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Engineering Department

INTERDEPARTMENTAL COMMUNICATION

To: Planning Department

Date: September 19, 2007

Revised: November 21, 2007

From: Engineering Department

Subject: Senior Residence Special Permit entitled "Residences at Quail Ridge"

We have the following comments regarding the above mentioned plan dated July 18, 2007.

Traffic Study

1. The applicant has submitted a traffic impact study as required by the Subdivision Rules and Regulations section 9.9. In summary, the study concludes that the added traffic volumes will not create unsafe conditions at the study area intersections. The study also revealed that the unsignalized intersections of Great Road, Harris Street & Acorn Park Drive and Great Road at Skyline Drive are currently operating at LOS F and will continue to operate at such with or without the project. No mitigation measures were proposed by the engineer, however, the added traffic from the proposed development plus other generated traffic from the study area's other development may expose and worsen the effects of existing deficiencies.
2. The Traffic Study for this project determines an annual increase for traffic to be about 0.5%. Upon our review of the other recent traffic studies in North Acton, we found that the following reports were performed using a 1.7 percent or greater growth factor.

Woodlands at Laurel Hill

- A 308 apartment units and 64 Senior Housing units located North of the study area.
- Traffic impact study for this development was performed by Vanasse & Associates Inc. Based on their review of the data compiled by Mass Highway for the Town of Acton, it was determined that traffic volumes within the study area have generally increased by approximately 1.87 percent per year. Accordingly, a 2 percent per year compounded annually background traffic growth rate was used.

Robbins Brook Senior Residence

- A Senior Residence of 80 assisted living, 20 independent living units and 32 townhouse units located on Main Street North of Carlisle Road in north Acton
- This project traffic impact study was prepared by David J. Friend of Transportation Planning services in 2003. Based on historical data provided by Mass Highway and other traffic impact studies done in the area, a 1.70 percent background traffic growth was used by the engineer.

Robbins Mill Estates

- A 90 single-family houses situated east of Carlisle Road in North Acton.
 - Traffic impact study was performed by David J. Friend of Transportation Planning services in 2000. Again, a 1.70 percent background traffic growth was used by the engineer.
3. We recommend that the traffic engineer consider the possibility of proposing a deceleration lane for eastbound traffic on Great Road that would be turning into Skyline Drive.
 4. If the accesses to Palmer Lane & Hazelnut Street are restricted for emergency vehicles only, we recommend that the traffic engineer reanalyze the impacts to the intersection of Skyline at Great Road. The traffic engineer should make recommendations as to any improvements to the alignment of Skyline Drive, modifications to Great Road, etc... that might be necessary in order to maintain an acceptable level of service at this intersection. In addition, we recommend an analysis considering only one-way traffic entering the site from Palmer Lane & Hazelnut Street and its impact to Skyline Drive at Great Road.

The Traffic Consultant revised their study to incorporate some of our changes we suggested in our memo. Based on the response from Conley Associates dated October 19, 2007, they have determined that Skyline Drive will continue to operate at Level of Service F under the proposed conditions. We would like to see the results of this data to understand what the impacts to future homeowners will be such as the peak anticipated queue lengths and delay times on Skyline Drive. The consultant is proposing to reconfigure Skyline Drive at Great Road to include a left-turn lane and a right turn lane. The applicant will be required to obtain a State permit from MassHighway for any work within the layout of Great Road.

Roadway Design

5. We understand the developer intends to have the roads remain private and not be presented for acceptance as public roads to the Town. The Engineering Department agrees that the roadway system should remain private due to the number of waivers that will be needed. Section 9B.13 of the Zoning Bylaw states that **generally** all streets and ways, drainage facilities, and utilities shall be designed and constructed in compliance with the Acton Subdivision Rules and Regulations. In order to comply with the rules and regulations, the applicant will need to request waivers from the following

design standards:

- We noted a few intersections within the development where the slope of the road within 50 feet of the intersection exceeded the allowable design standard such as Skyline Drive at Quail Ridge Drive, Greenside Lane at Skyline & Parkland Drive intersections at Quail Ridge Drive.
- We noted that the engineer has shown bituminous concrete cape cod berm along the entire road, including the intersection roundings. The rules requires slope granite curb at the intersection roundings.
- There is no turnaround proposed for the end of Greenside Lane adjacent to the proposed 12-unit building at Station 0+00. If these roads become public ways, the engineer will need to design the turnaround in accordance with Section 8.1.18. If the roads are to remain private, the engineer could reduce the amount of pavement on site by shortening Greenside Lane and utilizing the entrance of the parking area for the multi-unit building as part of a T-shaped turnaround.
- The typical details & cross sections for the roads show the total thickness of the road pavement to be less than the 3.5 inches of bituminous concrete (2-inches binder & 1.5 inches of wearing course) required for a typical roadway.
- The typical details & cross sections for the roads also show the total depth of gravel base material to be less than the 18-inches of gravel (12-inches of bank run gravel & 6-inches of processed gravel) required for a typical roadway.
- The plans indicate that the proposed sidewalk will be located adjacent to the existing roads without a grass strip. The applicant will need to request a waiver to eliminate the requirement for a grass strip.

