

August 2, 2018

Mr. Robert Truax
GLM Engineering Consultants, Inc.
16 Exchange Street
Holliston, MA 01746

Re: Goodridge Brook Estates
Sterling Road, Lancaster, MA
(HEI File no. 18002.00)

Dear Rob:

Hamwey Engineering, Inc. performed an initial review of the following information regarding the proposed Goodridge Brook Estates project on Sterling Road in Lancaster, MA. We also performed a site inspection on July 24, 2018.

- Plan entitled “Site Development Plan of Land, Goodridge Brook Estates, Multi Unit & Single Family Subdivision Layout, Lancaster, MA”, prepared for Crescent Builders, Inc., prepared by GLM Engineering Consultants, Inc., dated February 8, 2018, last revised July 5, 2018 and stamped July 6, 2018.
- Stormwater Management Report entitled “Goodridge Brook Estates, Sterling Road, Lancaster, MA”, prepared for Crescent Builders, Inc., prepared by GLM Engineering Consultants, Inc., dated July 5, 2018 and signed July 6, 2018.

Hamwey Engineering, Inc. has the following comments.

GENERAL

1. Show the north arrow in all the sheets.
2. The Zoning Classification Table should be the same on all sheets. The Zoning Classification table should show the required and provided numbers and also include the setbacks for the various types of streets.
3. The availability of water (flow & pressure) should be confirmed with the Water Department.
4. The availability of sewer capacity should be confirmed with the Sewer Commission.
5. The applicant will be submitting the plans to the Conservation Commission.
6. Confirm adequate access for emergency vehicles with the Fire and Police Departments.
7. Recordable lot layout subdivision plans (including lot line information, lot shape calculations, bound locations, easements, etc.) were not submitted.
8. All signs (street, stop, speed limit, etc.) and pavement markings should be shown on the plans.
9. All stop lines should be shown on the plans.
10. Sewer pump station calculations should be submitted.
11. A Special Permit may be required for the apartment complex driveway (greater than 1000').
12. Electric, telephone cable, etc. is not shown throughout the site.
13. It should be noted that the majority of the site's upland area is proposed to be developed.
14. The Zoning Board may want to require that the proposed lots that abut Sterling Road, including the lots on the corners of Road A & Road C, be similar in size, frontage, setbacks, etc. as the existing lots on Sterling Road.
15. A DEP Sewer Extension and a Sewer Connection may be required.
16. The applicant should submit a list of all local, state and federal permits/approvals that will be required.

17. Confirm with the Water Department that they will accept the water line to be installed outside of the traveled way (paved portion of the roadway).

18. Passive recreation areas are mentioned but not shown on the plans.

WAIVERS/VARIANCES

Subdivision Rules and Regulations

1. Waive the Environmental Analysis. ZBA's decision.
2. Variance to reduce the diameter of the cul-de-sac. ZBA should request input from the Fire Department.
3. Variance to allow a dead end street for collector streets. ZBA should request input from the Fire Department.
4. Variance of the right of way & pavement widths (40' & 24'). The requirements for a lane are 40' & 24', for a minor street are 50' & 24' and for a collector street 60' & 30'. ZBA should request input from the Fire Department.
5. Variance to install iron rods at front lot corners and easements. ZBA should require the bounds.
6. Request to allow Modified Cape Cod berms. The requirement is bituminous concrete berms. I don't believe this request is necessary.

Zoning By-Laws

1. Variance for lot shape. The lots sizes have been considerably reduced and the lot shapes are basically square and rectangular. I don't believe this that variance is applicable.
2. Variance of the lot area and frontage. ZBA's decision.
3. Variance of the yard setbacks. ZBA's decision
4. Waiver of building permit fees for the affordable units. ZBA's decision.
5. Waiver of occupancy permit fees for the affordable units. ZBA's decision.
6. Variance of parking space size from 9'x20' to 9'x18'. There is no need to allow this variance.

7. Waiver of sewer fees for the affordable units. ZBA's decision.
8. Waiver of water fees for the affordable units. ZBA's decision.

