

Sediment Cleanup Middle River Complex, 2016-17

Season 1
Project Photo Tour
Updated July 2017



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LOCKHEED MARTIN 

Sediment Cleanup - Season 1

Project Photo Tour

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- **Lockheed Martin continues its removal of metals and other substances from Dark Head Cove and Cow Pen Creek.**
- **Contaminated sediments in Dark Head Cove (or Martin's Lagoon) and the lower portion of Cow Pen Creek were dredged during Season 1 between October 17, 2016 and March 3, 2017 and a clean sand layer was placed on dredged areas.**
- **Most work during this time concluded prior to fish spawning season (beginning Feb. 16); however a short extension to complete the work was required.**
- **In Season 1, Lockheed Martin used special dredging equipment and methods approved by the Maryland Department of the Environment and the U.S. Environmental Protection Agency.**
- **In Season 2 (between mid-June 2017 and February 2018) cleanup will also include excavation and restoration of Cow Pen Creek and placement of protective activated carbon onto sediment in areas not dredged in Dark Head Cove.**
- **Lockheed Martin provided a photo tour, a project bulletin, a set of Frequently Asked Questions, and a video during the sediment cleanup process to keep the community updated on our progress.**

Highlights of Completed Sediment Season 1 Cleanup

Cleanup began in October 2016 and completed in March 2017.

Bulkhead and storm drains were stabilized. That work began earlier and lasted longer than in-water sediment work.

~2000 trucks removed ~36,000 cubic yards of sediment during Season 1.

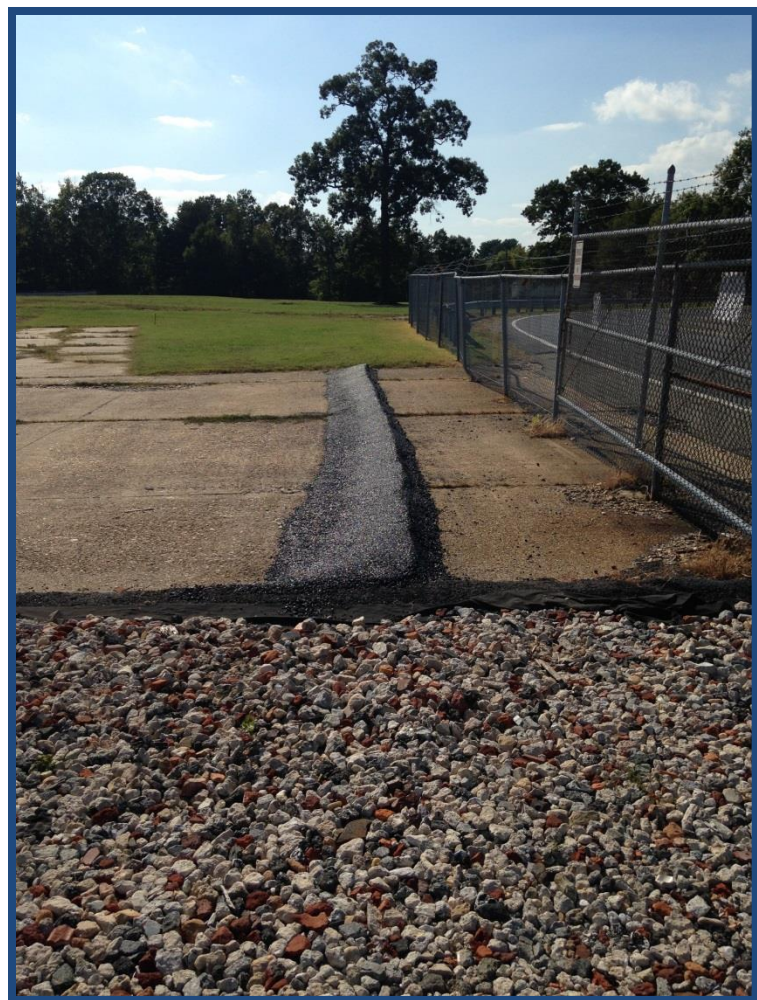
A protective layer of 6 inches of clean sand was laid on top of all dredged surfaces.

Samples confirmed cleanup goals were achieved.

Work began on land, protecting against erosion and sediment release by installing fabric on chain-link fencing, creating “super silt fencing.”



Other methods used to protect work areas included installing temporary asphalt berms, filter logs, and plastic sheeting anchored with rocks to protect rainwater outlets.



