

# Wilde Lake Maintenance Dredging



## DREDGING/DEWATERING

In the summer of 2012, JND Thomas Company, Inc., a general contractor based in Riverdale, CA and Daytona Beach, FL was awarded a contract by the Columbia Association of Columbia, Maryland for the maintenance dredging of Wilde Lake. The comprehensive “turn-key” operation included dredging, construction of the dewatering and staging areas, dredging methodology, dewatering technology and equipment configuration, trucking and final off-site disposal of the lake sediments and the restoration of the site. The Columbia Association funded the project for approximately \$1.7 million.

### Background

The Columbia Association is a community-controlled, private, non-profit service corporation created to provide services, amenities and facilities for the benefit of Columbia, Maryland. It builds, operates and maintains community facilities, neighborhood centers, sports clubs, pools, parks, path-



Unloading of Moray dredge at Wilde Lake.

ways and over 3,400 acres of permanent open space including three lakes; Lake Elkhorn, Lake Kittamaquundi and Wilde Lake. Project representatives for the Association were Dennis Matthey - Head of Construction, Diana Kelley, CPPB - Contract Administrator and Charles Grey - Project Manager.

Wilde Lake is a 22-acre man-made lake, located in Columbia. Prior to its development in 1966, the site was a grassy meadow containing a small stream. The lake is surrounded by residential and open recreational space and fed by an unnamed tributary from the north and a fifteen-foot high concrete dam exists at the outfall channel. The outflow of Wilde Lake passes through Lake Kittamaquundi (another Columbia man-made lake) and eventually finds its way to the Little Patuxent River. The lake accepts drainage from approximately 1,200 acres consisting primarily from residential properties. Over time, Wilde

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Lake had accumulated too much sediment, which diminished its overall holding capacity causing a rapid decline in water quality and excessive vegetative growth in undesirable locations.

### Engineering and Permitting

The design, plans, specifications, cost estimating, engineering, permitting and construction oversight for the dredging project were performed by Anchor QEA of Columbia with local on-site supervision by Walter Dinicola, P.E. Regulatory oversight and permitting were secured through the Maryland Department of the Environmental Dam Safety Division and the Howard County Department of Inspections, Licenses and Permits.

### Challenges and Mobilization

Meeting the “turn-key” requirements of the project coupled with the complexities of working within a highly populated residential area posed many challenges. First and foremost was the challenge of mobilization and deployment of dredging and dewatering equipment. The dewatering site selected for the Wilde Lake Dredging Project that offered minimal disruption to the residents had an active spring requir-



**Dredge removing accumulated sediment at inlet of Wilde Lake.**

ing the addition of under drains prior to site preparation to meet compaction and grading specifications. JND Thomas Company's dredge and dewatering plant consists of mobile, portable equipment that

are trucked onsite without requiring any “special” height or width permits. The dewatering plant has a relatively small footprint and once assembled, takes less than one half acre. In this case, a grassy knoll



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within an open space of Wilde Lake Park was selected. The construction of access roads was minimal, all erosion control and silt fencing including safety postings were implemented and a turbidity curtain was installed 150' in front of the outfall dam, all as required by the contract. Two cranes, 70 and 150 ton, were used for lowering the dredge and positioning the components of

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the plant. The mobilization took approximately seven days from start to pumping, allowing for coordination of traffic, pipeline fusing and testing. Key JND participants were David Driver - Offsite Mgr, Keith Ayers - Project Mgr and Patrick Dunnigan - Dewatering Superintendent in addition to a team of six employees sharing dredging, dewatering, staging and loading responsibilities.

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**Dredging**

The dredging specs of the project called for removing accumulated sediment to the previous 1993 dredged grades (6"+ tolerance) in the northwest third of the lake. Neither the original lake bottom nor the current existing elevations are a smooth surface of uniform depth, but rather, an irregular bottom with varying depths that have evolved into sediment islands overgrown with undesirable vegetation. An 8" DSC Moray swinging ladder dredge with GPS positioning capability was deployed. The Moray can operate at a minimum water depth of 48" (ideal for Wilde Lake's shallow condition) and has the ability to work in tight areas by utilizing travel and positioning spuds instead of cables for movement. Capable of dredging depths up to 18', the Wilde Lake project depths around 6' were easily accomplished producing nominal flow rates up to 2,000 gpm @ 185 TDH (Total Delivered Horsepower). The cutterhead is a sealed planetary drive; 24" inside diameter 5-blade basket cutter with nominal production capacity around 90 in-situ yards per hour. The Moray was con-



**Dewatered silts, clays & organic sediment after being processed through JND's plant.**

nected to a maximum of 3,200 feet of 8" HDPE floating and submerged discharge pipe (placed as specified in the plans minimizing hiker/biker path interruptions and/or closures with all crossings being buried). An additional DSC floating booster pump was incorporated after beginning the project to assist with the pumping of sand and gravel. Hydro Data of Chester, Connecticut verified all dredging progress with bathymetric surveys after the completion of each section. Dredging began in the SMU1 and SMU2 prioritized areas located at the northwest third of the lake.

