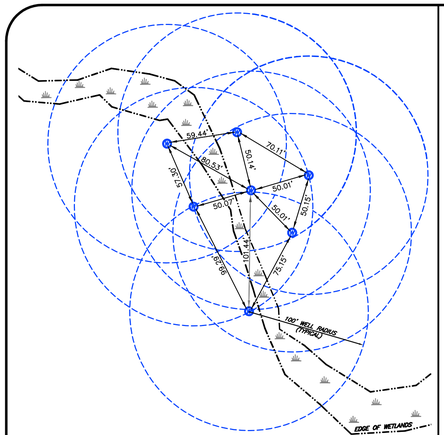
ATTACHMENTS

A: APPLICANT'S PLAN P – PUBLIC WATER SUPPLY



PUBLIC WATER SUPPLY DETAIL

SCALE: 1"= 40'

LEGEND

EXISTING	DESCRIPTION	PROPOSED
102	2 FOOT CONTOUR	102
110	10 FOOT CONTOUR	110
	EDGE OF PAVEMENT	
	CURBING	
	STONE WALL	
IP	IRON PIN	IP, T.B.S, IR
IR	IRON ROD	T.B.S
DH	DRILL HOLE	DH, T.B.S
SBDH	STONE BOUND W/ D.H.	
	SPOT GRADE	71x0
	TREE LINE	
	DRAIN PIPE –HDPE	
	DRAIN MANHOLE	
	CATCH BASIN	
-u-	UNDERGROUND UTILITIES (CABLE, TELE, ELEC)	-u-
	WELL	W
	WATER LINE (4"PVC; SDR 21)	-w-
	SEWER FORCE MAIN (E-ONE)	-m-
	STOP SIGN	
	STREET LIGHT	
	BUILDING SETBACK	
UP #72	UTILITY POLE	UP #73
	EROSION CONTROL (AS SPECIFIED)	
	TREE	
	PROPANE TANK	
	CUL-TECH ROOF DRAIN	
	SNOW STORAGE	
FAR	FIRE ACCESS ROAD	

REVISION –1	8-18-2016	UTILITY / TOWN CHANGES	JAB

PLAN P – PUBLIC WATER SUPPLY – UTILITY

"The Birches"

100 LONG RIDGE ROAD
CARLISLE, MASSACHUSETTS

PREPARED FOR:
LIFETIME GREEN HOMES, LLC
142 LITTLETON ROAD
WESTFORD, MA 01886

FEBRUARY 2, 2016 SCALE: 1"= 40'

40 20 0 40 80

MEISNER BREM CORPORATION
142 LITTLETON ROAD, STE. 16, WESTFORD, MA 01886 · (978) 692-1313
202 MAIN STREET, SALEM, NH 03079 · (603) 893-3301

JOB NUMBER: 2066

ACAD FILE: 2066m-publicwellsNewlayout.dwg

B: BEDROOM COUNTS AND PROPOSED SEPTIC SYSTEM LOADING RATES

2015
Bedroom Count

(the "Approved Plans").

2. This Decision permits the construction, use and occupancy of twenty (20) housing units on the Property. No additional housing units may be added to the Property.

3. The unit models to be constructed within the Project are (1) "Calinda," (2) "Brandywine Classic," (3) "Brandywine Gold," and (4) "Goldenrod," all as designed by Art Form Architecture, and shown on the documents presented in Exhibit B. Only these particular housing units may be constructed within the Project, and these housing units shall be distributed as follows:

Calinda—Units 1, 3, 4, 5, 7, 9, 10, 13, 14, 15, 16
Brandywine Classic—Unit 8
Brandywine Gold—Units 11, 12, 17
Goldenrod—Units 2, 6, 18, 19

Unit 20 is the preexisting four-bedroom house that exists on the Property. Unit 20 shall remain in place in its existing form and shall become a part of the Project subject to all of the conditions of approval contained in this decision.