PLAN SHEET 1

1. Zoning Classification Table: There is a conflict with the Town's Subdivision Rule & Regulations and the Zoning Map regarding the status of Sterling Road (collector street vs minor street). This will affect the required front setback.
2. The revised date should be July 6, 2018, the same as the revision block on all the plans.

PLAN SHEET 3

1. Please show the division line between Lots B1 and B2.

PLAN SHEET 4

1. Show the yard setbacks to the building.
2. The scale should be 1"=40'.
3. Label the curb.
4. Show landscaping.
5. In the area of the labelled 21 parking spaces north of the 46 unit building, there are only 20 spaces.
6. Show how the number of required parking spaces was determined. There should probably be 2 spaces/unit.
7. Explain the reserve parking spaces (for who, surface type, striping, etc.).
8. The required parking space size is 9' x 20'. The plan shows spaces 9' x 18', a variance has been requested.
9. Is the roundabout between the two connected buildings adequate for the emergency vehicles turning radii? Submit to the Fire Department for their approval.

10. Show centerline line radii throughout the entire length of the driveway.
11. The curb radii at station 5+50 should be revised to 100' and 124'.
12. Seven handicap parking spaces are required.
13. Show the dimensions of the back-up spaces at the ends of the parking lots.
14. Handicap ramps are required where sidewalks end at curbs.
15. Show dimension from sidewalks to buildings.
16. Show snow storage areas.
17. Show the dumpster locations and screening.

PLAN SHEET 5

1. Show the sight distance at the entrance in both directions along Sterling Road, including the sight triangle. Also show the utility poles, trees, other site obstructions, etc.
2. Show centerline line radii throughout the entire length of the driveway.
3. The curb radii at station 5+50 should be revised to 100' and 124'.
4. Handicap ramps are required where the sidewalks meet Sterling Road.
5. A school bus shelter/area should be included on the plan.
6. Show snow storage areas.
7. Is the one long entrance adequate for emergency vehicles? Confirm with the Fire and Police Departments.

PLAN SHEET 6

1. Show the proposed lighting.
2. Show the type of water pipe.

3. Show the type and size of the water services to the buildings.
4. Show gate valves for the domestic water services.
5. Show gate valves along the water main.
6. The Fire Department may want a hydrant opposite the 46 unit building. Check with the Fire Department.
7. Show the type of sewer pipe.
8. Show the sewer service to the two connected buildings.
9. Show the size and type of the sewer force main.
10. The invert in SMH 19 may be too high to service the north end of the building.
11. How is the roof being drained for the 46 unit building?
12. Show the size and type of all the drain pipes.
13. Show the rim and inverts of all the DMH's and CB's.
14. The SMH's should show in & out inverts.
15. Show drainage basin emergency overflow spillways.
16. Label the DH near Drainage Basin #6.
17. What is the ground water depth in Drainage Basin #2?
18. Show thrust blocks at all the bends in the force main.

PLAN SHEET 7

1. Show the proposed lighting.
2. Show the type and size of the water services to the buildings.
3. Show gate valves for the domestic water services.
4. Show gate valves along the water main.

5. Show the type of sewer pipe.
6. Show the size and type of the sewer force main.
7. Show the size and type of all the drain pipes.
8. Show the rim and inverts of all the DMH's and CB's.
9. The SMH's should show in & out inverts.
10. Show thrust blocks at all the bends in the force main.

PLAN SHEET 8

1. Show the sight distance at the Roads A & C in both directions along Sterling Road, including the sight triangle. Also show the utility poles, trees, other site obstructions, etc.
2. Show the road centerline radii. Roads A is a collector street (min. $R=200'$).
3. At the cul-de-sac, the required pavement diameter should be 120' and the required property line diameter should be 160'. A variance has been requested.
4. Islands in the cul-de-sac are not recommended.
5. The required right-of-way width for a collector street (Road A) is 60'. The plan scales 40', but the dimension is not shown. A variance has been requested.
6. The required pavement width for a collector street (Road A) is 30' and a lane (Road C) is 24'. The plan shows a 22' width. The proposed width of the apartment complex driveway is 24'. Why is the roadway width less than the driveway width? A variance has been requested.
7. Show the proposed lighting as required.
8. Show proposed street trees.
9. Show the type of the water line.
10. Show gate valves along the water main.
11. Hydrants are spaced greater than 500' apart.

