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Susie Francis
suzy@mcn.org

Date: July 1st, 2022

Re: 44821 Baywood Drive
Preliminary soils evaluation to determine on-site sewage disposal system feasibility

Susie,

As was requested, personnel from our office were at the above referenced parcel on June 28th, 2022 in order to conduct a soils evaluation, in order to determine the feasibility of designing an on-site sewage disposal system for the parcel.

Disposal systems must adhere to numerous State and County Division of Environmental Health (DEH) code requirements. One distinct code that often limits potential leachfield areas is the maximum allowable slope in a leachfield area. Standard trench systems (in deep, well drained soils) are limited to 30% maximum slopes. Shallow trench or above ground systems (in shallow soil conditions) are limited to 20-25% maximum slopes. If these slopes are exceeded, then a request to allow this code requirement to be waived must be prepared and submitted to the County DEH for their acceptance. Even with an acceptable waiver, additional calculations regarding slope stability and linear loading rate capacities must be made. Portion of this parcel contain slopes greater than 30%; these areas were not investigated.

Two main soil factors, investigated during a site evaluation, determine what type of permissible system design (if any) can be proposed. These factors are:

1. The presence of and depth of a seasonal or perched groundwater condition.
2. The permeability and depth of the soil.

The depth of a seasonal groundwater condition is critical to any on-site sewage disposal system proposal because there is a required separation distance between the bottom of the leaching system and any seasonal watertable. The State code requires a five-foot separation distance but this may be reduced to no less than two feet if a case can be made to justify the reduced separation distance. The type of disposal system; deep trench, shallow trench, above ground system or above ground system with sewage treatment directly responds to this depth of seasonal groundwater and the required separation distance.

If groundwater is present at any time above 2 feet, no type of on-site sewage disposal system will be allowed because the required separation distance could not be met, hence the parcel would not be allowed to be developed. *It is specifically prohibited to fill a site with imported soil material in order to increase the separation distance.*

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The depth to a seasonal watertable is determined in two ways. In the dry season, this is done by using soil color. A specific soil color pattern, known as soil mottling, occurs when soils have been saturated with water for prolonged periods. The depth to this soil color pattern may be used to indicate the *assumed* depth to a seasonal watertable. The second method to determine a seasonal watertable is by direct observation during the winter months. Monitoring wells are installed (using hand augers) in the potential leachfield areas. **The depth to groundwater is measured weekly through the required wet weather testing period. The monitoring period opens after 20 inches of rain has fallen and continues until April 15th. The wet weather season must contain two storm events of 1 inch or more of rain.** It is possible that some winters do not meet the minimum rainfall requirements and the groundwater monitoring results may not be acceptable.

We use the direct observation of seasonal watertable on sites where soil mottling shows the site to be unacceptable (soil mottles above 2 feet) or where we feel that the soil mottles may not reflect the modern day groundwater conditions.

In general terms, the higher in the soil the watertable rises the more elaborate and therefore potentially more expensive the disposal system becomes.

The second main soil finding that must be made is that of soil depth and permeability. In this County two methods are used to determine that a soil has acceptable permeability rates for an on-site disposal system. The first method is a laboratory analysis of the soil. This method is acceptable for soils with up to about 35 percent clay. The laboratory results obtained are converted to an allowable sewage effluent application rate and the disposal system is sized based on these values. **If the results of the laboratory analysis shows that the soil horizon tested contains greater than 35 percent clay, then an in-field percolation test, conducted during the winter's wet season, is required**. The test consists of augering 6-inch diameter holes into the subject soil horizons and pouring water into them on a timed base. The rate at which the water level drops is then used to size the leachfield. This test can be conducted after 20 inches of rain is reached and shall be completed prior to April 15th. The percolation rate measured in this test is used to size the leaching system.

On the opposite end of things, the soil cannot be too coarse. If the total combined amount of silt and clay is less than 15%, then these soils are not considered to have a sufficient amount of filtrative capacity and are not factored into the useable soil depth. **Weathering rock is also not considered useable soil, and as such is effectively the end of useable soil depth.** A minimum of 2 feet of permeable (and useable) soil must be demonstrated beneath the bottom of a disposal system. The depth of useable soil relates directly to the type of system that can be permitted in addition to its size.