#### **Dewatering and Material Handling**

JND's dewatering plant uses mechanical operations and clarification tanks in combination with the addition of polymers to dewater dredge spoils. The secondary benefit is the enhanced clarification of lake water, which is returned back to the lake after exiting the plant. The process begins with lake sediment and water being pumped from the dredge to the dewatering plant at 10 – 15 percent solids. The slurry is first directed over two sets of Dual Tandem Trash Shakers, exposing the flow to 20 square feet of surface area for removing any debris larger than 1/8<sup>th</sup> inch in size. The pass thru slurry is collected below in the first mix tank where it was kept

in suspension and pumped to four - 14" Hydro-cyclones. Any material larger than 225 mesh drops onto two Linear Motion King Cobra Shakers where it is dried and removed. All remaining material less than 225 mesh and water is collected below into a second mix tank where it again is kept in suspension and pumped to the Clarifier. Various types and amounts of specifically formulated polymers are injected at various points between the first and last tanks to maximize the flocculating process (separation of solids from water). When applied at the correct mix points and correct ratios, the polymers enhance the separation and settling of ultra fines (organics, clays and silts presented as cloudy, discolored water) and suspended solids (presented as fine free floating particles). The Amber Group of Irvine, CA provided the technical expertise and product selection recommendations for the Wilde Lake project. Thickened slurry is consolidated at the clarifier and equally distributed to three 1.7-meter Charter Machine Company Belt presses where the thickened fines are pressed to remove all Capillary (Intercellular) water. Capillary Intercellular water can only be separated from solids by overcoming adhesive or capillary forces in pressure sections, like a belt press or centrifuge. By combining all three processes in a continuous,

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## DREDGING/DEWATERING

calibrated fashion, the plant was capable of producing dewatered sediment "cake" at 40 – 45% moisture (55 – 60% dry), easily capable of stacking for staging. Cleaned water from the plant was returned to the lake and sampled for turbidity as required by federal, state and local regulations with a DR-850 turbidity meter averaging 48 NTU (Nephelometric Turbidity Units) for the duration of the project. During the staging process, a 4 cubic yard wheel loader collected and mixed dewatered sediments from all three screening/dewatering points and consolidated it for loading into trucks. Tri-axle trucks capable of hauling 20-22

tons or 13-14 cubic yards per load were used to transport the dewatered sediment. On average, 17 truckloads per day were transported offsite to an approved disposal site. The trucking was sub contracted to Ag Tran of Jessup, Maryland.

### Demobilization and Site Restoration

The project was completed in late July with demobilization occurring after necessary scheduled maintenance thereafter. The equipment was disassembled and relocated to Elkhorn Lake for additional work. Site restoration was sub contracted to RF Watson Contracting of Upper Falls, Maryland,

the same sub contractor who performed the initial site preparation. Minimal restoration was required due to the overall small footprint of the dewatering plant and consisting primarily of removing base gravel

*Minimal restoration was required due to the overall small footprint of the dewatering plant and consisting primarily of removing base gravel and rock, silt perimeter fences and the replanting of grass.*



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and rock, silt perimeter fences and the replanting of grass.

The Wilde Lake dredging project resulted in the removal of approximately 15,000 cubic yards of accumulated sediment that settled in the northwest inlet of the lake. Work began in May and was completed in July 2012. The crews worked Monday through Saturday from 7:00am – 8:00pm and occasionally on Sundays. The project showcased the successful coupling of three distinct operations, dredging, mechanical dewatering and staging/loading, representing that all three can be performed simultaneously and efficiently as an alternative to conventional practices when an immediate basin is unavailable.

JND Thomas Company, Inc. wishes to acknowledge and thank the Client, Consultants, Sub Contractors and Vendors that participated in the Wilde Lake Project all working together to insure the project was successful. **L&W**

*by Thomas B. Amaro, VP of Sales & Mktg, JND Thomas Company, Inc.*

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