

BEALS · ASSOCIATES

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Barrington Planning Board
333 Calef Hwy
PO Box 660
Barrington, NH 03825

Feb. 1, 2018

Re: Commercial site plan on Route 125, Barrington NH

Dear Members of the Board:

This is written in supplement to the full drainage analysis provided with the application packet specific to the stratified drift aquifer at the referenced project. We have reviewed the ambient groundwater quality standards cited in the State Code and have determined the only contaminant that would apply to the proposed use is Nitrogen (See attached Table 600-1 from Env-Or 603). The standard cited is the primary drinking water maximum concentration of 10 mg/L or parts per million.

Stormwater is assumed to have nitrate concentration of 8.1 mg/L (highest concentration found in sampling from Rainwater Chemistry Across the United States by: Ellen Root, Whit Jones, Bessie Schwarz, Jack Gibbons, Bereket Haileab, November 22, 2004).

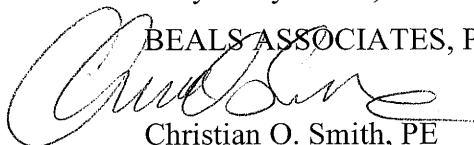
Background nitrate levels in groundwater are assumed to be 1 mg/L. As detailed in the full drainage analysis, based on UNH Storm Center testing results, the infiltration pond with sediment forebay will remove 54% of dissolved nitrogen in the Stormwater.

In summary based on this assessment groundwater nitrate-nitrogen levels at the downgradient parcel boundary are anticipated to be below the primary drinking water standard of 10 mg/L. No negative off-site impacts to groundwater quality are not expected from the proposed commercial development.

Thank you for your attention to this. We trust this information addresses your concerns regarding the stratified drift aquifer. Please feel free to contact our office if you have any additional question and/or comments.

Very Truly Yours,

BEALS ASSOCIATES, PLLC



Christian O. Smith, PE
Principal

NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES

PART Env-Or 603 GROUNDWATER QUALITY CRITERIA

Env-Or 603.01 Groundwater Quality Criteria. Unless exempt under Env-Or 603.02, the following criteria shall apply to all groundwaters of the state:

- (a) Groundwater shall be suitable for use as drinking water without treatment;
- (b) Groundwater shall not contain any regulated contaminant at a concentration greater than the ambient groundwater quality standards in Env-Or 603.03; and
- (c) Groundwater shall not contain any regulated contaminant at a concentration such that the natural discharge of that groundwater to surface water will cause a violation of a surface water quality standard established in Env-Wq 1700.

Source. (See Revision Note at p. iii) #8812, eff 2-1-07; ss by #10831, eff 6-1-15

Env-Or 603.02 Exemptions to Groundwater Quality Criteria. Groundwater quality shall be exempt from the groundwater quality criteria of Env-Or 603.01 if:

- (a) The groundwater is within a groundwater discharge zone permitted in accordance with Env-Wq 402;
- (b) The groundwater is within a groundwater management zone permitted in accordance with Env-Or 607;
- (c) The groundwater is contaminated solely with salt and other de-icing chemicals applied for winter road maintenance;
- (d) The groundwater contamination resulted from backwash from a public water treatment facility that is subject to Env-Wq 402; or
- (e) The groundwater contamination is not the result of human operations or activities.

Source. (See Revision Note at p. iii) #8812, eff 2-1-07; ss by #10831, eff 6-1-15

Env-Or 603.03 Ambient Groundwater Quality Standards (AGQS).

(a) Pursuant to RSA 485-C:6, ambient groundwater quality standards (AGQS) shall apply to all regulated contaminants that result from human operations or activities.

(b) The following shall apply to Table 600-1, below:

- (1) The standard for total trihalomethanes, namely bromoform, bromodichloromethane, dibromochloromethane and trichloromethane (chloroform), shall be 80 micrograms per liter ($\mu\text{g/L}$) if the groundwater is contaminated by chlorinated water supplies;
- (2) If perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are both present, the standard shall be a combined total of 0.07 $\mu\text{g/L}$;
- (3) Positives for total coliform shall be confirmed by the presence of other wastewater parameters, such as fecal coliform, Escherichia coli, fecal streptococcus, nitrates, and chlorides;
- (4) Unless otherwise noted, concentrations shall be measured in micrograms per liter ($\mu\text{g/L}$), which is equivalent to parts per billion (ppb); and
- (5) Gross alpha radionuclides, radium 226 and 228, strontium 90, and tritium shall be measured in picocuries per liter (pCi/L).

