



Case Study: Fish Hatchery Reline

**COMPLETE RELINE OF 53 PONDS IN LESS THAN 200 CALENDAR DAYS
FOR TEXAS PARKS AND WILDLIFE DEPARTMENT**





The Project

OVERVIEW

The Texas Parks and Wildlife Department (TPWD) needed a complete relining of 53 ponds, which included two settling ponds and a zooplankton production pond and entailed:

- Removal of 2 layers of degraded geomembrane liner in all 53 ponds
- Installation of 1 layer of geomembrane liner in all 53 ponds, which totaled 53 acres
- Installation of underdrains in 50 ponds
- Installation of new batten bar around each kettle in 50 ponds

The project required completion within 400 calendar days plus written record of all submittals, mobilization, procurement, installation, testing, and inspection documents.

BACKGROUND

Texas Parks and Wildlife Department's inland fish hatchery program is one of the most visible sport fish stocking programs in the world. Each year, TPWD stocks approximately 14 million fish in lakes, ponds and rivers.

Originally built in 1949, the A.E. Wood Fish Hatchery in San Marcos, Texas is a mainstay of warm water fish production for the state and is responsible for raising millions of fish each year for stocking into the public waters. A four-year renovation project, which began in 1984, resulted in one of the most modern fish hatcheries in the United States.

MUSTANG EXTREME IS SELECTED

Having worked with TPWD to reline several ponds damaged during the freeze of 2018, and 22 ponds at its Sea Center location in 2022, the Mustang Extreme team fully understood the critical nature of the project, the schedule, and the need for the highest quality products and installation standards.





Critical Requirements

ATTENTION TO DETAIL

For the hatchery staff, getting the details right was very important.

- “Sculpting” the ponds to achieve the proper shape.
- Attaching batten bar to concrete kettles with the proper fit and no punctures or leaks.
- Installing the liner with the perfect amount of slack to accommodate expansion of the liner in the heat and contraction in the cold.

SAFETY

Operations at the hatchery continued during construction, so in addition to the hazards of the crew working in tight spaces and in extreme heat, staff and crew needed to be aware of all TPWD personnel and equipment moving around the site throughout the project.

COMMUNICATION AND COORDINATION

Daily communication and coordination between fishery staff and Mustang crews were critical to the safety of the fish, the management of the schedule, and the sequencing of the work. Daily, weekly, and monthly meetings, as well as clear written communication using the TPWD E-Builder software, ensured all stakeholders were informed and consulted throughout the project.



Mustang Delivered

PROJECT MANAGEMENT

The Mustang team included project management, operations, safety oversight, business development, engineering, and the field crew. While detailed schedules and project plans were created prior to the start of the project, the day-to-day needs of the hatchery often required the Mustang crew to hop between ponds and adjust the sequencing of the work.

LOGISTICS

To help alleviate congestion within the narrow access roads between the ponds, the project was divided into five manageable sections, material shipments were staggered, and equipment and materials were strategically staged through the 50-acre site.

SAFETY

Daily safety meetings addressed any issues of concern. When necessary, alternate plans and precautions were implemented:

- Confined workspaces were made safe by removing berms and creating a shelf to capture falling dirt.
- A ground evacuation plan was created in the event of a cave-in.
- Daily schedules were altered to avoid laying liner during the hottest parts of the day.
- If required, plans were reviewed and approved by a 3rd party safety company.

UNDERDRAIN INSTALLATION

The site was prone to the accumulation of water from natural runoff under the liner. This could cause pressure on the liner, making it susceptible to damage and could create safety issues for personnel and the fish. To alleviate the problem, extended underdrains were installed, which required running perforated piping trenched with river rock under the ponds and around and through the concrete kettles.



Perforated PVC pipe installed underneath the pond.



Concrete kettles drilled to enable installation of the pipe into the kettle.



Piping installed through the kettle and into the drainage system.



Liner installed under the drainage system to capture water flowing under the pond.



River rock was installed in the trench to help collect water and guide it to the underdrain.



Liner installed over the drains and connected to the kettles with batten bar.



LINER INSTALLATION

Mustang's Chief Engineer wrote detailed technical installation instructions to accommodate for the expansion and contraction of the liner in the heat and cold. To achieve a smooth floor on the bottom of the ponds, an expansion joint was positioned in the inside toe of the ponds.

Expansion joint at the inside toe of the pond to offset the effects of extreme temperature variations.



Liner carefully cut to fit and attached to concrete islands with batten bar



Pipe protrusion fitted with a boot to add strength to the liner



Batten bar used to attach liner to the concrete boot.

Mustang Extreme Craftsmanship

The TPWD staff appreciated the innovative approach the **Mustang crew took to handling the many details of the project:**

- Batten bar installed with mitered edges and rounded corners to help guard against punctures in the liner.
- Testing for gaps between batten bar and concrete kettles, drains, inlets, and outlets using a vacuum box to ensure every transition was properly sealed.
- Installation of extra liner at the corners to provide additional strength and leak prevention.
- Use of drones to photograph the existing state of the roads to document potential damage during construction.
- Use of composite mats to protect sensitive areas from unnecessary damage.

PROJECT COMPLETION

**THE PROJECT WAS COMPLETED IN 200 DAYS.
A FULL 200 DAYS AHEAD OF SCHEDULE.**

Completing the project early was a huge advantage for TPWD, providing them a full calendar year for fish production in 2024.

Mustang delivered an Operation and Maintenance Manual containing every detail of the project: data sheets on all products used (even the nuts and bolts), change orders, as-builts, QAQC documents, safety plans, and warranty letters.

TPWD staff attributes the success of the project to Mustang's innovative practices, attention to detail, willingness to be flexible, and excellent communication throughout the project.





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