Maple Ridge Wind Farm

Access Road Design
Over Unstable Soils
On the Tug Hill Plateau
Objectives of this Presentation

- Discuss the pre-construction or timeline of events that made this project a success
- Present the geogrid design for the wind tower access roads
- Present some of the obstacles/issues during the windmill/geogrid installation
Project Background

- Project located on the Tug Hill Plateau in Lowville, New York
- Owners: PPM Energy and Horizon Wind Power Co.
- Formerly known as the Flat Rock Wind Farm
- 120 Windmills designed for the Phase I program
Project Background

- Approximately 200MW of electricity will be produced
- Provide electricity for approximately 60,000 residents
- Largest Wind Farm east of the Mississippi River
- Additional 75 Windmills to be constructed in 2006
Pre-construction Summary

- Contech met with the Delaney Construction on May 4, 2005 and introduced the BX product line
- Contech contacted on May 10, 2005, to inspect site conditions
- Contech reviewed boring logs from 67 of the 120 windmill locations (evening of May 10, 2005)
Pre-construction Summary con’t

- Performed SpectraPave2 analysis on May 11, 2005, and gave several product overviews to the GC, geotech, etc.

- Presented SpectraPave2 results to the Owners representatives, Blattner (GC) and Delaney Construction at 3PM

- Performed a test drive at 4:30PM on May 11, 2005
Pre-construction Summary con’t

- Wrote a technical letter to the geotech on May 12 (all nighter) and submitted the report at 5:00AM on May 13, 2005

- Received verbal PO for 300,000 sy on May 13, 2005, and first shipment from the Contech Palmer plant arrived on May 13, 2005
General Soil Series Trends

- Ca-Camroden silt
- Me-Marcy silt
- Pe-Pinckney silt
- Tb-Turin silt loam
- Other mixed silt loam and silt series
Soil Series Composing Area of the Maple Ridge Wind Farm

- Ca-Camroden silt
- Me-Marcy silt
- Pe-Pinckney silt
- Tb-Turin silt loam
- Other silt loam and silt series
Soil Series Composing Area of the Maple Ridge Wind Farm

- Ca-Camroden silt
  Moderately well to somewhat poorly drained soils. Medium textured, developed from glacial till of Late Wisconsin age.
- Me-Marcy silt
  Poorly drained soils, developed from glacial till of Late Wisconsin age.
- Pe-Pinckney silt
  Well drained soils. Medium textured, developed from glacial till of Late Wisconsin age.
- Tb-Turin silt loam
  Moderately well to somewhat poorly drained soils. Medium textured, developed from weakly to moderately calcareous glacial till of Late Wisconsin age.
Locations of the Maple Ridge Access Roads
Original Access Road Design

- The original access road (23 miles x 16 ft width) included:

  10 inches of undercut; geofabric installation; and the installation of 10 inches of a limestone aggregate (3”- 4”)

Surface Soil Inspection Summary
May 10, 2005

- Inspected three tower access roads locations including two access roads that followed the original design.

- For the two completed tower access roads, Contech observed the following:
  1) Observed several areas where silt/clay had day-lighted at the surface (indicating the geotextile had ruptured or failed) due to rutting. Observed filter fabric at the surface.
  2) “Rocking” (one to two inch deflection or movement of the in-place aggregate by standing and rocking back and forth)

- At the third location, Contech observed rutting depths (of vehicle tracks) that equated to an estimated CBR of 0.8 to 1.6
Reviewed 67 of the 120 foundation boring logs. Converted the “N” values to CBR values and obtained two design values: average CBR (1.4) and “worst-case” CBR (0.8). Soils were primarily silts (ML) with some to trace clay.

No borings were taken along the tower access roads.
SpectraPave 2 Design
May 11, 2005

Average CBR = 0.8
Access Road Design Changes

May 11, 2005

- Contractors changed the design width from 16 feet to 32 feet to accommodate the 31 feet width of the 300 ton crane
- All access roads will be returned to a 16 feet width
BX1200 Test Drive
May 11, 2005
Rehab Design
with geofabric and BX1200
Maple Ridge Wind Farm
“Spider“ Area
Maple Ridge Wind Farm
Maple Ridge Wind Farm
Maple Ridge Wind Farm
Maple Ridge Wind Farm
Maple Ridge Wind Farm

Reclaiming the access road to 16’ width
Wind Farm Design Considerations

- Determine the access road width necessary for the crane mobilization (i.e. 16, 32 feet etc.)
- Determine the loadings – usually cement trucks have heavier loadings than the crane and axle loadings – communicate with the site geotechnical engineer
- Have a general idea of the type of soils (i.e., silts, silty clays)
- Give options to the design (i.e., use BX1300 for temp. access)
Obstacles/Issues during the Windmill/BX1200 Installation

- Contractor would want grid in three to four days from his request – need to pre-plan/increase communication with Contech plants/Tensar

- The cost of grid was not part of the original costs, therefore the contractor was looking for ways to save on costs. During installation Contech had to defend against:

  1) Lime (lack of clay in the soil was a plus)

  2) Heavy duty geofabric (fabric was used on some roads during dry times)
Crane collapse at a Kansas Wind Farm Project
September 2005
Crane collapse at a Kansas Wind Farm Project September 2005

Got Grid......
Questions?