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SITE VISIT – REDINGTON WIND FARM PROJECT

Date of Visit: November 12, 2003

Attendees:

Bill Conners, Endless Energy (bill@endlessenergy.com)
John Nelepovitz, Senior Forester for International Paper (john.nelepovitz@ipaper.com)
Al Frick, Albert Frick Soil Scientist (albertfrick@worldnet.att.net)
David Rocque, State Soil Scientist (David.Rocque@state.me.us)
Dwight Anderson, DeLuca-Hoffman Associates, Inc. (danderson@delucahoffman.com)

We met at the International Paper's Straton office off Route 27 at 8:00 A.M.

The following items were reviewed while visiting International Paper (IP) roads in Chain of Ponds Township northeast of Route 27 at Long Pond (Map 38 of the DeLorme atlas), and in Seven Ponds Township off Kennebago River Road (Map 28 of the DeLorme atlas).

1. During our review of IP roads the condition of lower elevation existing roads at the Redington site was discussed. It was noted that existing roads may not have been constructed with as frequent culverting, or as much of a gravel base, as they would have if built today; however, these roads should not be excavated and reconstructed with additional culverting unless specific problem areas are observed.

2. The special treatment details that will be developed for the roadway sections will only be needed in select areas, specifically on the steepest cross-slope sections leading up to the mountaintops and on portions of both Redington and Black Nubble mountaintops. Standard cross sections will be able to be used along the majority of the mountaintops where drainage concerns are reduced, and along lower access roads where less cross slope will be encountered.

3. We discussed the existing subterranean surface water and groundwater flowing down off the mountainside. Dave is concerned that these flows should be maintained in these areas to keep the flow laminar through existing drainageways. We discussed two provisions to maintain this laminar flow. One would be additional cross-culverts at locations observed to be discharging subterranean surface flow; these culverts would be in addition to the number of culverts required for stormwater runoff. The other option would be a stone drainage layer to allow water to pass under the entire roadway section. The drainage layer detail will need to be reviewed with S. W. Cole to make sure that it will provide adequate capacity to serve these areas, likely in conjunction with added culverting and plunge pools.

When we reviewed the idea of attempting to maintain subterranean surface flows in their current locations by providing culverts (likely 12-inch culverts), Dave wasn't concerned about the steep culvert slopes, but stated that riprap plunge pools should be installed to dissipate water energy and redistribute base flows.

4. Numerous large boulders were observed during the site visit and it was mentioned that these are also abundant in the area of Redington and Black Nubble and that these would likely need to be used as material for armament of slopes, both on the uphill and downhill sides, and possibly mechanical means to break up the boulders into smaller, angular pieces would benefit their placement and stability of the slopes.

5. We observed examples of similar soil profiles expected to be encountered at the project site. The top 2 to 3 feet of these soils was a composite of small and medium-size boulders and rocks mixed with organic soils with glacial till below. Hand augering in these soils would be very difficult and excavator equipment access to proposed roadway areas for deep test pits does not currently exist. Inaccessibility and expected finetuning of the profile and the alignment are reasons hand equipment would not be able to provide reflective information of the actual soil conditions to be encountered.

6. We reviewed ditches seeded with conservation seed mix near elevation 2,700 in late August where a substantial catch of grass had taken and discussed this area with regard to water seeping above the overburden layer. We also discussed slope treatment measures for these wet areas, as well as how to handle areas that do not take, coming back at a later date – spring possibly – to correct areas where a more conservative level of slope stabilization treatment is required. Riprap or erosion control mesh would be required in areas that did not adequately take due to excessive water flow. It was also noted that riprap would be placed at the time of construction in areas where a substantial amount of groundwater seepage is observed.

7. From our observations during the site visit, it appeared that standard mountain access roads could be used above elevation 2,700 feet, as long as existing cross-slopes were not too steep, likely 3H:1V or less. We reviewed this in a number of areas where we stopped and the existing grades were approximately 3H:1V to 5H:1V. We traveled up to approximately elevation 2,700 during our site visit.

8. We reviewed the details that were presented in September regarding the toolbox approach to standard details and sections that would be used for the roadway. The toolbox approach has a matrix set up with different scenarios given – bedrock conditions, groundwater levels, and cut-and-fill slopes and heights – and the different slope treatment measures that would be used. Slope treatment measures noted include seed and mulch, hydroseeding, a bark mulch conservation mix (which was also observed during our site visit as having recently been installed along Route 27), and riprap installation, as well as stapled fabrics, all of which Dave agreed were appropriate if used in the right situations. Obviously, any place where concentrated water was observed at a steep slope, riprap would be required to protect

underlying soils. Measures used in other areas would be dependent upon slopes and would need to be reviewed with the geotechnical engineer as well.

As a follow-up to the site visit, Bill Conners, Steve Cole, Bill Hoffman and Dwight Anderson participated in a teleconference meeting and discussed more extensive structural measures to be included as slope treatment options including soil nail walls and gabions which could be used in very steep areas with or without water problems. We also discussed the need for an uphill ditch drain and underdrain and/or a crushed rock drainage layer under the roadway in select areas where high groundwater or surface drainage is observed to be a problem.

9. During the site visit, we also reviewed that the time at which construction may actually occur will affect treatment measure selection. Hydroseeding and mulch with seed will only be effective to a certain date; therefore, after this time other measures such as fabric, riprap or bark mulch will be required.

10. We discussed thixotropic soils that can occur in higher elevations, that have 'smeary' soil consistency or gel-like conditions in higher organic and sesquioxide horizons. These soils would be best placed at the toe of the downhill slope rather than under the roadways as they are gel-like soils that have a tendency to break down over time, resulting in roadway movement.

11. We did review deep cuts and fills in high elevations, approximately elevation 2,700 feet, and observed that it is practical and reasonable to have deep cuts and fills in these areas. We reviewed roadway areas with approximately 12 feet of cut to the bottom of the ditch and 12 feet on the fill slope side from the edge of the road to the toe of the slope. The soils were holding up well at nearly a 1:1 slope on the cut side without any stabilization measures. However, these soils had not gone through a freeze-thaw cycle. A variety of soil conditions were discussed at length, and how we would address them is noted above in this memo.

12. Steep slope areas where cross culverting had been installed were reviewed. Dave noted that plunge pools should be provided in areas such as this to help protect lower areas from erosion. We reviewed a section of roadway that had nearly the maximum project grade (14%), and ahead of that a grade between 20 and 25%. The roadway in this area had stable ditches and no base gravel had been placed on the existing soils used to build the roadway. However, even though it has been fairly wet recently, the roadway held up for us to travel to the end of the road, approximately a mile, up to elevation 2,700.

13. Stream crossing alternatives were reviewed. John noted they are currently installing a couple of temporary bridge crossings. They do this is because these roads are temporary and they are required to remove the bridges when logging activity is complete in the area. Large culverts are not considered for these stream crossings because it is easier to remove a bridge structure.

14. Other stream crossing alternatives discussed were arch span and bridges with precast abutment walls. The precast abutment walls are fairly efficient and have been used to meet aggressive schedules.

15. It was also noted that a number of small box culverts exist along IP Road and Nash Stream Road that may be deteriorating and may need to be reviewed.

Many thanks to John Nelepovitz for taking his time to spend the day with us reviewing local logging roads.

Prepared by: Dwight D. Anderson, P.E.

Distribution:

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