4. The twenty (20) units allowed at the Property shall contain a maximum of 58 bedrooms, distributed as follows:

Calinda—3 bedrooms per unit (x 11 units)
Brandywine Classic—3 bedrooms per unit (x 1 unit)
Brandywine Gold—2 bedrooms per unit (x 3 units)
Goldenrod—3 bedrooms (x 4 units)
Preexisting four-bedroom house (Unit 20)—4 bedrooms (x 1 unit)

No additional bedrooms are allowed within the Project. No space within any individual unit that is not shown as a bedroom on the plans attached as Exhibit B may be converted to a bedroom, or used as a sleeping area. No space within the preexisting four-bedroom house may be converted to provide an additional bedroom or sleeping area.

5. Units 1-19 shall be constructed within the footprints shown on the Approved Plans and Unit 20 shall be limited to its existing footprint. Units 1-20 shall be set back from (1) all other structures within the Project and (2) the Property's lot lines at least by those distances shown on the Approved Plans.

6. Units 1-20 may not be changed or revised, including dormers, so as to create additional interior space.

7. No additional accessory structures, sheds, outdoor enclosures, impervious surfaces or infrastructure not shown on the Approved Plans shall be allowed in connection with the use of any residential units.

2016 Bedroom Count

The Birches – Unit Style and Bedroom Counts

Unit Style	No. of Bedrooms	Unit Identification	Total Number of Unit Style
Existing Deck House	4	20	1
CALINDA	3	2,4,5,6,7,11,15,16,17	9
GOLDENROD	3	1,3,10,14,18,19	6
BRANDYWINE CLASSIC	3	13	1
BRANDYWINE GOLD	2	8,9,12	3
TOTAL			20

Loading Rates for Proposed Septic Disposal Areas

100 Long Ridge Road, Carlisle, MA

Sep-16

Septic Disposal Area	2-bedroom housing units	3-bedroom housing units	4-bedroom housing units	total number of bedrooms	Daily load @110 gpd/BR	Daily load @ 165 gpd/BR
1		#1 - 6		18	1980	2970
2	#9,12	#7,8,10,11,19		18	1980	2970
3	#13	#14-18		18	1980	2970
existing			#20	4	440	660
Total				**58**	**6380**	**9570**

Note: Housing units assigned to Septic Disposal Areas, as per Plan re Public Water Supply

C: NOTES ON HYDROGEOLOGY, GROUNDWATER FLOW AND MOUNDING ANALYSIS

Attachment C

Notes on Hydrogeology, Groundwater Flow, and Mounding Analysis

In Nobis' 2015 Phase 2 Report, Nobis plotted groundwater levels in overburden monitoring wells and two staff gauges in the brook measured by NGI on January 23, 2015 (NGI 2015 Report, Table 1). Nobis notes that where a pair of monitoring wells exists at the same location (MW-1-15 and MW-1A-15; MW-2-15 and MW-2A-15; and MW-3-15 and MW-3A-15), water elevations, referenced to a local benchmark, not sea level, calculated by NGI based on the water level measurements varied between 0.03 and 1.04 feet between members of the well pairs. Because the NGI report does not offer an explanation for the differences nor an opinion as to which water level in each pair is more accurate, Nobis averaged the water elevations to obtain a data point at each location. The significant discrepancy in water levels between MW-1-15 and MW-1A-15 lend uncertainty to the groundwater contours and gradients in the vicinity of proposed Septic Disposal Area 1. This in turn could affect the predicted depth to the top of the groundwater mound at this Area and could also affect the dispersion calculations by Nobis in the 2015 Phase 2 Report in this area.

In addition to the five monitoring well locations, water levels at staff gauges SG-1 and SG-2, located in the brook are assumed to represent the water table (potentiometric surface) at these locations. The NGI 2015 Report (Table 1) does not present a water elevation at wetland piezometer PZ-1, located in the wetland that is drained by the brook and that is north of the Site in the adjacent property (NGI 2015 Report, Figure 2). Therefore, seven data points are available for contouring the overburden groundwater potentiometric surface on January 23, 2015.

Nobis' interpreted overburden groundwater potentiometric surface contours, based on NGI's measurements, as described above, are shown in Figure 1. Between and beyond the seven locations with water elevation data, Nobis assumed that the potentiometric surface parallels topography; this is a standard assumption in unconfined conditions for a shallow water table in areas where there are no direct water level measurements. The contours are dashed where they are estimated in areas beyond data points.