12. The sidewalk is not shown on Road C.
13. Show drainage basin emergency overflow spillways.
14. Show a profile of the cross-country sewer line.
15. Show the inlet and outlet elevations of the cross-country sewer line.
16. Label/number the SMH's.
17. Is the one long entrance adequate for emergency vehicles? Confirm with the Fire and Police Departments.
18. Show the relocation of U.P #48 & U.P. #51.
19. Should the entrances to Roads A & B line up with the Town of Lancaster ROW's on the north side of Sterling Road?
20. No building setbacks are shown.
21. Confirm with the Water Department that they will accept the water line installed outside of the traveled/paved portion of the road.
22. The double grate catch basins should be labeled.

PLAN SHEET 9

1. Show the sight distance at the two intersection of Road B with Road A.
2. Show the sewer line servicing Lots 16-18, 24-32, 54 and 60-64.
3. Show the centerline radii. Road A is a collector street (min R=200'). Road B is a minor streets (min. R=150'). Road C is a lane (min. R=100').
4. The required right-of-way width for a collector street (Road A) is 60' and a minor street (Road B) is 50'. The plan scales 40', but the dimension is not shown. A variance is requested.
5. The required pavement width for a collector street (Road A) is 30' and a minor street (Road B) is 24'. The plan shows a 22' width. The proposed width of the apartment complex driveway is 24". Why is the roadway width less than the driveway width? A variance is requested.

6. Show the proposed lighting as required.
7. Show proposed street trees.
8. Show the type of the water line.
9. Show gate valves along the water main.
10. Triple water gates may be required at water line intersections. Check with the Water Department.
11. Hydrants are spaced greater than 500' apart.
12. Show drainage basin emergency overflow spillways.
13. What is the ground water depth in Drainage Basin #4?
14. Label/number the SMH's.
15. Show thrust blocks at all the bends in the force main.
16. No building setbacks are shown.
17. Confirm with the Water Department that they will accept the water line installed outside the traveled/paved portion of the road.
18. Label the TC's and GF's for all the homes.
19. The double grate catch basins should be labeled.
20. Number all the CB's and DMH's.
21. The inspection ports of the Cul-Tec system are not shown.

PLAN SHEET 10

1. Show the sight distance at the two intersection of Road B with Road A.
2. Show the sewer line servicing Lots 16-32, 54 and 60-64.

3. Show the centerline radii. Roads A & B are minor streets (min. R=150'). Road C is a lane (min. R=100').
4. At the cul-de-sac, the required pavement diameter should be 120' and the required property line diameter should be 160'. A variance has been requested.
5. Islands in the cul-de-sac are not recommended.
6. The required right-of-way width for a collector street (Road A) is 60' and a minor street (Road B) is 50'. The plan scales 40', but the dimension is not shown. A variance has been requested.
7. The required pavement width for a collector street (Road A) is 30' and a minor street (Road B) is 24'. The plan shows a 22' width. The proposed width of the apartment complex driveway is 24'. Why is the roadway width less than the driveway width? A variance has been requested.
8. Show the proposed lighting as required.
9. Show proposed street trees.
10. Show the type of the water line.
11. Show gate valves along the water main.
12. Hydrants are spaced greater than 500' apart.
13. Show drainage basin emergency overflow spillways.
14. Label/number the SMH's.
15. No building setbacks are shown.
16. Confirm with the Water Department that they will accept the water line installed outside of the traveled/paved portion of the road.
17. Label the TC's and GF's for all the homes.
18. The double grate catch basins should be labeled.
19. Number all the CB's and DMH's.

PLAN SHEET 11

1. Show the calculation for each vertical curve length.
2. Confirm with the Sewer Commission that a pipe slope of 0.005 is adequate.
3. Proposed SMH#1: The elevation of the proposed 12" invert is incorrect. There will be no existing 12" invert. Will the existing SMH be removed and a proposed SMH installed?
4. The SMH's should show in & out inverts.
5. Is SMH 2 a drop inlet manhole?
6. Number all the CB's and DMH's.
7. Label the size and slopes of the pipes from the CB's to the DMH's.

