schedule for the Dutchess County LOOP 4 bus has been included in the Traffic Impact Study found in Appendix 2.

The Wappingers Central School District school buses serve the local area during the school year.

Emergency vehicles must access the project site from Creek Bend Road since the property has no other established access from any direction. According to the Project Engineer the existing bridge on Carol Drive was researched via the NYSDOT bridge data base to determine the condition of the Carol Drive Bridge crossing the Fishkill Creek. As per the NYSDOT finding posted on March 27, 2009 the bridge was found to be neither structurally deficient or functionally obsolete. The bridge has a NYS bridge rating of 5.592, a rating of 5 or greater indicates the bridge is in good condition. The Nation Bridge Inventory (NBI) indicates the Carol Drive Bridge deck, superstructure, substructure, and channel are in good condition. Operating rating is 41.6 metric tons and an inventory rating of 28.2 metric tons, the ratings can support the truck loads anticipated during construction as well as support emergency vehicles.

An updated review of the condition of the bridge, as of February 28, 2013 the bridge continues to be neither structurally deficient or functionally obsolete. The Town of East Fishkill has initiated a 2013 engineering review of the Carol Drive Bridge. The results of this analysis are included in Appendix 10.

Pedestrian Activity

Recent counts conducted in April 2010 show a moderate level of pedestrian and bicycle activity on both Oak Ridge Road and Creek Bend Road. During the 4 p.m. to 5 p.m. hour it was observed that Approximately 15 pedestrians and 5 bicyclists were observed at or near this intersection.

Sight Distance

Stopping sight distance is the distance a vehicle would require being able to stop on wet pavement to avoid a collision with a vehicle entering the traffic stream. Intersection sight distance provides an additional margin of safety above stopping sight distance.

Intersection sight distance is defined as the sight distance that is necessary for a vehicle to safely enter the traffic stream requiring only minor speed adjustments by vehicles in the traffic

stream. Table F.1-1 shows the Intersection Sight Distances recommended by the American Association of State Highway and Transportation Officials (AASHTO).

Table F.1-1 Intersection Sight Distance	
Sight Distance	Speed (in miles/hour)
335 Feet	30
390 Feet	35
445 Feet	40
500 Feet	45
555 Feet	50
A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 6th ed., 2011.	

Speed measurements have been collected to identify the 85th percentile operating speeds along Creek Bend Road. Based on the data it was determined that the 85th percentile speed is 33 mph in the northbound direction and 29 mph in the southbound direction. AASHTO requirements indicate that a stopping sight distance of 250 feet and an intersection sight distance of 390 feet would be required for the proposed road intersection.

2010 No-Build Traffic Volumes

The 2005 Existing Traffic Volumes were projected to a future design year of 2010 utilizing a background growth factor of 2% per year. These projected traffic volumes are shown on Figures F.1-3 and F.1-4. In addition, traffic from other pending or proposed development in the area were estimated and/or obtained from the studies prepared for those developments. These other development traffic volumes are shown in Appendix 2 – Traffic Impact Study. The other development traffic volumes were combined with the 2010 Projected Traffic Volumes to obtain the 2010 No-Build Traffic Volumes, which are also shown in Appendix 2 – Traffic Impact Study.

F.2 Potential Impacts

Site Generated Traffic Volumes

Estimates of the expected site generated traffic volumes for each of the peak hours were computed based on information published by the Institute of Transportation Engineers (ITE) as contained in their report entitled, "Trip Generation", 9th Edition, 2012. The resulting peak hour trip generation rates and corresponding Site Generated Traffic Volumes for the Hilltop Manor subdivision are summarized in Table F.2-1.

Table F.2-1 Site Generated Volumes

LAND USE	PEAK AM HOUR			PEAK PM HOUR		
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
21 Single Family Homes	6	20	26	18	10	28

Arrival and Departure Distributions

Based upon a review of the traffic volumes on the surrounding roadway network, estimates of the expected arrival and departure distributions of Site Generated Traffic were determined.

