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## IWS Denitrification Upflow Filter Helping Clients Nationwide

### Coast to Coast Adoption

The IWS Denitrification Upflow Filter (Upflow Filter) is getting nationwide attention as clients need a simple, cost effective solution to meet reduced Total Nitrogen (TN) levels for their onsite wastewater effluent. From California to Rhode Island, there is great interest in the IWS patent pending Upflow Filter which utilizes a sustainable wood based media filter to denitrify wastewater effluent. The IWS performance guarantee, simple operation, low maintenance, excellent operating results, favorable economics, and regulatory acceptance have made the IWS Upflow Filter the preferred solution for the onsite industry.



IWS Upflow Filter enclosed in coyote fence

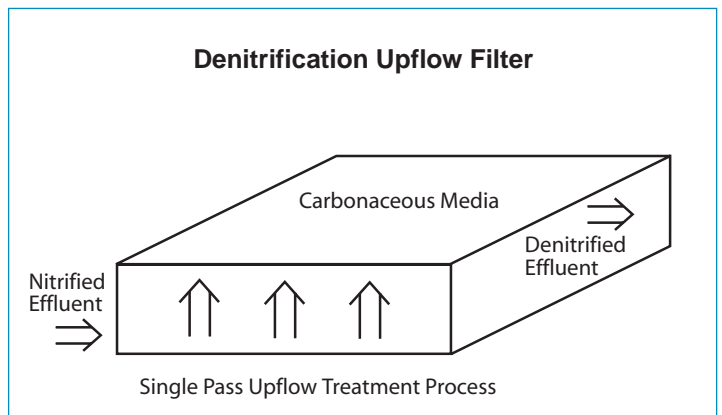
### Technology/Process

The IWS denitrification process was developed as an engineered solution for reducing total nitrogen in nitrate laden effluent from advanced treatment systems. By integrating a simplified, carbon laden de-nitrification filter into an advanced treatment system where ammonia has been nitrified, the TN in the effluent stream can be reduced by an additional 75% and overall nitrogen reduced by up to 95% depending on influent characteristics. Average total nitrogen reductions of 93% have been achieved to date following Advantex treated effluent. Results are dependent on BOD reductions required to maximize nitrification of ammonia in the waste stream.

The IWS solution uses no chemical additives, controls, or instrumentation and involves pumping nitrified secondary treated wastewater effluent (post BOD, TSS reductions and ammonia nitrification) discharged from the primary Advantex or other advanced treatment system into a dosing basin or tank for pumping to the de-nitrification system. The nitrified wastewater effluent is pumped from the post Advantex dosing tank through the Upflow Filter. Under anoxic conditions, heterotrophic bacteria within the carbonaceous media Upflow Filter use nitrate as an oxygen source to consume available free carbon and, thereby, convert the nitrate to nitrogen gas.



The de-nitrified treated effluent gravity flows into an effluent dosing tank for disposal or, when BOD limits are required, through a secondary BOD polishing Advantex system to minimize any residual BOD elevations due to flowing through the carbon laden Upflow Filter. Post secondary treated effluent is discharged into the final dosing tank for pumping to the discharge system.



Process Flow Diagram for IWS Upflow Filter

### Performance Guarantee

IWS provides a Performance Guarantee of their engineered treatment system based on the influent conditions pro-

*continued on page 2*

jected in the design report. IWS shall oversee the operation and maintenance of the treatment system and work with the owner's O&M provider to ensure system performance. The Upflow Filter shall be included in IWS's overall system Performance Guarantee. The IWS performance guarantee is subject to the owner operating the treatment system to the guidelines established in the O&M manual.

### **Extensive Development and Testing**

With projects operating, installed, or in the permitting process in Arizona, California, Florida, Montana and New Mexico IWS has the Best Available Technology for onsite wastewater denitrification. Dave Patton, IWS CEO, says "The acceptance of the technology has been overwhelming and it validates our investment in research, development, and testing of the product before bringing it to market. We are looking forward to working with owners, engineers, and manufacturers to help address their low Total Nitrogen requirements with a cost effective and low maintenance solution which works. We guarantee that our product will perform and we don't use chemicals or additives, our solution is environmentally sustainable."