In concrete work areas, silt fencing and filter logs prevented sediments from moving outside the area.



Work preparation included constructing a temporary road and entrance for construction vehicles and installing a mobile treatment system for water drained from sediment.



Sediment mixing bins were constructed with concrete barriers and multiple layers of plastic sheeting.



A base-layer of gravel was spread over the plastic sheeting for protection. Drained water filtered through the gravel, then was collected and transported to the temporary onsite water treatment system.



A temporary haul road was built with protective plastic sheeting and covered by gravel.



A push-boat delivered the dredge barge.



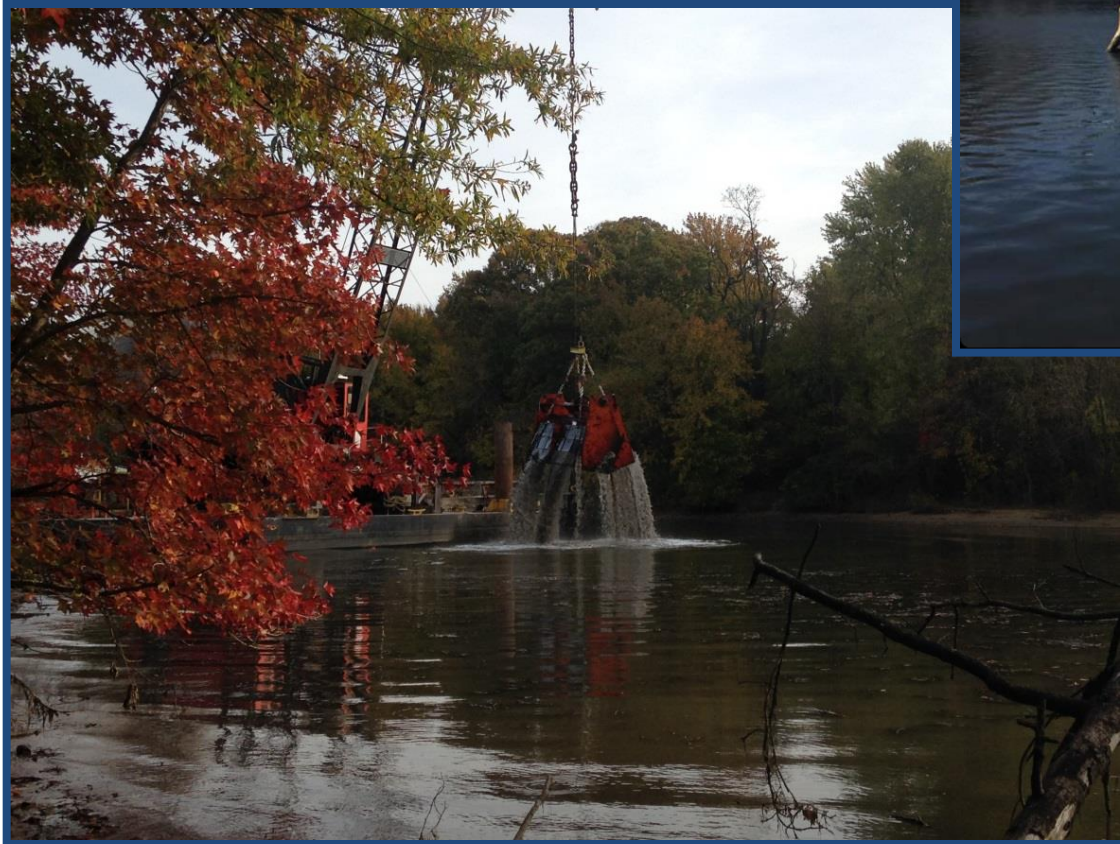
Dredging equipment arrived, then barges and cranes. A silt curtain was installed across the width of Dark Head Cove.



Equipment was moved around the cove using a 500 HP push-boat. Sediments were dredged using an “environmental bucket” which closes before lifting, limiting the amount of sediment released into the waterway.



Sediment dredging began at the lower portion of Cow Pen Creek. The material was loaded onto a barge for storage, then transported to the offloading area.



The environmental bucket is shown draining water but retaining sediment.