It also must be noted that two leachfield areas must be identified and designed, one field to be built at this time and the second area to be held in reserve for a future replacement leachfield. The leachfield areas must each be sized to accommodate the wastewater flow generated from the proposed development. Residential leachfields are sized based on the total number of bedrooms proposed. A flow of 150 gallons of wastewater per day is assigned to each bedroom.

Profile P3

0-14" Dark yellowish brown (10YR3/4) loam, strong subangular blocky structure, firm, very many very fine roots, common fine roots

14-29" Dark yellowish brown (10YR4/6) sandy clay loam, strong subangular blocky structure, firm to hard, few fine and medium roots

29-60" Mixed dark yellowish brown (10YR4/6), strong brown (7.5YR5/6) and light gray (10YR7/2) sandy clay loam, strong to moderate subangular blocky structure, firm to friable, few fine roots, 15-25% soft through hard weathering rock fragments

60" End of observation

- Permeability appears acceptable throughout.
- The gray colors at 29 inches will be used to represent the winter watertable
- Site could likely support a pressurized At-Grade leachfield incorporating Aerobic secondary effluent treatment.

Profile P4

0-18" Dark yellowish brown (10YR3/4) loam, strong subangular blocky structure, firm, very many very fine roots, common fine roots

18-36" Dark yellowish brown (10YR4/6) sandy clay loam, strong subangular blocky structure, firm to hard, few fine and medium roots

36-60" Mixed dark yellowish brown (10YR4/6), strong brown (7.5YR5/6) and light gray (10YR7/2) sandy clay loam, strong to moderate subangular blocky structure, firm to friable, few fine roots, 25-40% soft through hard weathering rock fragments

60" End of observation

- Permeability appears acceptable throughout.
- The gray colors at 36 inches will be used to represent the winter watertable.
- Site could likely support a pressurized At-Grade leachfield.

The preliminary results from our initial site evaluations are as follows:
(refer to the attached general site map for the locations of profile observations.)

Profile P1

0-15" Dark yellowish brown (10YR3/4) loam, strong subangular blocky structure, firm, very many very fine roots, common fine roots

15-24" Dark yellowish brown (10YR4/6) sandy clay loam, strong subangular blocky structure, firm to hard, few fine and medium roots

24-54" Yellowish brown (10YR5/6) sandy clay loam, strong subangular and angular blocky structure, friable to firm, few fine, medium and coarse roots, common areas of strong brown (7.5YR4/6) soft weathering rock fragments

54-72" Mixed dark yellowish brown (10YR4/6), strong brown (7.5YR5/6) and light gray (10YR7/2) sandy clay loam, strong to moderate subangular blocky structure, firm to friable, few fine roots, 15-25% soft through hard weathering rock fragments

72" End of observation

- Permeability appears acceptable throughout.
- The gray colors at 54 inches will be used to represent the winter watertable
- Site could likely support a pressurized At-Grade leachfield

Profile P2

0-8" Dark yellowish brown (10YR3/4) loam, strong subangular blocky structure, firm, very many very fine roots, common fine roots

8-32" Very dark brown (10YR2/2) sandy clay loam, strong subangular blocky structure, friable to firm, common very fine roots, few fine and medium roots, few areas of hard weathering rock

32-60" Mixed strong brown (7.5YR5/8) and yellowish brown (10YR 5/6) clay loam with many gray (7.5YR6/1) mottles, moderate to weak subangular blocky structure, hard, few fine roots

60" End of observation

- Permeability questionable below 32 inches.
- Soil mottling noted at 32 inches and will be used to represent the winter watertable.
- Site could likely support a pressurized leachfield incorporating Aerobic secondary effluent treatment.