### **Easy To Integrate**

Typically IWS will be contacted by an Owner, Engineer, or Regulator looking for a cost effective solution to meet Total Nitrogen levels of 10 mg/l or less. IWS can work with the system engineer to integrate the IWS Upflow Filter into their design or provide a comprehensive solution, whichever is best for the stakeholders. A typical application has been the IWS Upflow Filter following an Advantex treatment system or a sand filter.

### **Regulatory Acceptance**

The regulatory community has embraced the IWS Upflow Filter based on its performance in the field, simplicity of operation, low O&M requirements, and ability to treat a diverse range of waste strength. The IWS Upflow Filter has been approved by every regulatory agency that has received a permit application.

### **Site Configuration**

The IWS Denitrification Upflow Filter can be installed at grade (shallow walled structure) or below grade (fiberglass tank), depending upon site requirements and layout. The choice in configuration provides the Owner with options for integrating the solution into their existing or future operations.

### **Low Capital and Life Cycle Cost**

The cost of the IWS Denitrification Upflow Filter is a function of influent conditions including: biological loading (BOD, TSS, TN); water chemistry; hydraulic loading; discharge and site requirements; and other factors. The IWS Denitrification Upflow Filter has up to a 60% lower projected life-cycle-cost

than other industry standard denitrification technologies. Some of the factors that give the IWS Denitrification Upflow Filter a cost advantage include:

- No chemical additives or consumables
- No independent control system
- No instrumentation
- Minimal energy requirements
- No maintenance costs
- No licensing fees

IWS will provide a site specific price quotation for your project based on the influent conditions listed above.

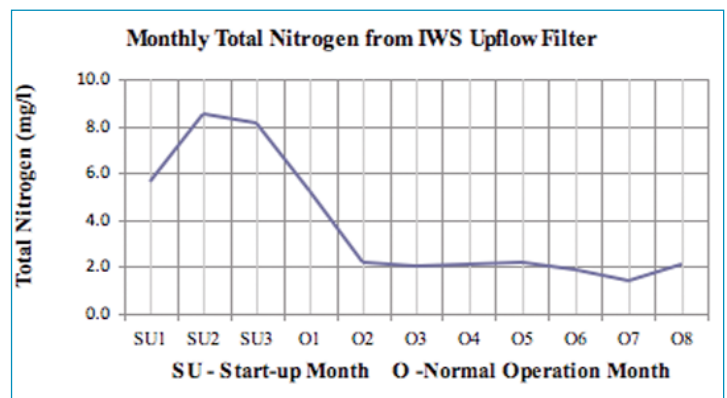
### **Life of the System**

IWS has designed the Upflow Filter and the carbonaceous media to an expected life of 15 – 20 years prior to any drop in performance. Life of the media shall be dependent upon residual nitrate levels of the secondary treated effluent flowing into the de-nitrification system. Projected Nitrate influent to the de-nitrification system is projected to be in the 15 – 60 mg/l range. Effluent nitrate levels exceeding these concentrations may have an effect on the expected life of the media. Detectable N as Nitrate will be monitored as part of the OM program. Once residual nitrate reaches 80% of maximum design effluent limits then the media shall be replaced within the filter.

### **New Mexico Case Study**

IWS installed its Denitrification Upflow Filter at the legendary Rancho Encantado resort outside of Santa Fe, New Mexico in 2008, and the system has been running for over a year with excellent performance. Under a Design-Build contract, IWS designed, and constructed a system to treat 20,000 gallons per day of wastewater from the resort. The facility includes 65 rooms (casitas), over 300 seats of restaurant capacity, and a spa.

The system has met its discharge requirement every month. IWS has done extensive sampling each month to monitor performance. Based on monthly sampling events, the aver-



*Historical Performance Data*

age TN over the past 12 months is 49.4 mg/l inlet, and 3.1 mg/l out of the Upflow Filter. The highest TN recorded in any month was 8.1 mg/l (which was at the tail end of reaching steady state) and the lowest TN was 1.4 mg/l.

The system configuration included: 6 Orenco Advantex AX-100 pods; 40,000 gallons of septic tank capacity; 20,000 gallons of anoxic capacity; 20,000 gallon recirculation tank; and a 5,000 gallon dosing tank.