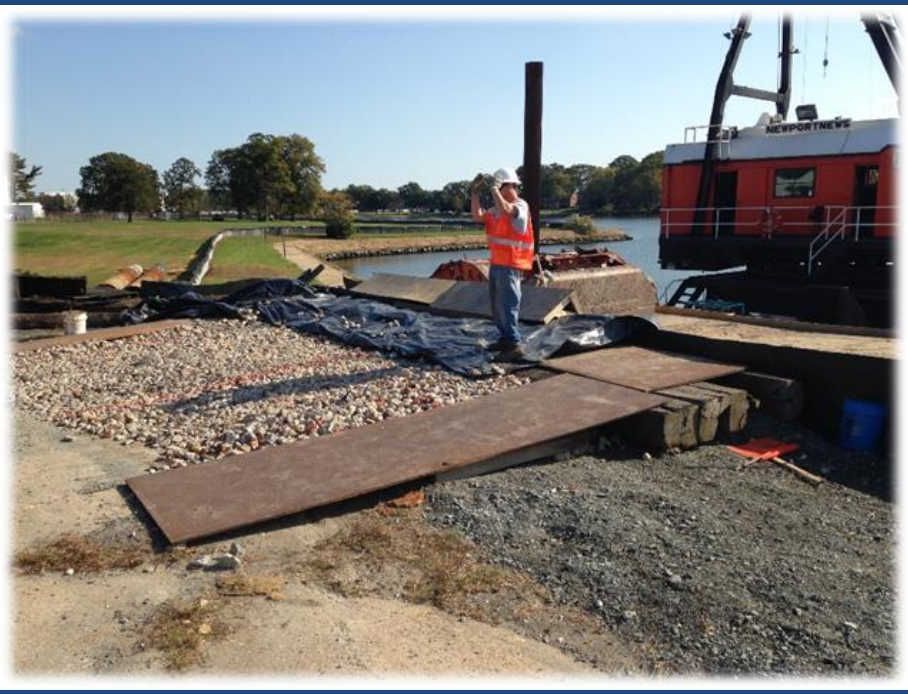
Sediment dredging proceeded to the lowest portion of Cow Pen Creek, then Dark Head Cove.



The push-boat moved the barge into position for offloading sediments.



Using an apron to contain spillage, dredged sediments were offloaded from the barge. Haul trucks were positioned for sediment transfer at the spill apron.



Using a clamshell bucket, dredged sediments were transferred to a haul truck.



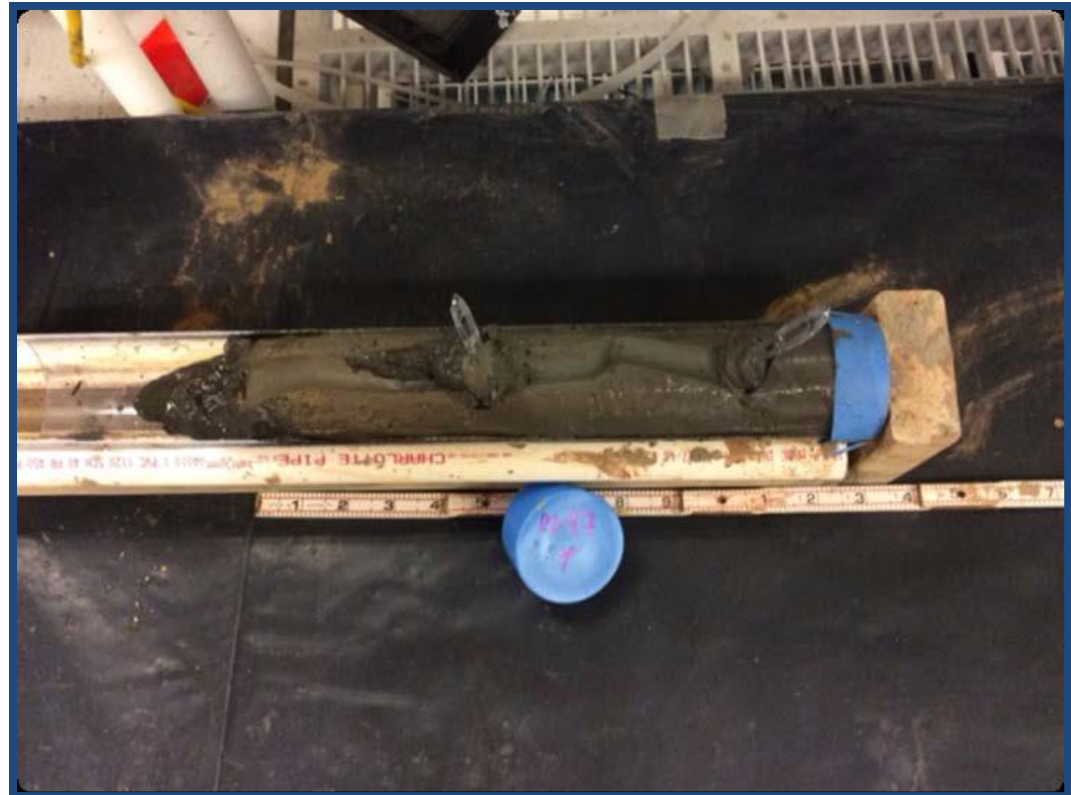
Sediments were then transferred into mixing bins where a specialized material (Calciment™) was added to dry the sediment adequately to meet disposal requirements.