PLAN SHEET 12

1. Show the calculation for each vertical curve length.
2. Confirm with the Sewer Commission that a pipe slope of 0.005 is adequate.
3. The SMH's should show in & out inverts.
4. Show the sewer line and SMH's from SMH 9 to the end of the cul-de-sac.
5. The invert of SMH 10 should be 401.58.
6. Show the sewer line servicing Lots 16-25 and 54.
7. Number all the CB's and DMH's.
8. Label the size and slopes of the pipes from the CB's to the DMH's.

PLAN SHEET 13

1. Show the calculation for each vertical curve length. The Subdivision Rules and Regulations require various vertical curve lengths for various types of streets.
2. Confirm with the Sewer Commission that a pipe slope of 0.005 is adequate.

3. The SMH's should show in & out inverts.
4. Show the sewer line servicing Lots 24-32 and 60-64.
5. The invert of SMH 11 should be 399.78.
6. What is the size and type of the force main?
7. Show thrust blocks at all the bends in the force main.
8. Number all the CB's and DMH's.
9. Label the size and slopes of the pipes from the CB's to the DMH's.

PLAN SHEET 14

1. The grade of Road C cannot exceed 4% within 30' of Sterling Road. The plan shows a grade of 4.5%.
2. Is SMH 14 a drop inlet manhole?
3. The SMH's should show in & out inverts.

PLAN SHEET 15

1. Show how the existing houses on Sterling Road will be connected to the new sewer line.
2. Show the vertical elevations on the profile.
3. Proposed SMH: The elevation of the proposed 12" invert is incorrect. There will be no existing 12" invert. Will the existing SMH be removed and a proposed SMH installed?
4. Show the saw cutting and patching of pavement in Sterling Road.
5. Confirm with the Sewer Commission that a pipe slope of 0.005 is adequate.

PLAN SHEET 16

1. Silt Sack Catch Basin Inlet Detail:
 - a. More detail of the actual silt sack needs to be provided. The detail, as is, can be interpreted as just installing a piece of filter fabric in the catch basin.
2. Sediment Check Dam Detail:
 - a. Are there any swales proposed in this project? Is the detail necessary?
3. Erosion Control Barrier with & without Filter Mitt Details:
 - a. Due to the area of disturbance, haybales should be installed instead of filter mitts.
 - b. The Conservation Commission should determine if these details are adequate.
4. Erosion & Sedimentation Control Note 7:
 - a. The stone size of 1"-3" crushed stone fills in with silt very early in the project and creates a smooth surface. This does not allow the truck tires to vibrate and for dirt to fall off the tires. 4"-8" riprap should be installed to vibrate the tires. A detail of this construction should be shown on the plans.
5. Erosion & Sedimentation Control Note 9:
 - a. I don't believe the detail is shown on the plans.

PLAN SHEET 17

1. Typical Right of Way Cross Section Detail
 - a. The required right-of-way width for a minor street is 50'. The detail shows 40'.
 - b. The required pavement width for a lane and minor street is 24'. The detail shows a 22' width.
 - c. Add a note stating "Fill material, if required, shall meet the specifications of MSSHB M1.01.0, Ordinary Borrow".
 - d. The gravel surface material (for the roadway & sidewalk) should be MSSHB M.1.03.0, Type b.
 - e. Add a note stating that sieve test results must be submitted for the gravel.
 - f. Add a note stating that compaction test results must be submitted for the subbase and the gravel.
 - g. Add a note stating that paving is not allowed between November 1 and April 15.
 - h. Add a note stating that the pavement should meet MSSHB M3.11.03, similar to the sidewalks spec.
 - i. 8" of gravel is required in the shoulders (grass strip) under the loam..
2. Handicap Sidewalk Curb Cut Detail:
 - a. The detail should be changed to reflect a bituminous concrete sidewalk and cape cod berm.