### **A First in Arizona**

IWS recently received approval from the Arizona Department of Environmental Quality (ADEQ) for an Individual Aquifer Protection Permit to construct an IWS Denitrification Upflow Filter for a 30,000 gallon per day onsite wastewater treatment system serving the Shadow Ridge Subdivision in Mohave County, Arizona. Shadow Ridge is the first Individual APP permit for Advantex treatment system in Arizona. The Upflow filter is part of the overall treatment system which utilizes the Orenco AdvanTex pods for secondary treatment. The discharge requirements for Total Nitrogen from the IWS Upflow Filter are 10 mg/l.

The Shadow Ridge Subdivision will be constructed in phases, with 71 residential home sites in the first phase. Each home will have its own septic tank effluent pump system (STEP) which is connected to the central treatment plant. The effluent is pumped from the STEP tank at each home and travels through a common gravity collection system to the treatment system.



*Advantex in foreground and Upflow Filter in corner*

The IWS Upflow Filter follows a 9-pod AdvanTex treatment system that was designed by Shephard-Wesnitzer, Inc. of Sedona. The collaborative approach between IWS and Shep-

hard-Wesnitzer facilitated the approval from ADEQ for the first Individual APP permit for an AdvanTex treatment system over 24,000 gallons per day. Prior to Shadow Ridge and the IWS Upflow Filter, AdvanTex was primarily used in Arizona for small commercial and residential systems requiring only an APP General permit in which TN is generally non-restrictive.

Once constructed, the wastewater treatment system will be owned and operated by Beaver Dam Water Co., Inc., a regulated Arizona utility. According to Mr. Bob Frisby of Beaver Dam Water Co., "The development team wanted to implement the most cost-effective, reliable, and easy-to-operate treatment system available that could be scaled as the development is phased in over several years."

### **California**

In California, the Regional Water Quality Control Boards and the County Health Officials are very interested in the IWS Denitrification Upflow Filter. IWS currently has three projects in the permitting process in California that will utilize the IWS Upflow Filter. Peter C. Balas, IWS COO, says "The regulators like the data they have seen, know that IWS will guarantee the performance of the system, and like the ease of operation and low O&M costs. It is a real win/win solution for the regulators and owners alike."

The Total Nitrogen limits being required by the Regional Water Board in many areas of California are 10 mg/l, with some as low as 3 mg/l. Although 10 mg/l is the national drinking water standard, the agencies are compelled to sometimes lower them further in environmentally impacted areas, such as Malibu, CA.

### **Montana, Oregon, and Utah**

IWS has a number of proposals pending and several projects in various phases of the permitting process in Montana, Oregon, and Utah. IWS interface with the State regulators has been very positive. Jamie Miller, IWS Project Engineer says "The regulators have been very supportive and open to discussing our Upflow Filter. We have several projects in the formal regulatory permitting process, and we are looking to install the Upflow Filters in 2010 once the permitting process is complete."

### **East Coast**

Interest and adoption of the Upflow Filter now includes states on the East Coast where Total Nitrogen levels have come down and the onsite community is looking for a simple, cost effective solution. Jeff Thomas, VP of IWS says "We are getting a great response to our Upflow Filter from clients throughout the East Coast that need to meet low Total Nitrogen levels for their projects to move forward and want a low cost and maintenance free solution". •

## Eco-Friendly Retail Center Launched in Malibu

### High Profile Project

The former Malibu Lumber Yard has been transformed from a building supply business to a high-end commercial complex, with environmental sensitivity as the watchword during the centers planning and construction. Located on 2.7 acres at the intersection of Cross Creek Road and Pacific Coast Highway in Malibu, CA, the two story open air complex has 30,000 ft<sup>2</sup> of retail space and was designed with eco-conscious materials which include low flow faucets and toilets, water wise landscaping, and decomposed granite driveways. The onsite wastewater system has been designed to produce Title 22 water quality and meet very stringent subsurface discharge requirements – maybe the most stringent in the State of California for an onsite system of its size.



Malibu Lumber Yard view from Pacific Coast Highway

### Malibu Experience Critical for IWS

IWS was selected by the Developers (longtime Malibu residents Richard Weintraub and Richard Sperber) and their General Contractor, Matt Construction (Santa Fe Springs, CA), to construct the system which included equalization tanks, a state-of-the-art Siemens Membrane Bioreactor (MBR) system, and an extensive drip irrigation dispersal system. IWS has constructed a number of high profile onsite wastewater treatment systems in Malibu and was well qualified to meet the challenges for the Malibu Lumber Yard project.