The engineer has stated that they will prepare a list of waivers when the final roadway design is completed.

1. If the access on Hazelnut Street and Palmer Lane are used for public access and not just for emergency access, the engineer will need the to complete the following:
 - Extend the Plan & Profiles for Quail Ridge and Skyline Drive to demonstrate compliance with the horizontal & vertical design standards as set forth in the Subdivision Rules & Regulations where the proposed roads will meet with the existing road(s)/access. The profile for Quail Ridge Drive shows a 7.32% grade to the edge of the existing driveway for the Concord Water Department without any vertical curves transitioning to the profile of the existing driveway. If the accesses to Acorn Park are used for any type of vehicular access (public, emergency, etc...), we recommend that the engineer provide this same level of information to ensure that the access is acceptable for the intended use.
 - The engineer will need to show the improvements that will be made to the access to Hazelnut Street if this access is used for this development. The existing access to Hazelnut Street is only about 12 feet wide.

- Relocate the existing locked gate on the access on Hazelnut Street to allow traffic through this section of the road. The existing gate should be relocated onto the driveway for the water treatment plant. The engineer will need to consult with the Concord Water Department as to the appropriate location for the gate. If the access is only for emergency vehicles, the applicant will need to work with the Police & Fire Departments and the Concord Water Department to ensure that all parties have access to unlock this gate.
- The existing access on Hazelnut Street is shown on the as-built plan to be located partially outside the existing right of way. If this access is used, the engineer will need to propose that this access be reconstructed within the road right of way. Enclosed is a copy of the as-built plan for Hazelnut Street.
- The engineer will need to replace the existing wood guardrail on the Hazelnut Street access with a suitable type guardrail to prevent vehicles from accidentally driving over the existing headwalls.
- If the access to Palmer is used and the roads become public (which we do not recommend), the existing turnaround at the end of Palmer Lane could be removed since the Town way would be extending through the development and the existing perpendicular turnaround leg may no longer be necessary.

Not Applicable - The two accesses to the Acorn Park subdivision are now proposed only for emergency access.

2. If new gates are proposed for emergency access, the engineer will need to add a typical detail to the plans.

The engineer stated that this will be added to the plans.

3. We recommend that the baseline stationing for existing portion of Skyline Drive be continued through the new development instead of restarting the stationing at Station 0+00. The engineer could also consider removing the existing perpendicular turnaround leg at the existing end of Skyline Drive by the golf course since Skyline Drive will be extended through the new development and this turnaround may no longer be necessary.

The engineer stated that this will be added to the plans.

4. The minimum centerline radius needs to be labeled on the Plan and Profile (sheet 34 of 43) for Parkland Lane between Stations 4+71.48 & 5+10.81.

The engineer stated that this will be added to the plans.

5. If the access to Palmer Lane & Hazelnut Street is deemed for one-way traffic only, the engineer will need to propose the appropriate signage to alert drivers of the intended traffic flow.

Not Applicable - The two accesses to the Acorn Park subdivision are now proposed only for emergency access.

6. We also noted a potential problem for plowing snow on these streets due to the

closeness of the dwelling units, the number of driveways, the lack of a turnaround on Greenside Lane, etc...

No Comment

7. Due to the close proximity of the dwellings to the roads and the potential for residents and guests parking on the 20-foot wide streets, the Engineering Department recommends the proposed roads to be 24 feet wide.

The sections of the roads in front of the proposed homes have been widened to 24 feet.

8. The Fire Chief will have to review the plan to ensure that it is adequate for emergency SU-30 vehicles (fire truck).

The engineer has stated that the roads and the turnarounds have been designed in accordance with the Subdivision Rules & Regulations. We will review the adequacy of the design for an emergency SU-30 vehicle when we receive a full-size set of the revised plans.

9. Based on our turning templates for a SU-30 vehicle (fire truck), the intersection for the common driveway for units #77-80 appears that it would be tight for a fire truck coming from Hazelnut Street on Quail Ridge Drive and turning onto the common driveway.

