STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

April 17, 2009

MEMORANDUM TO: K. J. Kim, P.E.
Eastern Regional Geotechnical Manager

John Pilipchuk, L.G., P.E.
Western Regional Geotechnical Manager

Eric Williams, P.E.
Geotechnical Design Supervisor

Structure Design Unit Project Engineers

FROM: Njoroge Wainaina, P.E.
State Geotechnical Engineer

Greg Perfetti, P.E.
State Bridge Design Engineer

SUBJECT: LRFD Driven Pile Foundation Design Policy, Load Request Form and Structural Resistance Charts

The Geotechnical Engineering Unit (GEU) and Structure Design Unit (SDU) have completed the new LRFD Driven Pile Foundation Design Policy, Load Request Form and Structural Resistance Charts.

The following is a summary of the GEU procedure for designing driven pile foundations in accordance with the new policy.

1. Determine factored structural resistance for the selected pile type and smallest possible pile size. The nominal compressive resistance chart for steel piles and the factored compressive resistance from the interaction diagrams for concrete piles developed by SDU may be used at designer's discretion to estimate preliminary pile axial structural resistance.
2. Determine factored geotechnical resistance based on drivability analysis.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
Fax: 919-250-4237

Website: www.ncdot.org./doh

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

3. Determine "Maximum Factored Resistance" by reducing factored geotechnical resistance for downdrag, scour and dead load of piles above the design scour elevation. For pile bents, also determine the preliminary point of fixity (POF) elevation based on the maximum factored resistance and an assumed lateral load and ensure lateral deflection for the preliminary design is within the acceptable limits in the new policy.
4. Use the Load Request Form to provide the SDU with the maximum factored resistance and if applicable, preliminary POF elevation and request structure information.
5. SDU will provide controlling factored loads, pile configurations and bottom of cap elevations for structure information.
6. Based on structure information received, determine the "Factored Resistance" equal the maximum factored axial load and the resulting estimated pile lengths. For pile bents, also determine the new POF elevation and compare it to the preliminary POF elevation. If the difference exceeds the limits in the new policy, provide the SDU with the new POF elevation, request structure information again and repeat this step.
7. Prepare foundation recommendations with factored resistances (rounded up to nearest 5 ton increment), estimated pile lengths (rounded up to the nearest 5 ft increment), pay item quantities, foundation comments and notes including required driving resistances and if required, tip no higher than elevations and hammer energies. For pile bents, also include final POF elevations.

If there are any questions, please contact Scott Hidden, P.E. at (919) 250-4088 or Brian Hanks, P.E. at (919) 250-4046.

Attachments: LRFD Driven Pile Foundation Design Policy
Load Request Form
Structural Resistance Charts

cc: Rodger Rochelle, P.E., State Transportation Program Management Engineer
Mike Robinson, P.E., State Bridge Construction Engineer
Dan Holderman, P.E., State Bridge Management Engineer
Tom Drda, P.E., Federal Highway Administration