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2608	7-22-95	DIN 14505

SUBJECT: Proposal to Conduct Geologic and Hydrogeologic Study as part of the Site Application for a proposed Demolition Landfill at Ft. Bragg, NC.

Dear Pat:

Thank you for inviting me to propose on Geologic and Hydrogeologic Study as part of the Site Application for a proposed Demolition Landfill at Ft. Bragg, NC.

The purpose of this study is twofold. First, the study will characterize the site's geology and hydrogeology so that DEHNR may evaluate the suitability of this site for development as a demolition landfill. Emphasis is placed on evaluation of properties which contribute to or inhibit the migration of leachate to groundwater (i.e.; ability to accurately predict the direction and rate of leachate migration and reliably detect this migration; permeability of cover soils, aquifers, and aquicludes; etc.). Second, the study will locate the groundwater surface and the direction of groundwater flow. If the site is found suitable, groundwater location will establish the limit of excavation to insure 4' separation of waste from seasonal high groundwater and direction of groundwater flow will be used to site groundwater monitor wells for detection of leachate migration.

On 30 August I talked to Jim Bateson, Hydrogeologist, Solid Waste Section, NC DEHNR, who will be reviewing the Geologic and Hydrogeologic Study for this Demolition Landfill site permit application. We discussed his requirements and his observations during a recent visit to the site. We agreed that groundwater hydrology in resolution adequate for his purposes might be determined with 10 borings with piezometers installed in these borings, provided that the location of these piezometers is based upon current topographic map in a scale not smaller than 1 inch = 100 feet. More piezometers would be required if current topo in the desired scale is not available. On 5 September I talked to Bobby Lutfy, Hydrogeologist, Solid Waste Section, NC DEHNR (Jim Bateson's boss). Bobby clarified that the requirements for the Geologic and Hydrogeologic Study were defined under 15A NCAC 13B .0504 (1) (c). Considering the geology as described by Jim Bateson from his site visit Bobby feels that 2 undisturbed samples from each geologic unit (2 geologic units observed by Jim) and one or 2 remolded samples from whatever DPWE intends to use for cover soils.

The general method will be to conduct 10 borings with 2.25 inch hollow stem augers and install piezometers in these borings (average depth of these borings is 30'). One additional 2.25 inch auger boring will be to a depth of at least 50' and will not have a piezometer installed. These borings will be logged for field USCS classification of soils and tested for standard penetration (SPT) every 5'. Based on identification of location (depth) of the 2 expected geologic units during logging of the 2.25 inch auger borings, 2 each borings will be conducted with 4.25 inch hollow stem augers for the purpose of obtaining 4 undisturbed samples with Shelby Tube (Shelby Tube is too large to fit inside 2.25 inch auger). Piezometers will not be installed in 4.25 inch auger borings.

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SCOPE OF WORK

✓ JIM BARBER

1. Walk site with DPWE and RS&H personnel to define limits of fill, buffer from existing C&D Landfill and proposed transfer station (minimum 200' buffer requested by Bobby Lutfy). Cost: \$580
MAP PIT WALL 1-2 EXIST. DAMS.
2. Locate proposed soil borings and piezometers on topo map (to be furnished by RS&H) with registered geologist and negotiate with Jim Bateson for approval of soil boring and piezometer locations and depths as per .0504 (c) (i). Cost: \$790

3. Conduct 11 soil borings by 2.25 inch hollow stem auger and perform associated tests as follows:

Standard Penetration Tests and field USCS classification of split spoon samples will be conducted every 5' per .0504 (c) (i) (A and C). These results will be recorded on boring logs per .0504 (c) (i) (I). Provide stratigraphic data from boring logs per .0504 (c) (i) (G) to RS&H for drafting stratigraphic cross sections.

Excavation
Perform 2 each laboratory analyses (one for each of the expected geologic units) for particle size distribution and USCS classification per .0504 (c) (i) (B and C). Soil will be taken from undisturbed samples gathered in Task 4, below.

Install 10 piezometers in borings. Determine and tabulate water table elevations in piezometers 24 hours and 7 days after installation per .0504 (c) (i) (H). Provide data to RS&H for RS&H drafting of potentiometric map of surficial aquifer based on 7 day readings from piezometers per .0504 (c) (iii).

Abandon all borings and piezometers.

Cost: \$14,595

4. Conduct 2 each borings by 4.25 inch hollow stem auger and gather 4 each undisturbed samples by Shelby Tube (2 samples from each of the 2 expected geologic units) as per .0504 (c) (i) (E). Test undisturbed samples as per .0504 (c) (i) (E) (I, II, and III) for saturated hydraulic conductivity, volume percent water, and porosity. Abandon borings. Cost: \$1,760
5. Gather 2 surface samples from intended source of cover soils, remold the samples as per Proctor, and test as per .0504 (c) (i) (F) (I, II, and III) for saturated hydraulic conductivity, total porosity, and atterberg limits. Cost: \$680
6. Evaluate geologic considerations as per .0504 (c) (i) (D) and write a report with registered geologist summarizing the geologic and hydrogeologic considerations relevant to landfill siting, operation, maintenance, and closure per .0504 (c) (iv). This will include analysis of seasonal fluctuation of water table (primarily based on USGS proximate recording well data) to establish limits of excavation during landfill construction/ operations. Cost: \$6,680

Geologist of record will be Mr. Ray Daniels, NC PG Registration No. 949. Boring, sampling, piezometer installation, and abandonment will be conducted by Special Inc., Garner, NC. Laboratory testing will be performed by Special Testing Inc., Garner, NC. Both companies meet small business criteria.

