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Introduction
This study is being conducted due to flood damages experienced in Desoto County, MS. The flooding issues are occurring in short durations due to inadequate channel capacity throughout the town and the overtopping of top banks. It has been documented that the overtopping of the top banks of the drainage channels throughout Desoto County is causing damage to private homes and municipality properties. Physical indications of these damages can be seen from the water marks left on homes and buildings in areas of relatively close proximity to these drainage channels. The purpose of this study is to identify the remediation needs of this area and then to conduct an economic study to determine the Benefit to Cost ratio to see if it is reasonable to perform design and construction work for these areas.

*Disclaimer: All recommendations provided in this report are general in nature and it is recommended that borings are taken and a full analysis is performed before any construction begins.

Historical Borings
Due to this being a study and not a design build project, there were no borings drilled, as the alternatives proposed here are for feasibility purposes. Through reaching out to members of the local government of Desoto County, the PDT was able to find some historical borings for some of the general areas where the PDT was looking at performing channel widening/cleanouts. The Historical borings that were found were generally in the cowpen and near HWY 51 areas and were taken between 1975 and 1979. Refer to Geotechnical Appendix A to see these historical borings.

Design and Design Recommendations
No official Geotechnical design recommendations were able to be provided as current borings were not taken and some areas in which we are performing design do not have any boring information in general available. However, some general “minimally acceptable” recommendations have been provided in areas in which work is being proposed. These recommendations are to determine a relative feasibility level of this project. Additionally, based on the historic borings for areas of work where channel widening is being performed, it is estimated there will be enough fine-grained materials excavated that it could be used to perform a considerable amount of the new levee construction.

Areas for Design Based on Benefit to Cost ratio
Generally, most of the proposed remediation that existed at the start of the project does not meet the benefit to cost ratio, however some areas have qualified for design remediation to some extent, and these areas will be discussed, and general recommendations provided throughout the rest of this report.

Channel Widening
Generally, most of construction work associated with this project will pertain to excavation, so that the drainage channels can be widened to have increased capacity. Due to not having any current borings in areas where this excavation will be occurring, the only geotechnical recommendations that are being
provided for this are the final slopes of the channel widening cannot be any steeper than 3H:1V. If this project is funded to be executed and constructed, it is recommended that a subsurface investigation is performed, and a geotechnical slope stability analysis is performed to meet corps standards of design. This in turn could result in the final construction recommendations of the channel slopes being laid back more than the current minimum 3H:1V recommendation for this study.

**Proposed Construction**

The PDT is proposing the construction of a small concrete flood wall (blue) that extends 3’ above natural ground, and a new levee embankment (red) that is roughly 2,500’ long, 6’ tall on average, has a 12’ crown, and has 3H:1V side slopes. This new levee is going to extend from the southern end of the proposed concrete wall past the shopping area, turn, and proceed up to and along the road to the southern reaches of the project which can be seen in the figure below.

*Figure 1 Recommendation Overview*

**Floodwall Recommendations**

The proposed floodwall has an overall height of 5 feet, with 2 feet of cover on the riverside and Landside of the wall, leaving the exposed height of the wall to be 3 feet. The overall length of the wall is approximately 500 feet and runs from the embankment by HWY 51 until it ties into the proposed levee section. It is additionally recommended that the slopes along the drainage channel up to the toe of the floodwall have riprap placed to provide protection for the ground surface along the floodwall. Refer to the figure below to see a typical section of the proposed floodwall.
Levee Recommendations

Due to the low height of the levee to be built, the 3H:1V recommendation comes from the practical considerations outlined in EM 1110-2-1913 under chapter 6 section 6-1 subsections (a) and (3). The typical section of proposed levee can be seen below.

There is not much concern geotechnically in the general slope stability or overall stability of this small section of levee. Additionally, for the newly built levee material, it is recommended that material used for construction is clay, which is readily available from the areas where the channel widening is occurring. It is recommended, that clay material that is located in these areas based on the historic borings be used in
construction of the new levee. If there is estimated to be insufficient fine-grained material, at minimum the entire levee section will need to be covered in a 2’ foot clay cap.

**Additional Recommendations**

If this project goes to construction, it is recommended that borings are taken, and a full design is performed for the stability analysis for the floodwall, levee embankment, and channel widenings that are being proposed in accordance with appropriate EM’s. All recommendations that are provided in this report are generic and do not have a design basis for this specific project or area.
Appendix A : Geotechnical Appendix
The locations of within the vertical reaches of such borings, as shown on the boring logs is based on driller's log and visual core, except within those vertical reaches of the borings where shear compression tests are shown.

BOR. 8-U-76
LEFT DOWNSTREAM BANK
AT MEADOWBROOK ROAD BRIDGE
BOR. TYPE-AUG. 5" TUBE & SS
GROUND WATER EL. 256.7
23 JAN 76

BOR. 4-U-75
RIGHT UPSTREAM BANK
AT VALLEYBROOK ROAD BRIDGE
BOR. TYPE-AUG. 5" TUBE & SS
30 APR 75
FIGURES TO THE RIGHT OF BORING

Are values of cohesion in lbs./sq. ft. from unconfined compression tests
In parentheses are driving resistances in blows per foot determined with a
standard split spoon sampler (1 3/8" I.D. 2" O.D. ) and a 140 lb. driving hammer
with a 30" drop

Where underlined with a solid line denotes laboratory permeability in centimeters
per second of undisturbed sample.
Where underlined with a dashed line denotes laboratory permeability in centimeters
per second of sample remoulded to the estimated natural void ratio.

BORING TYPE

SS - Split Spoon Sampler
AUG - Auger
TUBE - 3" or 5" Thin Wall Tube

* The D_10 size of a soil is the grain diameter in millimeters of which 10% of the soil
is finer, and 90% coarser than size D_10.

* Results of these tests are available for inspection in the U.S. Army Engineer District if
these symbols appear beside the boring logs on the drawings.

BOR. 9-U-76
LEFT DOWNSTREAM BANK
AT VALLEYBRIDGEBLUE BRIDGE
BOR. TYPE-AUG. 5" TUBE & SS
GROUND WATER EL. 265.1
27 JAN 76

BOR. 5-G-75
RIGHT DOWNSTREAM BANK
AT NAIL ROAD BRIDGE
BOR. TYPE-AUGER & SS
GROUND WATER EL. 264.8
30 APR 75