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(c) AGQS shall be as set forth in Table 600-1 below:

Table 600-1 AMBIENT GROUNDWATER QUALITY STANDARDS		
Chemical Name	CAS No.	AGQS µg/L (ppb)
Acenaphthene	83-32-9	420
Acenaphthylene	208-96-8	420
Acetone	67-64-1	6,000
Acrylonitrile	107-13-1	5
Alachor	15972-60-8	2
Aldicarb	116-06-3	7
Aldicarb sulfone	1646-88-4	7
Aldicarb sulfoxide	1646-87-3	7
Aldrin	309-00-2	0.1
Allyl chloride	107-05-1	7.4
Anthracene	120-12-7	2,100
Antimony	7440-36-0	6
Arsenic	7440-38-2	10
Atrazine	1912-24-9	3
Barium	7440-39-3	2,000
Benzene	71-43-2	5
Benzidine	92-87-5	0.8
Benzo(a)anthracene	56-55-3	0.1
Benzo(a)pyrene	50-32-8	0.2
Benzo(b)fluoranthene	205-99-2	0.1
Benzo(g,h,i)perylene	191-24-2	210
Benzoic Acid	65-85-0	28,000
Benzo(k)fluoranthene	207-08-9	0.5
Beryllium	7440-41-7	4
Biphenyl, 1,1-	92-52-4	350
bis-(2-chloroethyl)ether	111-44-4	10
bis-(2-chloroisopropyl)ether	39638-32-9	300
bis-(chloromethyl)ether	542-88-1	10
Bisphenol A	80-05-7	120
Bromobenzene	108-86-1	60
Boron	7440-42-8	620
Bromodichloromethane	75-27-4	0.6
Bromoform	75-25-2	4
Bromomethane	74-83-9	10
Butylbenzene, n-	104-51-8	260
Butylbenzene, sec-	135-98-8	260
Butylbenzene, tert	98-06-6	260
Cadmium	7440-43-9	5
Camphor	76-22-2	50
Carbofuran	1563-66-2	40
Carbon disulfide	75-15-0	70
Carbon tetrachloride	56-23-5	5
Chlordane	57-74-9	2
Chloroaniline, p-	106-47-8	28

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Table 600-1 AMBIENT GROUNDWATER QUALITY STANDARDS		
Chemical Name	CAS No.	AGQS µg/L (ppb)
Chloromethane	74-87-3	30
Chlorophenol, 2-	95-57-8	35
Chlorotoluene	95-49-8	100
Chlorotrifluoroethylene (CFC 1113)	79-38-9	5
Chromium (Total)	7440-47-3	100
Chrysene	218-01-9	5
Clopyralid (Stinger 3SC)	1702-17-6	3500
Copper	7440-50-8	1300
Cyanide	57-12-5	200
Cyanazine(Bladex 4L/90DF)	21725-46-2	1
2,4-D (Dichlorophenoxy acetic acid, 2,4-)	94-75-7	70
Dalapon	75-99-0	200
DDD (Dichlorodiphenyl dichloroethane, p,p')	72-54-8	0.1
DDE (Dichlorodiphenyl dichloroethylene, p,p')	72-55-9	0.1
DDT (Dichlorodiphenyl trichloroethane, p,p')	50-29-3	0.1
Dibenzo(a,h)anthracene	53-70-3	0.1
Dibromochloromethane	124-48-1	60
Dibromochloropropane	96-12-8	0.2
Dibutylphthalate	84-74-2	800
Dichlorobenzene, 1,2- (o-DCB)	95-50-1	600
Dichlorobenzene, 1,3- (m-DCB)	541-73-1	600
Dichlorobenzene, 1,4- (p-DCB)	106-46-7	75
Dichlorobenzidine, 3,3'-	91-94-1	1.3
Dichlorodifluoromethane	75-71-8	1,000
Dichloroethane, 1,1-	75-34-3	81
Dichloroethane, 1,2-	107-06-2	5
Dichloroethylene, 1,1-	75-35-4	7
Dichloroethylene, cis-1,2-	156-59-2	70
Dichloroethylene, trans-1,2-	156-60-5	100
Dichloromethane (Methylene chloride)	75-09-2	5
Dichlorophenol, 2,4-	120-83-2	21
Dichloropropane, 1,2-	78-87-5	5
Dichloropropene, 1,3-	542-75-6	0.5
Dieldrin	60-57-1	0.1
Diethyl ether	60-29-7	1,400
Di(ethylhexyl)adipate	103-23-1	400
Di(2-ethylhexyl)phthalate (DEHP)	117-81-7	6
Diisopropyl ether (DIPE)	108-20-3	120
Dimethyl phthalate	131-11-3	50,000
Dimethylphenol, 2,4-	105-67-9	140
Dinitrophenol, 2,4-	51-28-5	14
Dinitrotoluene, 2,4-	121-14-2	10
Dinoseb	88-85-7	7
Dioxane, 1,4-	123-91-1	3
Diphenylhydrazine, 1,2-	122-66-7	10