This common driveway has been eliminated and replaced with an off-street parking area. We will review the adequacy of the access to this proposed parking area when we receive a full-size set of the revised plans.

Drainage

10. Based on the drainage calculations for the Senior Residence, the engineer has shown that the post development peak runoff rates for a 10-year design storm will not exceed the pre-existing conditions.

No Comment

11. Prior to approval of the drainage design, the engineer should conduct a deep test hole and percolation test in the same locations as the proposed infiltration chambers & basins to field verify the type of existing soils, the actual infiltration rate and the groundwater elevations that were used in the drainage design. The engineer should label the estimated seasonal high groundwater on the typical detail for the infiltration & detention basins and the subsurface infiltration chambers to ensure that the groundwater table is not higher than the bottom of the proposed drainage facilities.

The engineer has agreed to provide some documentation for the larger infiltration basins.

12. The plan & profile of the proposed roads shows the roadway to be located within cut sections along the existing ground surface. The engineer should add a note requiring subdrains along all the cut sections as well as any other locations where groundwater becomes a problem for the roads.

The engineer stated that this will be added to the plans.

13. We recommend that the engineer provide high-capacity double grates on the catch basins (CB 8 & 9) located at the low point on Quail Ridge Drive at about Station 10+91. We are concerned about the amount of potential runoff that could bypass the catch basins uphill of this area allowing more runoff than designed to continue to the catch basins at the low point in the road. Based on the profile of Quail Ridge Drive, there is about 2500 feet of road that slopes to the low point at the proposed culvert crossing.

The engineer stated that this will be added to the plans.

14. We have some concerns relating to the diversion walls being proposed in catch basins such as on Quail Ridge Road at Station 10+91 (CB #8 & #9). We are concerned that the combination of the 2 gas/oil hoods and the diversion wall inside the catch basin will make it very difficult for future maintenance. Also, the wall would have to be located in a position to allow the initial first flush entering the catch basin to be diverted to the recharge chambers. This would require the wall to be set closer to the pipe for drain manhole #7. As a result, the wall would make accessing this pipe and the gas/oil hood even more difficult. Not to mention that it would also reduce the storage volume in the sump to collect sediment. We recommend that the engineer utilize a separate diversion manhole and remove the diversion walls from inside the catch basins.

The engineer stated that this will be modified on the revised set of plans.

15. The engineer has shown subsurface recharge facilities to be utilized on the site in some locations such as underneath the road surface on Quail Ridge Drive. The engineer needs to label the type of traffic-rated covers that will be used for the system that is located under the road.

The engineer stated that this will be added to the plans.

16. The engineer should label a drainage swale to be constructed at the base of proposed slopes behind the units on Greenside Lane by Skyline Drive to ensure the overland runoff is diverted to the proposed drop inlet.

The engineer stated that this will be added to the plans.

17. The outlet for stormwater basin #12 is proposed to discharge across the existing driveway for the Concord Water Plant. We recommend that the engineer propose an alternative design to the outlet pipe to prevent this basin from discharging across their driveway.

The engineer stated that this will be revised on the plans.

18. The outlet for stormwater basin #15 is proposed to discharge across the existing path on Common Land parcel A even during smaller storm events such as the 2-year design storm. We recommend that the engineer propose a culvert crossing or some other alternative for the path to prevent this runoff from discharging across the surface of the pathway.

The engineer stated that this will be revised on the plans.

19. We also have some concerns about Stormwater Basin #28 adjacent to the proposed 12-unit buildings. The Great Road Condos have been experiencing problems in the past with water breaking out at the base of the slope adjacent to this drainage basin. We have noted some holes that formed in the bottom of this basin where runoff was discharging into the voids in the ground prior to reaching the existing outlet pipe for the basin. It appears that this water would travel through the voids and breakout at the base of the slope next to the Great Road Condos. We have spoken with the maintenance staff at the Quail Ridge Country Club in the past regarding this problem and they have filled-in the holes as they form in an attempt to stop the problem temporarily. If this basin is proposed to be used for this development, we recommend that this drainage basin be lined with a manmade impervious barrier and only allow this basin to detain runoff; not infiltrate into the ground.

The engineer stated that this will be revised on the plans.

20. The engineer needs to label the invert elevations of the outlet structure in Stormwater Basin 28 on the plans. The proposed grading for the Quail Ridge Country Club site plan and the septic leach field does not seem to match the existing contours for this drainage basin as shown on the plan.

The engineer stated that the invert will be added to the plans.

21. We want a note added to the detail for the Stormceptor to specify the location(s) where this structure will be installed on the site.

The engineer stated that this will be added to the plans.

