

Neuse River Basin Flood Risk Management Technical Report

Appendix E. Geotechnical Engineering



**US Army Corps
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Appendix E: Geotechnical Engineering

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APPENDIX E. APPENDIX E: GEOTECHNICAL REPORT

E.1 INTRODUCTION

The Neuse River Basin is within the Piedmont and Coastal Plain physiographic provinces. The Neuse River starts in the Piedmont region of North Carolina, but much of the river runs through the Coastal Plain before it empties into the Pamlico Sound. Only one flood risk management measure for the Neuse River Basin Feasibility Study, known as Alternative 2, had a BCR greater than 1 and consisted of dry floodproofing of 12 structures adjacent to the Crabtree Creek floodplain in Raleigh, NC in Reach CTC-2. A detailed description of Alternative 2 can be found in the Neuse River Basin Technical Report as well as the reasons this plan was not recommended for implementation.

E.1.1 Purpose

The purpose of this Appendix is to provide a geological description in the general vicinity of the non-structural measure in Reach CTC-2. Design phase considerations and general construction recommendations are also provided.

E.2. REGIONAL GEOLOGY

The regional geological description for the proposed non-structural measure is based on the 1985 Geological Map of North Carolina. Figure E-1 below shows the regional geology in the vicinity of the non-structural measure in Reach CTC-2. The approximate location of the non-structural measure is shown with a red polygon and is labeled in accordance with Chapter 3 of the Main Report. The geological formations near and within the non-structural measure are shaded and labeled. The non-structural measure is within the Raleigh Belt and contains the Injected Gneiss (CZig) and the Foliated to Massive Granitic Rock (PPmg) geological formations. Soils within the Piedmont region typically consist of residual soils overlying metamorphic and igneous bedrock.

The Triassic Basins, Eastern Slate Belt, and Coastal Plain are near the non-structural measure. Sedimentary rocks are present in the Triassic Basins and Coastal plain, while metamorphic and igneous rocks are common in the Eastern Slate Belt.

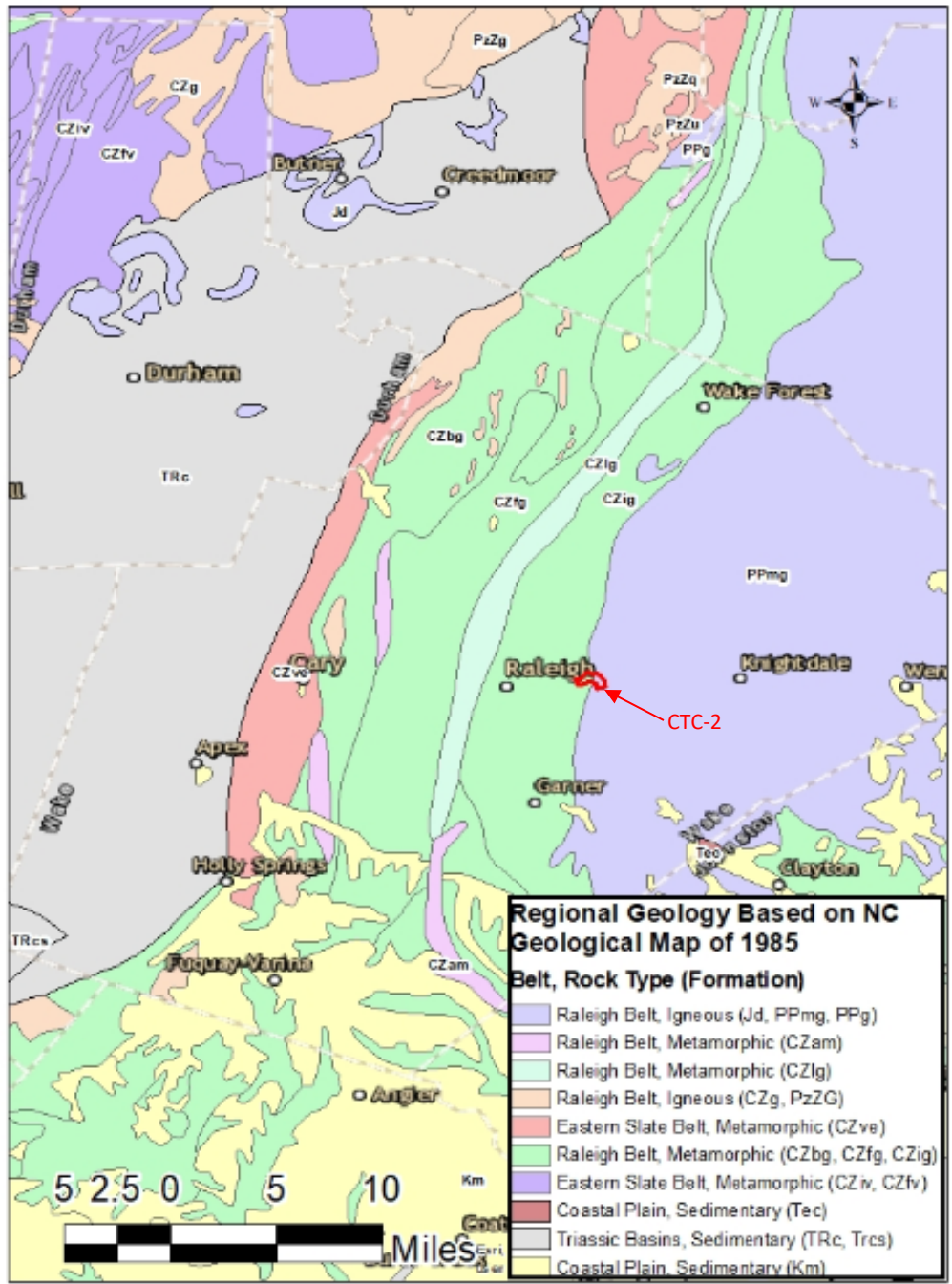


Figure E-1: Regional geology in relation to the proposed non-structural measure¹.

¹ Figure was generated from using the NC Geological Map of 1985, <https://mrdata.usgs.gov/geology/state/state.php?state=NC>

E.3. NON-STRUCTURAL DESIGN PHASE CONSIDERATIONS

Based on some knowledge of the regional geology, difficult excavation due to rock is unlikely. However, previously conducted construction activities have taken place on the proposed work site. As a result, debris and other unsuitable material may be encountered during the excavation operations.

E.3.1 Construction Considerations

Existing utilities near the proposed excavation areas should be located prior to construction activities. Excavation trenches near the existing structures should be graded such that rainwater does not saturate the soils beneath the existing foundation. Temporary unwatering measures, by sump pumps, drainage ditches, or other methods as determined by the contractor, may be needed to control surface water during excavation operations.

E.3.2 Report Limitations

The geological information provided in this report is based on the North Carolina 1985 Geological map. This report does not account for the human placed materials, existing organic materials, and/or surficial deposits that may overlay the geological formation. Site specific groundwater information is not available at the time of this report. Groundwater can vary based on site topography, seasons, rainfall, and other factors. Impermeable to semi-impermeable surfaces, such as concrete, rock, clay, debris, etc., can cause perched groundwater conditions. Site specific investigations can help the engineers and contractors have a better understanding of the subsurface conditions at the proposed work sites.

E.4. REFERENCES

1985 Geological Map of NC, <https://mrdata.usgs.gov/geology/state/state.php?state=NC>