In a porous medium such as the soil and sandy glacial till that underlies the Site, groundwater flows from areas with higher head to areas of lower head. Flow lines are perpendicular to potentiometric surface contours. In the vicinity of proposed Septic Disposal Area 1, groundwater flow can be expected in the easterly or southeasterly directions, based on the groundwater contours shown on Figure 1. However, based on topography, a component of groundwater flow may occur to the south and southwest as well. These flow arrows are shown with question marks on Figure 1. Installation of a new monitoring well or wells in this area would be needed in order to characterize shallow groundwater flow in these directions more accurately. In the vicinity of proposed Septic Disposal Area 3, the inferred groundwater flow direction is east-northeast or northeast. Because no water elevation data point (monitoring well) is located in this direction, this groundwater flow direction is somewhat uncertain, but is the most likely, based on the available measurements combined with topography. Installation of a new monitoring well or wells in this area would be needed in order to verify or discount shallow groundwater flow in these directions.

Nobis notes that proposed Septic Disposal Area 3 (with monitoring wells MW-2/2A and 3/3A) is located in an area that is currently used for horseback riding and has been leveled by excavation in the western portion (proposed Septic Disposal Area 3) and by emplacement of fill east of proposed Septic Disposal Area 3. It is unknown whether these alterations of the natural grade affect the groundwater potentiometric surface in this area, but it is possible that these changes may influence local groundwater flow and the potentiometric surface (including groundwater mounds after the septic system is in operation). During the April 3, 2015 field trip, Nobis noted a green plastic drain pipe discharging water from the base of the fill near the northeastern corner of the horseback riding area (near SS-2 on Figure 1 in the Phase 2 Report). If this drainage infrastructure remains in place, it may significantly influence the direction of transport of wastewater that may be discharged at the proposed Septic Disposal Areas.

The groundwater potentiometric surface, as interpreted by the contours and groundwater flow arrows in Figure 1, represents current conditions, as of January 2015. After construction and when the septic system is in operation, groundwater mounding is expected at the proposed septic disposal areas, locally changing the groundwater contours, groundwater flow gradient, and possibly local flow directions. Neither Figure 1 nor Figure 3 shows the effects that well pumping may have on the overburden potentiometric surface.

Hydraulic conductivity is a measure of the capacity of a soil or other geologic deposit to transmit water, although a hydraulic gradient (e.g. sloping water table, pumping stress, groundwater mound) must be present in order to drive flow. Hydraulic conductivity (or permeability) is expressed in units such as feet per day (ft/d) or centimeters per second (cm/sec), but is not the same as velocity. Several methods are used for estimating hydraulic conductivity, which is notoriously difficult to do with accuracy. In practice, agreement between various estimates is considered good if the estimates are within an order of magnitude of each other.

For the Site, hydraulic conductivity has been estimated by NGI (2015 Report) using slug tests on the monitoring wells. (A slug test is a short-term method by which the water level in a well is quickly raised or lowered on a one-time basis; the resulting drawdown or recovery of well water levels is measured for several minutes following this event. The water level data can then be analyzed by one of several methods to obtain an estimate of hydraulic conductivity. See the NGI 2015 Report text and Appendix B for more explanation of the methods and results.) In 2015, Nobis also collected soil samples for the purpose of obtaining additional estimates of hydraulic conductivity by a different method. As described in Section 2.1.2 of the Phase 2 Report, the results of the soil sample test are not suitable for estimating hydraulic conductivity because of the high proportion of fine-grained particles and also gravels in the samples. However, the high end of the hydraulic conductivity estimates obtained by this method is consistent with NGI's slug test results. For these reasons, Nobis used the hydraulic conductivity estimates obtained by NGI in our calculations.

For eight wells at five locations, the NGI slug test results suggest that hydraulic conductivity is between 2.08 ft/d and 23.75 ft/d, with a geometric mean of 9.0 ft/d. NGI also recommended additional testing for hydraulic conductivity, by means of pumping tests and/or hydraulic loading tests.