In support of this study RS&H is to provide current topo of the site and for a distance of 500' away from the proposed permitted boundaries of the site in a scale not smaller than 1 inch = 100 feet.

RS&H is to stake boring locations approved by NC DEHNR for drilling. RS&H to bring horizontal and vertical survey control (tied to permanent on-site bench mark) to boring locations and top of piezometer casings (with caps removed). RS&H is to produce stratigraphic cross-sections per .0504 (c) (i) (G), potentiometric map of surficial aquifer based on 7 day readings from piezometers, and a boundary plat showing boring locations per .0504 (c) (ii and iii). The potentiometric map will show current topography (screened), site boundaries, groundwater contours as interpolated from 7 day readings and further modified by Rust/ Daniels to mirror topography, and locations of piezometers and borings. Additionally, the 7 day groundwater elevations will typed beside each piezometer location.

I will need the topo map before starting work. Schedule will depend on state approval of boring locations. 15 days notice is normal to schedule drilling and the duration of the boring/ piezometer installation would be 6 days. Laboratory testing can be completed within 2 weeks of receiving samples. The report will take 2.5 weeks to research and write. I will not be able to start work on this project prior to 1 October. I am a sole proprietor meeting small business criteria.

Please call me if you have questions.

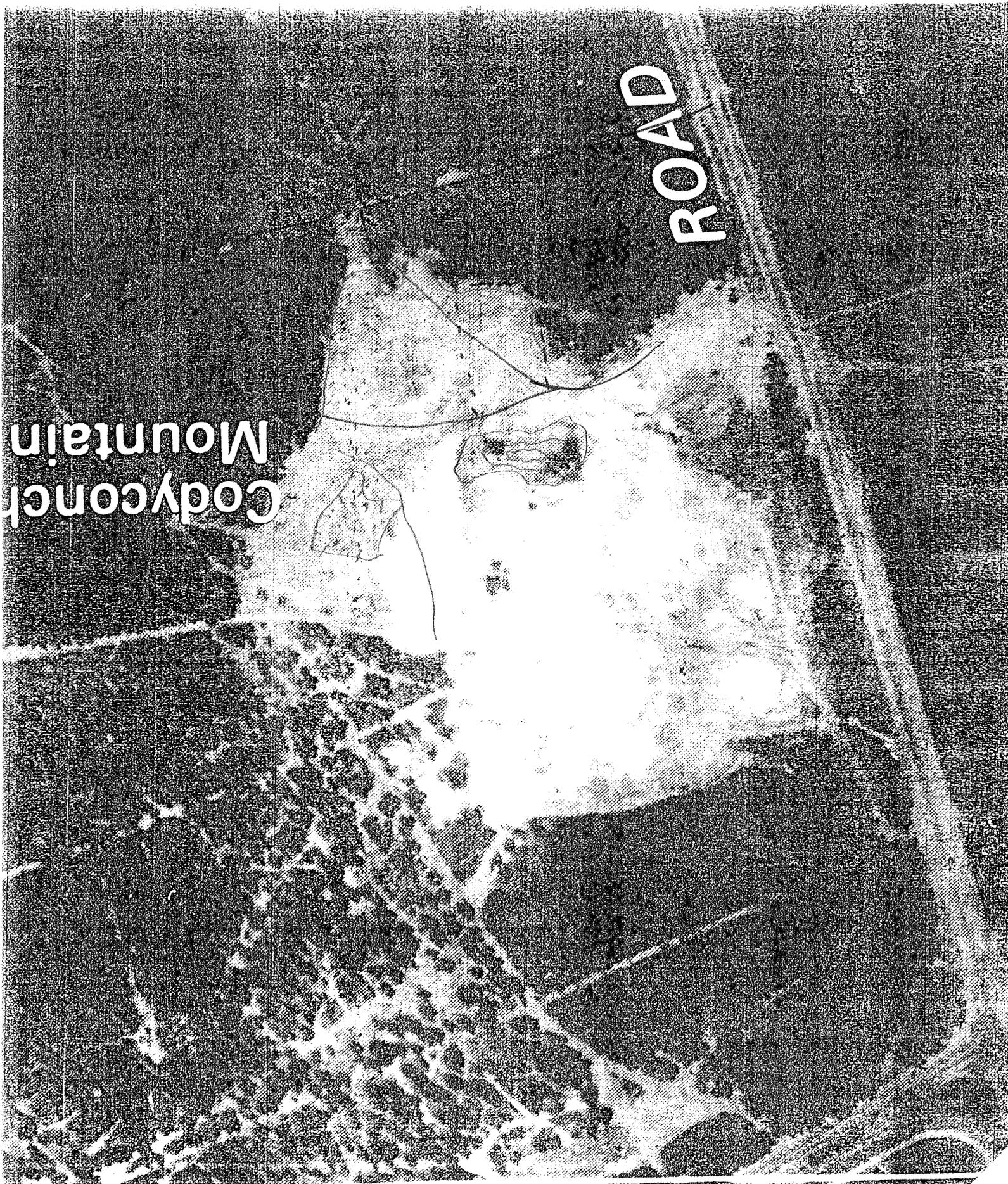
Sincerely,

Richard R. Rust, PE, PhD

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ROAD



McKELLAR ROAD

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Permitted LC+D Landfill Boundary

Borrow Area

New Demolitions
Landfill

Approximate area
of transfer station

CONYONG MOUNTAIN