PLAN SHEET 18

1. Cul-Tec Recharge Detail:
 - a. There are a number of labels missing from the detail.
 - b. The surface elevation should be approximately 410.
2. Cul-Tec Inspection Port Detail:
 - a. There are a number of labels missing from the detail.

PLAN SHEET 19

1. Typical Section Earth/Rock Trench Detail
 - a. The gravel borrow and select borrow should be MSSHB M1.03.0, Type b.
 - b. The ordinary borrow should be MSSHB M1.01.0.
 - c. What is select fine borrow?
 - d. There should be a minimum 6" of crushed stone under the pipe, whether on rock or earth.
 - e. The word "SUPERINTENDENT" should be replaced with the word "TOWN".
2. Subdrain Detail
 - a. The gravel borrow and select borrow should be MSSHB M1.03.0, Type b.
3. Precast Concrete Catch Basin Detail
 - a. Is the Lebaron LK121D frame & grate required? I don't believe there are grades greater than 6%, nor could I find CB's 40, 80 & 81.
 - b. The depth of the crushed stone bed should be the same as the MH detail.
 - c. A concrete collar should be placed around the flanges of the frame and half way up the frame.
 - d. Label the backfill material and compaction.
 - e. Use the same NOTES as the Typical Sewer Manhole Detail on Sheet 20.
4. Precast Concrete Manhole Detail
 - a. The depth of the crushed stone bed should be the same as the CB detail.
 - b. Show steps in the manhole.
 - c. A concrete collar should be placed around the flanges of the frame and half way up the frame.
 - d. Label the backfill material and compaction.
 - e. Use the same NOTES as the Typical Sewer Manhole Detail on Sheet 20.

5. Headwall Detail

- a. Does the contractor have a choice of installing a concrete or field stone headwall, or is the headwall a combination of concrete with imbedded field stone?
- b. The riprap stone should meet the MSSHB M2.02.3, Stone for Pipe Ends.

6. Riprap Impact Basin Detail

- a. Where does this detail apply to?

PLAN SHEET 20

1. House Service & Chimney Detail

- a. Confirm this detail with the Sewer Commission and DPW.

2. Typical Building Connection Detail

- a. The bedding, fill, backfill material, etc. and depths should be the same as the Typical Section Earth/Rock Trench Detail on Sheet 19.

3. Typical Sewer Manhole Detail

- a. A concrete collar should be placed around the flanges of the frame and half way up the frame.
- b. The bedding, fill, backfill material, etc. should be the same as the DMH & CB Detail on Sheet 19.

PLAN SHEET 21

1. Typical Hydrant Assembly Detail

- a. The Town requires a M&H Model 129 hydrant.
- b. Install pea stone around drain hole in the hydrant.
- c. Explain the label “ 2’-6” min. dia. form 6’ below hydrant to at least 6’ above hydrant drain ring”.

ADDITIONAL REQUIRED DETAILS

1. Bituminous Concrete Sidewalk

2. Lighting

3. Plantings

4. Sewer Pump Station and Calculations

5. Drain Trench
6. 10"x10"x8" Tapping Valve
7. Wetland Crossing
8. Bounds
9. Construction Entrance
10. Drainage Basin Emergency Overflow Spillways
11. Stormwater Pre-treatment Units.
12. Dumpster Screening.
13. Sewer Trenching in Sterling Road.

PLAN SHEET 22

1. Could not find the location of DH #5 on the plans.
2. DH #08-3, the groundwater elevation should be 399.5.
3. DH #08-6, the groundwater elevation should be 403.5.
4. DH #7, the surface elevation should be 403.0 and the groundwater elevation should be 400.0.
5. DH #6, the groundwater elevation should be 405.5.

STORMWATER MANAGEMENT REPORT

1. Checklist for Stormwater Report:
 - a. The report is not stamped and signed by a PE.
2. Standard 3:
 - a. The infiltrating sizing method is not checked off.
 - b. Mounding calculations have not been submitted.

3. Standard 4:

- a. A Long Term Pollution Prevention Plan was not submitted.