Once the sediments met disposal requirements, they were transferred to lined trucks and hauled off-site to a licensed landfill in York, Pennsylvania.



Once planned dredging depths were met, confirmation samples were taken for chemical analysis to determine whether additional dredging was needed. Four dredge areas required additional dredging, extending the project window by three weeks.



Following dredging, a layer of clean sand was placed over dredged areas to form a protective surface known as a residual management layer. Clean sand was stockpiled, loaded onto a hopper, and placed on a barge.



The hoppers were filled with sand using conveyors and barged to dredged areas for placement.



After sand placement, cores were taken to confirm six inches of sand were evenly placed.



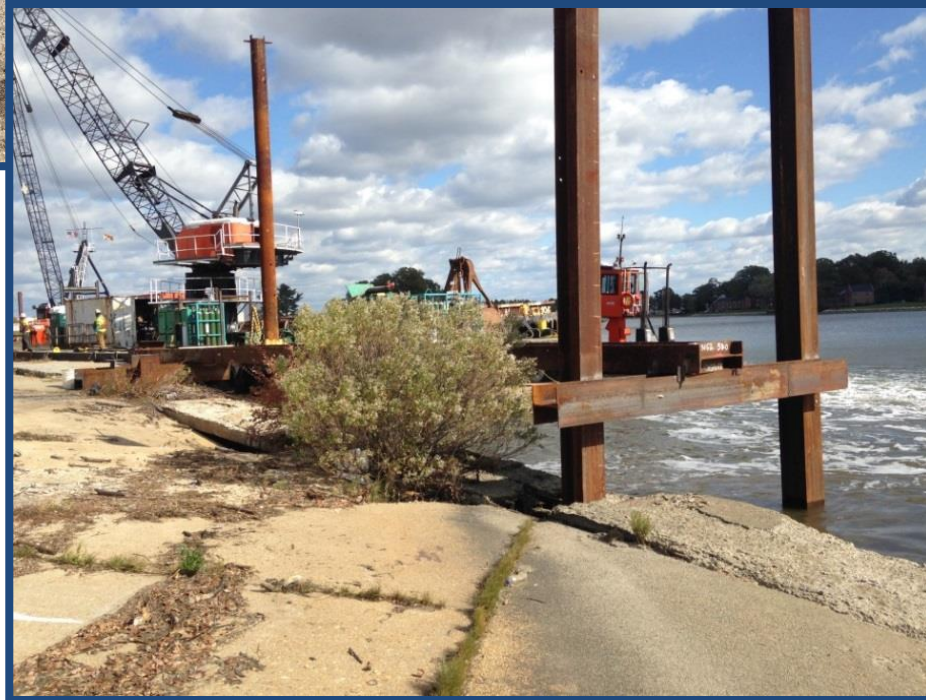
After confirming all dredging goals were met, sediment handling bins were deconstructed, and materials were sent to the landfill.



Once sediment and sand handling work was finished, the temporary haul road was removed and restored to its earlier uses, and no longer used as a road.



Another separate aspect of Season 1 work was to upgrade the deteriorating bulkhead with new sheet piles, which were barged to the site. Temporary template piles were installed to support construction of the sheet pile wall.



A crane positioned the sheet piles, and a vibrating hammer drove them to the planned depth.



Drainage holes were drilled prior to driving sheet piles to their final grade.



Spaces between the new sheet pile and the old bulk head were filled with gravel.



Backfilled areas with granular material were compacted and empty spaces were filled with a flowable material, similar to a watery concrete.