The results of our soil observations indicate that this site has a potentially high winter watertable, which is one of the limiting factors relating to leachfield development. Soil Profiles P1, P3 and P4 have gray colors which may be the result of weathering rock, but in the absence of direct observation during the winter, these colors will need to be used to represent the height of the winter watertable. Soil mottling was noted in Profile P2 at a depth of 32 inches which will represent the height of the winter watertable. If direct observation of the winter watertable, during an acceptably wet winter, shows the groundwater to be lower than the soil colors indicate, then an in-ground leachfield area could potentially be designed. The type of leachfield which could be proposed on these slopes of 25%, with the noted soil conditions (and the assumed watertable levels) will be an At-Grade leachfield. This is a gravel bed which is constructed on the soil surface then is covered with topsoil, resulting in a 2 foot high mounded area. Based on the ground contours and the variability of the soil in the four profiles, it is likely that aerobic secondary effluent treatment would need to be incorporated into the design. As such, the system would likely consist of; a septic tank (primary treatment), an aerobic treatment tank (secondary effluent treatment), a pump chamber and 2 pressurized At-Grade leachfields. The potential leachfield configurations are noted on the attached site map. The ground contours on-site do not allow us to design one long At-Grade as the primary or replacement leachfield. As such, there will be two At-Grades each, for both the primary and replacement leachfield areas. The configuration depicted on the map is large enough to support a two bedroom home (up to 2,100 square feet) and it may be potentially large enough to support a three bedroom home. There are distinct spatial limitation on this site relating to the slopes and setback to the wetland. In order to accurately determine whether a three bedroom leachfield could be supported, the wetland buffer would need to be accurately marked on-site and then the leachfield areas would need to be staked out on-site to determine the actual on-site lengths and widths of each bed.

It is also important to note that based on the leachfield configuration, it is likely that both the primary and replacement leachfield areas will need to be constructed at the same time. In order to fit the most possible leachfield area into the limited space, we are not honoring the required separation distances between the At-Grade beds. The justification for this concept is to build all of the leachfields at the same time.

In addition, we are proposing to place the topsoil cover portion of the leachfield up to the property lines. If there is a Surfwood development code which prohibits this, then the available leachfield area would be considerably diminished.

It must be kept in mind that numerous other considerations and codes may affect the actual leachfield configurations, placement and ability to be permitted. The preparation of the house and site development plans must be conducted in such a way as to not impact the leachfield areas. Several codes to keep in mind while preparing development plans are as follow:

- Any structure must be a minimum of 8 feet from the edge of the leachfield.
- No soil cuts (downslope) can take place within 50 feet of all leachfield areas.
- No driving shall take place over the leachfield area.

These referenced setbacks are only *some* of the potential issues relating to development of the parcel that may affect the leachfields. It is strongly recommended that all development plans be discussed with the Consultant to ensure that the development of the leachfield area is not adversely affected.