4. I don't agree with the soil classes you have assigned to the soil types; therefore, along with the comments below, I was not able to perform a complete review of the calculations.

5. Hydrogeological Calculations:

- a. Some of the subcatchments in the post development calculations don't show the time of concentration.
- b. Cul-Tec Chambers - There is no soil testing data in the area of the chambers.
- c. Drainage Basin #1 – The G.W. is at 30" and the bottom of the basin is 36" to 44" below existing grade.
- d. Drainage Basin #1 – There should be an emergency spillway for the basin.
- e. Drainage Basin #2 – There is no soil testing data in the area of the basin.
- f. Drainage Basin #2 – The exfiltration rate of 8.27 cannot be verified without soil test data.
- g. Drainage Basin #2 – Should the two devices be switched?
- h. Drainage Basin #2 – There should be an emergency spillway for the basin.
- i. Drainage Basin #3 – The G.W. is at 24" and the bottom of the basin is 0" to 4" below existing grade.
- j. Drainage Basin #3 – There should be an emergency spillway for the basin.
- k. Drainage Basin #4 – There is no soil testing data in the area of the basin.
- l. Drainage Basin #4 – There should be an emergency spillway for the basin.
- m. Drainage Basin #5 – The G.W. is at 42" and the bottom of the basin is 0" to 24" below existing grade.
- n. Drainage Basin #5 – There should be an emergency spillway for the basin.
- o. Drainage Basin #6 – The soil is a sandy loam; therefore the exfiltration rate should be 2.41.
- p. Drainage Basin #6 – There should be an emergency spillway for the basin.

6. Appendix A-1 (due to the comments below, I was not able to perform a complete review of the closed system calculations):

- a. The closed system in Road B is not listed in the calculations.
- b. DMH #62 may have to be a larger diameter to accommodate the pipes from CB#59, CB#60 & CB#61.
- c. I don't agree with some of the times of concentration. Please provide time of concentration charts.
- d. I randomly check some of the data in Overland Flow Travel Time chart and I don't agree with some of the travel lengths, slopes or time of concentrations.
- e. Some of the single grate catch basins may have to be double grates. Please provide grate capacity data from the supplier.
- f. The Overland Flow Travel Time table and the Average "c" Value for Structures table are labelled Fieldcrest Estates and dated 9/27/07. Is the Goodridge Brook

Estates design the same as the Fieldcrest Estates design?

7. Appendix B:

- a. Drainage Basin #2 – The volumes are not the same as Subcatchment 16S.
- b. Drainage Basin #2 – The K value of 8.27 cannot be verified without soil test data.
- c. Drainage Basin #3 – The evaluations of the forebay sizing are incorrect.
- d. Drainage Basin #3 – The K value is different from the Pond 3P calculations.
- e. Drainage Basin #4 – There is no soil testing data in the area of the forebay to determine the G.W. elevations.
- f. Drainage Basin #4 – The soil is an Class A with a depth factor of 0.6”.
- g. Drainage Basin #5 – The K value is different from the Pond 3P calculations.
- h. Drainage Basin #5 – The evaluations of the forebay sizing are incorrect.
- i. Drainage Basin #6 – I believe the soil class is a C/D soil.
- j. Drainage Basin #6 – The soil is a sandy loam; therefore the K value should be 2.41.
- k. In the TSS tables, add “with forebay” to Outlets #6, #10, #19, #30 & #39.

8. Appendix C:

- a. Haybales may be required by the Conservation Commission in lieu of filter mitts.
- b. The Construction Entrance detail is not shown on the plans.
- c. The Sediment Trap detail is not shown on the plans.
- d. The access ways to the drainage basins, along with a detail, are not shown on the plans.
- e. The drawdown outlet, along with a detail, is not shown on the plans.
- f. Construction Period Spill Control Requirements are mentioned but there is no written document.
- g. The Stormwater Management Operation and Maintenance Plan should be referenced on the plans.

Please contact me if you have any questions.

Very truly yours,
HAMWEY ENGINEERING, INC.



Fred A. Hamway, Jr., PE
President

cc: Noreen Piazza (Lancaster ZBA)