Outfalls passing through the new bulkhead sheet piling were extended and connected using HDPE (High Density Polyethylene) piping.



New manholes were installed above five outfalls.



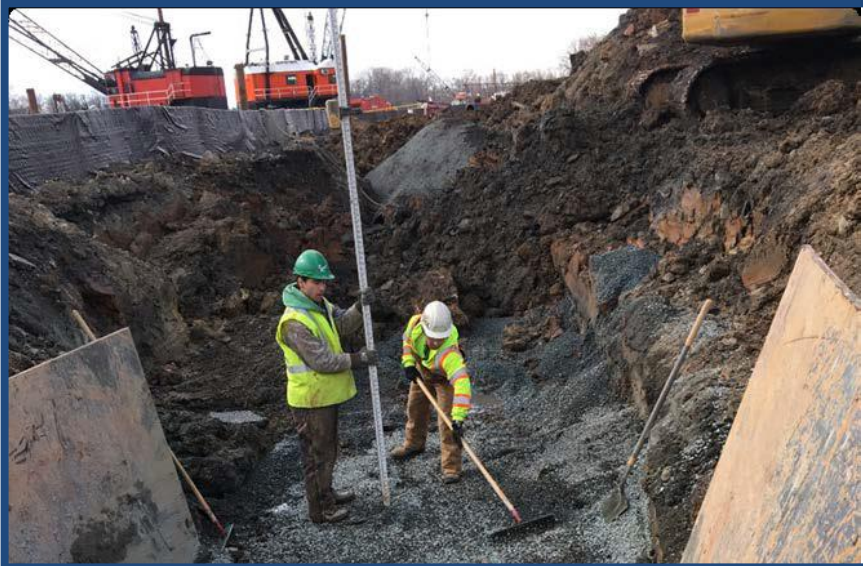
A protective cofferdam was set up outside the area where a new outfall was being installed.



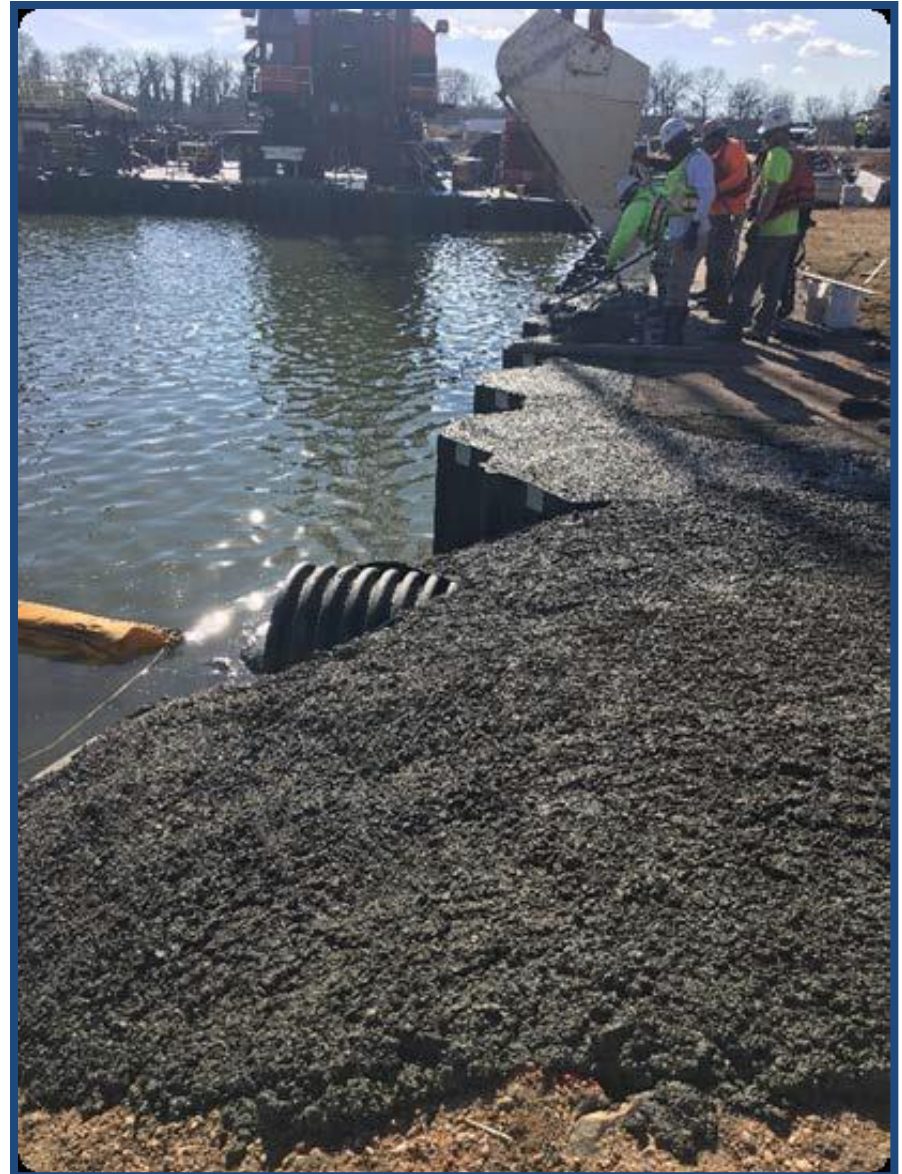
In Tax Block D, the area closest to Martin State Airport, a large double-piped outfall (009) was repaired.