22. The details for the infiltration & detention basins should also require all the existing top and sub-soil to be removed from underneath the bottom of the basin in addition to removing this material from underneath the earth berm.

The engineer stated that this will be added to the plans.

23. The engineer should add a note in the Drainage System Operation & Maintenance Plan for the infiltration basins so that the parties responsible will understand when there is standing water in these basins after a specified time period that these basins need to be cleaned to remove the sediment that has accumulated along the bottom of the basin.

The engineer stated that this will be revised as suggested.

24. We would like the engineer to label the stormwater basins on the Site Development Plan to identify which basins will be used for detention or infiltration. We would also like a note on the typical details for the infiltration & detention basins to specify the stormwater basins, as well. I would recommend that the detail for the detention basin show the outlet pipe to be set at or slightly below the bottom elevation of the drainage basin. There does not appear to be a need to allow runoff to pond in the detention basin since these basins will only be utilized for detaining runoff and not recharging to groundwater.

The engineer stated that this will be added to the plans.

25. The engineer has shown a typical detail for a proposed water quality swale outlet structure. The engineer should add a note to the detail identifying the locations of these water quality swale outlet structures. We also want these water quality swales clearly labeled on the Site Development Plan.

The engineer stated that this will be added to the plans.

26. The engineer should also add a typical cross section for the water quality swale to ensure the proper slopes, soil layers, dimensions, etc...

The engineer stated that this will be added to the plans.

27. It is our opinion that the engineer should remove the filter fabric from the bottom of the subsurface infiltration chambers in order to maximize the infiltration capacity of the trench and to minimize the risk of clogging due to the fine particles being trapped by the filter fabric. Our recommendation is based upon a conference on Stormwater Improvements for Low Impact Developments. There was a speaker from the University of New Hampshire that discussed their results showing an infiltration system that failed within 10 months of the installation due to the premature clogging of the filter fabric.

No Comment

28. The Drainage System Operation and Maintenance Plan should be incorporated into the private maintenance agreement for the road(s), access driveway and the parking areas.

The engineer stated that this will be added to the maintenance agreement.

Roadway & Utility Details

29. The engineer should label the 3/16 inch per foot sidewalk cross slope on the typical road & common driveway cross sections as the **maximum allowable** cross slope.

The engineer stated that this will be added to the plans.

30. The engineer should contact the Fire Chief to determine the need and locations for fire alarm call boxes.

No Comment

31. We want to ensure that the standard language for private ways is written into the decision and the maintenance agreements so the future residents clearly understand the Town will not be responsible for snow plowing or any other related maintenance and that the common driveways will not become a public way. If the roadways are also kept private, we recommend that this same language apply to these roads, as well.

No Comment

32. A note should be added to the plans stating that the binder course of pavement shall be exposed to one winter season (November 15 – April 30) prior to the application of the wearing course.

The engineer stated that this will be added to the plans.

33. There should be a note on the plans requiring the proposed street name signs shall meet the specifications of the Acton Highway Department. The street name sign should have a sign affixed to it designating the street a private road.

The engineer stated that this will be added to the plans.

34. Any traffic related street sign post should be seated in concrete.

The engineer stated that this will be added to the plans.

35. If the applicant intends to have a sign identifying the development, the engineer should show the location of this sign on the plans.

The engineer stated that this will be added to the plans.

36. The typical detail for a wooden guardrail should include a note stating that this type of guardrail is not allowed along the roadways. Any guardrail located alongside the proposed roads should meet MassHighway standards.

The engineer stated that this will be added to the plans.

37. We recommend that the engineer show a vertical granite curb at the proposed culvert crossing on Quail Ridge Drive instead of a slope granite curb to reduce the risk of concrete chipping at the edges similar to the problems with the concrete sidewalk behind Town Hall.

The engineer stated that this will be added to the plans.

38. The engineer is proposing the same type of precast modular retaining wall that was constructed at the wetland crossing for Ellsworth Village Road. This precast retaining wall system seems to work well in this type of situation.

No Comment

39. The engineer should show a stop line and stop sign at the intersections within the proposed development in accordance with the M.U.T.C.D.

The engineer stated that this will be added to the plans.

40. The street name signs could be affixed to the same post as the stop sign to minimize the amount of sign posts.

The engineer stated that this will be added to the plans.

The engineer should label the crosswalks at road intersections to be painted on the street in conformance with the M.U.T.C.D.

The engineer stated that this will be added to the plans.

41. If the existing access to Hazelnut Street remains as it exists today, we recommend that the existing driveway between the homes on Hazelnut Street be repaved along with the

new roadways within the development.

