INTRODUCTION

The Donald E. Davis Arboretum is located on the corner of Auburn University campus, and acts as an ecology preserve and teaching module for students. The focal point of the arboretum is a pond, which drains through the spillway pictured.

OBJECTIVES

- Design replacement spillway capable of passing a 25-year storm event with an emergency route plan for a 100-year storm.
- Integrate a pump into the new spillway to maintain year-round flow for aesthetic purposes.
- Mitigate storm flow over spillway to reduce amount of water reaching and disturbing downstream portions.

LOCATION MAP

Star represents pond in Davis Arboretum at Auburn University

DESIGN OVERVIEW

1) Overflow pipe for large storms
2) Recirculation pump for year round flow
3) Important vegetation left intact
4) Peak flow reduction using existing pond
5) ADA compliant footbridge
6) Four “step-pool” transitions

DESIGN ANALYSIS

1) Overflow Pipe: The overflow pipe will increase water conveyance capacity from the 25-year storm rate to the 100-year storm rate without overtopping the spillway. The water will be transported from the pond to the receiving channel.

2) Recirculation Pump: A 9600 gph pump will be installed to recirculate water from the bottom to the top step pool. This will fulfill the clients wish to have the sound of flowing water year round.

3) Important Vegetation: The arboretum is an ecological preserve, so it is imperative that specific trees be preserved. Among these is a water oak just downstream of the spillway. This tree will be unaffected by construction, and it’s habitat will be preserved.

4) Detention Basin: The existing pond will be used as an 18,200 square foot detention basin to reduce peak flow during storm events. The reduction in peak flow will reduce erosive forces on the receiving channel.

5) ADA Compliant Bridge: The rebuilt bridge will have no more than a 5% slope and will include handrails in order to increase accessibility in the Arboretum.

6) Step-Pool Transitions: The spillway is designed to mimic a mountain stream with cascading steps. Each step dissipates energy into the pool below it. This allows the spillway to loose elevation with minimal increase in water velocity downstream.

SPILLWAY DRAWINGS

The spillway above drops 8.5 feet in 27.5 horizontal feet, giving it a slope of nearly 30%. This steep slope is what caused the undercutting present in the old spillway. Because of project constraints, the new spillway has nearly the same slope. However, features in the redesigned spillway, such as the step-pools and overflow pipe, will prevent similar erosion problems.

MATERIALS COST ANALYSIS

<table>
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<tr>
<th>Item</th>
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<tbody>
<tr>
<td>Corrugated drainage pipe</td>
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<td>Recirculation pump</td>
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<td>Cobble lining</td>
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ACKNOWLEDGEMENTS

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- Dr. Mark Dougherty, P. E.
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