2010 Build Traffic Volumes

Utilizing the arrival and departure distributions, the Site Generated Traffic Volumes shown in Table F.2-1 were added to the roadway network. These Site Generated Traffic Volumes were then combined with the No-Build Traffic Volumes to obtain the Build Traffic Volumes that are shown on Figures F.2-1 and F.2-2 for the AM and PM peak hours, respectively

Description Of Analysis Procedures

In order to determine existing and future traffic operating conditions at the study area intersections, it was necessary to perform capacity analyses. The following is a brief description of the analysis method utilized in this report:

Signalized Intersection Capacity Analysis

The capacity analysis for a signalized intersection was performed in accordance with the procedures described in the 2010 Highway Capacity Manual, published by the Transportation Research Board. The terminology used in identifying traffic flow conditions is Levels of Service. A Level of Service "A" represents the best condition and a Level of Service "F" represents the worst condition. A Level of Service "C" is generally used as a design standard while a Level of Service "D" is acceptable during peak periods. A Level of Service "E" represents an operation near capacity. In order to identify an intersection's Level of Service, the average amount of vehicle delay is computed for each approach to the intersection as well as for the overall intersection.

Unsignalized Intersection Capacity Analysis

The unsignalized intersection capacity analysis method utilized in this report was also performed in accordance with the procedures described in the 2010 Highway Capacity Manual. The procedure is based on total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. The average total delay for any particular critical movement is a function of the service rate or capacity of the approach and the degree of saturation. In order to identify the Level of Service, the average amount of vehicle delay is computed for each critical movement to the intersection. Utilizing the procedures outlined in the 2010 Highway Capacity Manual, capacity analyses were conducted at each of the key intersections to determine Levels of Service and operating conditions. Table F.2-2 provides a summary of the Levels of Service and a description of each intersection is presented below.

Beekman Road and Clove Branch Road/Carpenter Road

Carpenter Road and Clove Branch Road intersect with Beekman Road at a signalized full movement intersection. All approaches to the intersection consist of one lane plus shoulders. The capacity conducted at this intersection indicate that under current conditions, an overall Level of Service "B" or better is experienced during peak periods.

The analysis was recomputed utilizing the future No-Build and Build Traffic Volumes. The analysis indicates that with signal timing modifications, a Level of Service "C" or better will be obtained at this intersection.

Martin Road/Foster Road and Beekman Road

Foster Road intersects opposite Martin Road at a "STOP" sign controlled full movement intersection. All approaches to the intersection consist of one lane. The capacity analyses conducted at the intersection indicate that the intersection operates at a Level of Service "C" or better during peak periods.

The capacity analyses were recomputed utilizing the future No-Build and Build Traffic Volumes. A review of these analyses indicates that a Level of Service "C" or better will be maintained under future conditions. It is recommended however that in order to supplement the "STOP" sign control that new pavement markings be added on the Foster Road and Martin Road approach. These would include a double yellow centerline and a painted "STOP" line.

Beekman Road and NYS Route 82

Beekman Road intersects with NYS Route 82 at signalized skewed intersection that is under signal control. Immediately east of the main intersection there is a secondary connection which handles primarily right turns from Beekman Road to NYS Route 82 northbound and left turns from NYS Route 82 onto Beekman Road eastbound. The connector intersection with Route 82 is controlled by a "STOP" sign. The capacity analysis conducted at this intersection indicates the intersection currently experiences a Level of Service "D" or better during peak periods.

The analysis was recomputed under future No-Build and Build conditions. The analyses indicates that a Level of Service "E" will be experienced under future No-Build conditions with similar Levels of Service under the Build condition. Signal timing modifications should be implemented to best

accommodate the future volumes at the intersection. Note that the additional traffic generated by the proposed subdivision will not significantly increase the delays experienced at this intersection.