No Change

42. The intersecting street name labeled on the Plan and Profile for Parkland Lane (sheet 35 of 43) should be changed from Ryder Path to Bentgrass Path.

The engineer stated that this will be added to the plans.

43. The applicant will need to obtain approval from the Acton Police & Fire Departments for the proposed street names within the development to ensure that there is no confusion during a 911 emergency with other existing street names in Town. Acton already has a **Parker Street, Quail Run & Green Needle Way** that could be an issue for the proposed street names.

The engineer stated that this will be added to the plans.

44. The engineer should add a note or detail to the plans stating the dimensional requirements for a standard parking space, maneuvering aisle, etc...

The engineer stated that this will be added to the plans.

45. The engineer should specify that the Standard Pavement Detail does not apply to the roadways.

The engineer stated that this will be added to the plans.

Sidewalks & Pedestrian Connections

46. A note should be added to the plan requiring the sidewalk construction will comply with the standards of the Architectural Access Board.

The engineer stated that this will be added to the plans.

47. The plans show a sidewalk network within the development that connects to the existing sidewalk on Palmer Lane in Acorn Park.

No Comment

48. The proposed sidewalk on Quail Ridge Drive ends at the existing driveway for the Concord Water Treatment Plant. If this access is used for vehicular access, the engineer should show a sidewalk extension from the sidewalk on Quail Ridge Drive to the existing sidewalk on Hazelnut Street.

No Change

49. The engineer should show a sidewalk connection from the end of the sidewalk on Skyline Drive to the interior walkways located at the golf course parking area.

The engineer stated that this will be added to the plans.

50. The existing section of Skyline Drive between Great Road & the parking area for the golf course does not have a sidewalk. Due to the anticipated increase in traffic on this street from this development (residential & commercial), the applicant could consider proposing a sidewalk along this section of Skyline Drive. This would provide a pedestrian connection from Acorn Park to the Acton Woods shopping plaza at the intersection of Great Road & Main Street.

No Comment

51. We believe that this new residential development creates even more of a need to construct the sidewalk on Great Road between Meyer Hill Drive & Main Street as it has been previously approved on the Skyline Drive definitive subdivision plans and on the Hillside Condominium PCRC plans.

52. The applicant could consider proposing new pathways to provide future residents an alternative to walking along the streets for recreation within the neighborhood. These new pathways could reconnect the existing wood bridges and paths that already exist within the wetland areas and the proposed site.

The engineer stated that this will be added to the plans.

53. The engineer might want to propose a trail connection to the trail network that is located on the adjacent Acton conservation land. The engineer has shown a pedestrian connection to the trail network on the land owned by the Town of Concord. It is our opinion that the Town might have an interest in having a public trail connection through the development to the Town conservation land.

The engineer stated that this will be added to the plans.

54. The engineer will need to show the proposed grading for these relocated paths within the development to ensure that the new grading is reasonable for pedestrians, etc... The engineer has shown the existing path by Skyline Drive at about Station 6+75 to be relocated around the detention basin where the road shoulder is shown at about a 2:1 slope.

The engineer stated that this will be added to the plans.

55. The engineer has shown a proposed parking area on the left side of Skyline Drive at about Station 3+00. There is a sidewalk shown to be constructed adjacent to the handicap space that ends at the edge of Skyline Drive. This sidewalk does not extend to the existing building that exists behind the parking area. The engineer might need to extend the sidewalk and install sidewalk ramps, crosswalks, signs, etc to provide a pedestrian connection to the existing building and/or the proposed restaurant & golf course facility.

The engineer stated that this will be added to the plans.

Additional Comments/Concerns:

56. The engineer will need to revise the proposed street numbering on Ryder Path to correct the duplicate street addresses. We would also like to have the numbering on Quail Ridge Drive revised so that the house numbers on both sides of the road stay

fairly consistent. We noticed along the higher unit numbers that the even side street addresses are much higher than the odd side.

The engineer stated that this will be added to the plans.

57. The engineer should also indicate a sign for the multi-unit buildings on the road to clearly indicate the Greenside Lane street addresses for these units. We would also like to have the numbering for the multi unit building changed so that the addresses on both sides of the Greenside Lane stay fairly consistent. We noticed that the even side street addresses are much higher than the addresses for the multi-unit buildings.

The engineer stated that this will be added to the plans.

58. We recommend that an as-built plan showing the buildings, pavement, drainage and utilities be required at the conclusion of construction along with a letter from a professional engineer certifying that the project was constructed according to the approved plans.

59. The engineer should describe the locations of the mailboxes on the plans.

The engineer stated that this will be added to the plans.