At Outfall 009 a new bed was laid, new pipes installed then covered with concrete followed by dirt, and the top surface was graded.



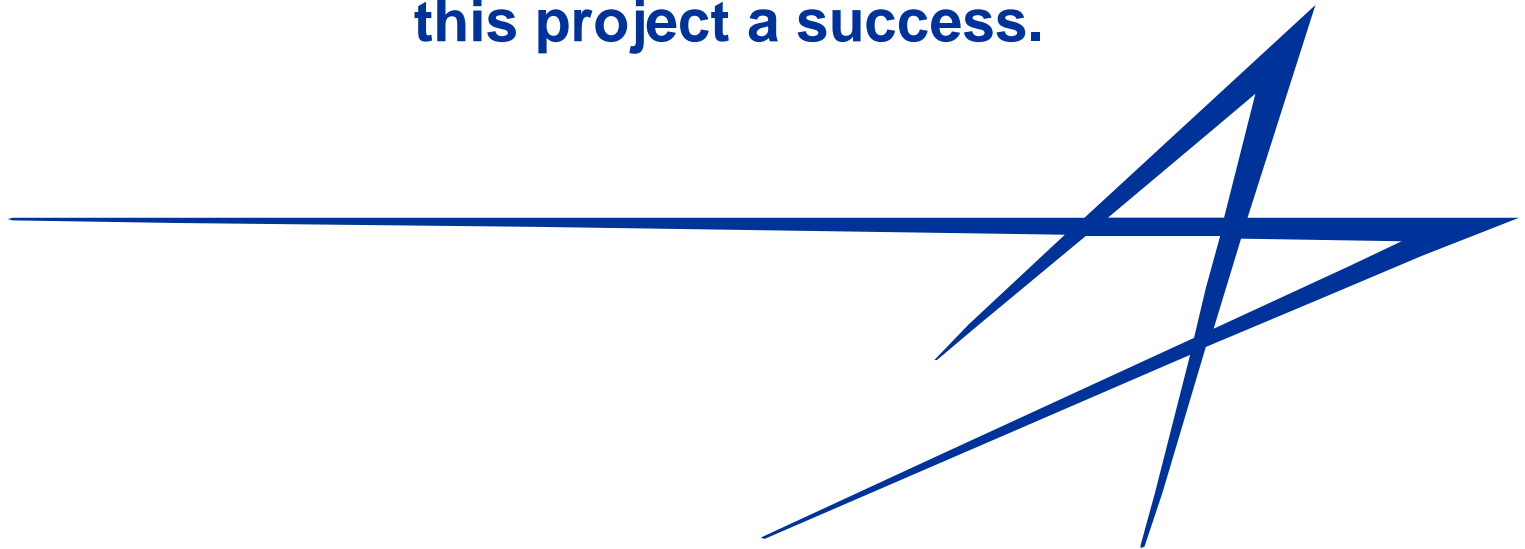
Another outfall (007) needed a culvert hatch box installed.



Bulkhead work was almost completed; however, some work remained beyond completion of the Season 1 sediment work.



Lockheed Martin wishes to thank the contractors, the regulators and permitting authorities, and the community for its cooperation in helping make this project a success.



**For questions, comments or concerns please contact:
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