NYS Route 82 and Turner Street

Turner Street intersects with NYS Route 82 at a “STOP” sign controlled “T” intersection. The approaches consist of one lane and this intersection is slightly offset from the intersection with Martin Road. The capacity analysis conducted at this intersection indicates a Level of Service “C” or better is currently experienced at this location.

The analysis was recomputed under future No-Build and Build conditions. The analyses indicates that a Level of Service “D” will be experienced during the AM peak hour and a Level of Service “C” during the PM peak hour.

NYS Route 82 and Martin Road

Martin Road intersects with NYS Route 82 at a “STOP” sign controlled “T” intersection. The Martin Road approach is a narrow roadway with somewhat limited sight distance. The capacity analysis conducted at this intersection indicates a Level of Service “C” during AM peak hour and “D” during the PM peak hour. Under future conditions, Levels of Service “D” and “E” are expected for the 2010 No-Build with similar Levels of Service for the 2010 Build conditions.

Martin Road and Carol Drive

Martin Road intersects with Carol Drive at a “STOP” sign controlled “T” type intersection. The capacity analysis indicates a Level of Service “A” at this intersection under the Existing, No-Build and Build conditions. It is recommended however that some new pavement markings including a painted “STOP” bar and a possible double yellow centerline striping be installed at this intersection to better define the travel path and to control traffic movements.

NYS Route 82 and Foster Road

Foster Road intersects with NYS Route 82 at a “STOP” sign controlled “T” intersection. All approaches consist of one lane. The capacity analysis conducted at this intersection indicates that currently a Level of Service “B” is experienced during peak periods. The analysis indicates that under future 2010 No-Build conditions Levels of Service “B” and “C” will be experienced for the AM and PM peak hours, respectively. Similar Levels of Service are expected under the future Build conditions.

F.3 Mitigation Measures

In addition to the individual intersections, the roadway segments in the area were reviewed relative to traffic volumes and operating conditions. The segments considered included the following:

- Creek Bend Road to Oak Ridge Road
- Oak Ridge Road to Carol Drive
- Carol Drive to Martin Road
- Martin Road to Beekman Road
- Martin Road to NYS Route 82

Settings, Anticipated Impacts, and Mitigation

January 21, 2014

Based upon review of the existing and future traffic volumes on each of these roadways, the roadway segments will accommodate the expected volumes at acceptable Levels of Service. However, in consideration of the alignment and the nature of the existing residential development located along these roadways, traffic calming measures should be considered to control speeds and overall traffic flow. In addition to the recommendations for the intersections identified above, some additional potential traffic calming measures would include the following:

1. Signal timing modifications at the intersection of Beekman Road and Clove Branch Road/Carpenter Road and New York State Route 82 and Beekman Road.
2. New pavement markings including a double yellow centerline and a painted "STOP" bar on Foster Road and Martin Road at their intersection with Beekman Road as well as at the intersection of Martin Road and Carol Drive.
3. Installation of additional signing and striping at the intersection of Carol Drive and Oak Ridge Road in order to better define the traffic movements. Also, the modification of this intersection to an all-way stop control intersection upon approval by the Town. Traffic calming measures such as signing, speed tables and other methods will be coordinated with the Town as part of the site plan approval process to improve safety to pedestrians and bicyclists in the vicinity of this intersection.
4. The modification of the intersection of Creek Bend Road and Oak Ridge Road to a "STOP" sign controlled intersection upon approval by the Town.

Similar traffic calming and signing measures should be considered along the section of Martin Road between Carol Drive and NYS Route 82.

The additional traffic generated is not expected to significantly change the Levels of Service on the surrounding roadway network. The capacity analyses indicate no significant traffic impacts resulting from the development of this project.

Table number I-1 provides a comprehensive listing of all proposed roadway area improvements. Localized traffic calming measures should be considered for the area roadways with or without this development. The internal loop road will be completed to Town standards with regard to width and grade.