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Table 600-1 AMBIENT GROUNDWATER QUALITY STANDARDS		
Chemical Name	CAS No.	AGQS µg/L (ppb)
Diquat	85-00-7	20
Endosulfan	115-29-7	42
Endothall	145-73-3	100
Endrin	72-20-8	2
Ethylbenzene	100-41-4	700
Ethylene dibromide	106-93-4	0.05
Ethylene glycol	107-21-1	7,000
Ethyl tertiary-butyl ether (ETBE)	637-92-3	40
Fluoranthene	206-44-0	280
Fluorene	86-73-7	280
Fluoride	16984-48-8	4,000
Formaldehyde	50-00-0	100
Glyphosate	1071-83-6	700
Gross alpha radionuclides		15 pCi/L
Heptachlor	76-44-8	0.4
Heptachlor epoxide	1024-57-3	0.2
Hexachlorobenzene	118-74-1	1
Hexachlorobutadiene	87-68-3	0.5
Hexachlorocyclohexane, alpha	319-84-6	0.03
Hexachlorocyclohexane, beta	319-85-7	0.1
Hexachlorocyclohexane, gamma (Lindane)	58-89-9	0.2
Hexachlorocyclopentadiene	77-47-4	50
Hexachlorodibenzodioxin, 2,3,7,8	34465-46-8	0.0221
Hexachloroethane	67-72-1	1
Indeno(1,2,3-cd)pyrene	193-39-5	0.1
Isophorone	78-59-1	100
Isopropyl benzene	98-82-8	800
Isopropyltoluene, p-	99-87-6	260
Lead	7439-92-1	15
Manganese	7439-96-5	840
Mercury	7439-97-6	2
Methanol	67-56-1	4,000
Methoxychlor	72-43-5	40
Methyl ethyl ketone (MEK)	78-93-3	4,000
Methyl isobutyl ketone (MIBK)	108-10-1	2,000
Methylnaphthalene, 1-	90-12-0	160
Methylnaphthalene, 2-	91-57-6	280
Methyl phenol, 2- (o-cresol)	95-48-7	40
Methyl phenol, 4- (p-cresol)	106-44-5	40
Methyl tertiary-butyl ether (MtBE)	1634-04-4	13
Metolachlor (Dual 8E/25G)	51218-45-2	70
Metribuzin (Sencor 75DF)	21087-64-9	100
Monochlorobenzene (Chlorobenzene)	108-90-7	100
Naphthalene	91-20-3	20
Nickel	7440-02-0	100
Nitrate	14797-55-8	10,000

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Table 600-1		
AMBIENT GROUNDWATER QUALITY STANDARDS		
Chemical Name	CAS No.	AGQS µg/L (ppb)
Nitrite	14797-65-0	1,000
Oxamyl	23135-22-0	200
Pentachlorophenol	87-86-5	1
Perfluorooctanoic Acid (PFOA), total of all isomers	335-67-1	0.07
Perfluorooctane Sulfonate (PFOS), total of all isomers	1763-23-1	0.07
Phenanthrene	85-01-8	210
Phenol	108-95-2	4,000
Picloram	1918-02-1	500
Polychlorinated biphenyls (PCBs)	1336-36-3	0.5
Potassium	7440-09-7	160,000
n-Propylbenzene	103-65-1	260
Pyrene	129-00-0	210
Radium 226 and 228	7740-14-4	5 pCi/L
Selenium	7782-49-2	50
Silver	7440-22-4	100
Simazine	122-34-9	4
Strontium 90	10098-97-2	8 pCi/L
Styrene	100-42-5	100
Sulfate	14808-79-8	500,000
TCDD, 2,3,7,8- (Dioxin)	1746-01-6	0.00003
Tertiary amyl methyl ether (TAME)	994-05-8	140
Tertiary butyl alcohol (TBA)	75-65-0	40
Tetrachloroethane, 1,1,1,2-	630-20-6	70
Tetrachloroethane, 1,1,2,2-	79-34-5	2
Tetrachloroethylene (PCE)	127-18-4	5
Tetrachlorophenol, 2,3,4,6	58-90-2	200
Tetrahydrofuran	109-99-9	600
Thallium	7440-28-0	2
Toluene	108-88-3	1,000
Total Coliform	-	CTS/100ml
Toxaphene	8001-35-2	3
2,4,5-TP (Silvex)	93-72-1	50
Trichlorobenzene, 1,2,4-	120-82-1	70
Trichlorobenzene, 1,3,5-	108-70-3	40
Trichloroethane, 1,1,1-	71-55-6	200
Trichloroethane, 1,1,2-	79-00-5	5
Trichloroethylene (TCE)	79-01-6	5
Trichlorofluoromethane	75-69-4	2,000
Trichloromethane (Chloroform)	67-66-3	70
Trichlorophenol, 2,4,5-	95-95-4	700
Trichlorophenol, 2,4,6-	88-06-2	5
Trichloropropane, 1,2,3-	96-18-4	0.5
Trimethylbenzene, 1,2,4-	95-63-6	330
Trimethylbenzene, 1,3,5-	108-67-8	330