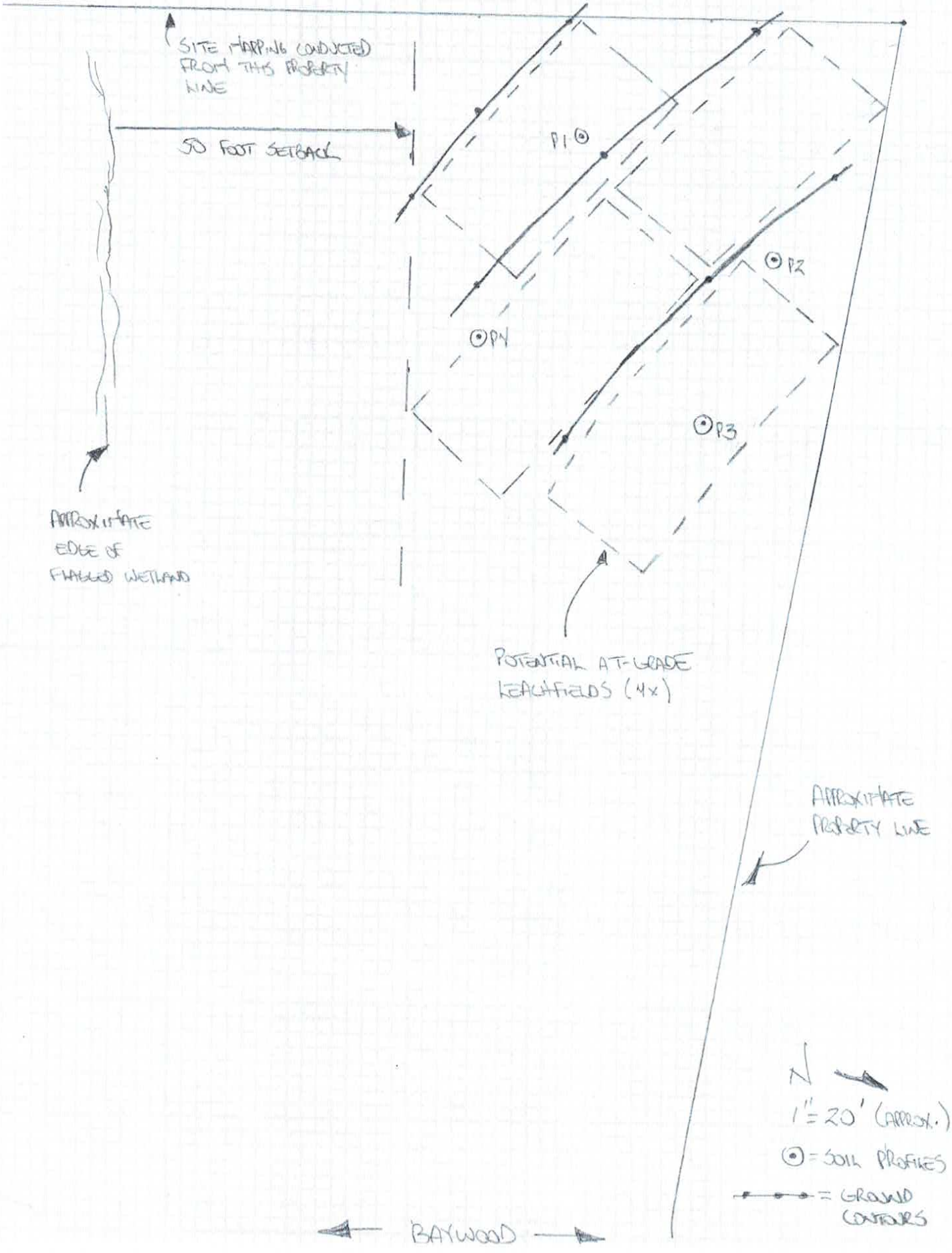
Keep in mind that this preliminary evaluation *does not* guarantee that a permitted disposal system design could be prepared for this parcel. This evaluation serves to provide a discussion of the sites feasibility to support an on-site sewage disposal system. The preparation of a complete Site Evaluation Report, its submittal to the County DEH and its subsequent approval by the County DEH and the Planning Department *is* the guarantee of the sites potential to support a disposal system.

When it is necessary for a complete disposal system design and Site Evaluation Report to be prepared, contact our office and a proposal to conduct the work can be provided. We would revisit the site to stake out the potential leachfield areas and prepare a map. Laboratory analyses would be completed on the soil samples from each soil profile and then the design document would be prepared. The complete Site Evaluation Report would then be submitted to the County DEH for their review and subsequent issuance of a permit to construct the system.

If after reviewing this report, questions arise regarding the work conducted or the work necessary to prepare a complete design, please feel free to contact our office. Thank you.

Sincerely,

Andrew Kawczak
Associate


SITE MAPPING CONDUCTED FROM THIS PROPERTY LINE
50 FOOT SETBACK
P1
P2
P3
P4
APPROXIMATE EDGE OF FLAGGED WETLAND
POTENTIAL AT-GRADE LEACHFIELDS (4x)
APPROXIMATE PROPERTY LINE
N
1" = 20' (APPROX.)
= SOIL PROFILES
= GROUND CONTOURS
BAYWOOD