### Project Challenges

The Lumber Yard project was complex and required dealing with a number of variables to ensure success which included: a) the first Siemens MBR system constructed below grade (due to space limitations) worldwide; b) due to tight site conditions and schedule constraints, IWS installed the concrete vaults first and then installed the MBR components later in the project when they arrived at the site; c) there were changes to the equipment specified during the con-

struction phase of the project; d) the site required dewatering and treating millions of gallons of groundwater before being discharged; e) extensive shoring to secure the deep excavations for the tanks and treatment equipment; and f) there were numerous trades working at the site in tight conditions which required coordination and timing to keep the overall project moving forward.

### Unique Total Nitrogen Limits

Malibu Lumber site is located in the “Civic Center Area” of Malibu which has been declared an environmentally sensitive area by the EPA and the Los Angeles Regional Water Quality Control Board (LARWQCB). Although the drinking water limits for Total Nitrogen are 10 mg/l, the limits for the discharge from the system were set by the LARWQCB at 3 mg/l Total Nitrogen, which may be the lowest Total Nitrogen limit for an onsite wastewater treatment system in the State of California. In addition, the effluent had to meet Title 22 requirements, which is the level of treatment required in California for water that may come in contact with humans. These very stringent discharge limits required an MBR treatment technology and sophisticated control system and instrumentation. The system selected for this project was Siemens Water Technologies Corp, based in Warrendale, PA.

### Team Effort

The complexity of the project and tight schedule required cooperation and a team effort of various professionals. Matt Construction (Matt) was the General Contractor for the retail center and IWS worked closely with the Matt team on all aspects of the wastewater system.

Dewatering was a critical aspect of the project due to shallow groundwater at the site, with several million gallons of groundwater having to be pumped and treated before being disposed of under an NPDES permit in the Malibu Lagoon.



Setting MBR Chamber at crowded site

IWS teamed with Jerry King (CEO) of Hydroquip to provide the dewatering services which included the NPDES permit, pump test, and pump down of the groundwater. Jim Osborne (Principal) and Michael Slaby (Principal) of Pure Effect provided the treatment system and sampling/analytical support to treat the groundwater before being discharged under the NPDES permit.

Due to the nature of the project and permitting environment, there were changes to the plans during the course of the project which required close coordination with the design engineer for the project, John Yaroslaski, PE of Ensitu Engineering of Morro Bay, California. Reflecting on the project Yaroslaski said " IWS was proactive in raising constructability issues and anticipating potential concerns. Due to the schedule, we were in constant communication with IWS and had a great working relationship. We would highly recommend IWS to construct our future systems".

### System Design

The wastewater treatment system was designed and permitted to comply with both Regional Water Quality Control Board requirements as well as City of Malibu Dept of Env. Health requirements. The system, designed by Ensitu Engineering, in Morro Bay California, was one of the first MBR installed in Malibu and the very first to be designed and installed below grade. Siemens Corp Application Engineer Nathan Anntoneau, Project Manager Ken Childre as well their entire technical team worked closely with IWS and the Ensitu design team and was critical in getting the design completed and the system tested and up and running. Ken Childre, Siemens Project Manager, said " IWS worked closely with Siemens and their experience with other installations in the Malibu area was a valuable asset to the design and construction team". The system also includes more than 40,000 lineal feet of Geoflow drip tubing configured in 10 drip dispersal zones with automated controls.



*Covers on MBR vaults in the parking lot*

### Accelerated Schedule

As the permit and discharge requirements were resolved, the final design of the treatment system needed to be modified to meet final treatment objectives. IWS worked closely with Ensitu, Malibu Lumber LLC (Project Manager Brett Thornton), and Matt in supporting the design process by doing constructability reviews and various cost models. By working closely during the final design process, the team was able to make adjustments to schedule and construction requirements. This communication allowed the retail facility to open on schedule and have the treatment system perform in accordance with both the design and permit requirements.

### Successful Project

The project was a success for all the stakeholders and was completed on schedule. Dick Miller, V. P. at Matt Const. summed it up, " IWS was selected not only because of their reputation for quality work but also because of their success in completing similar projects in the area. This project was a confirmation of IWS ability to perform". •



*Installation of 75 foot MBR Treatment Tank through shoring structure*

## IWS Wins Design-Build Competition for USACE Project in Georgia

### **Turn-key in 120 days!**

IWS recently designed and constructed a 30,000 gallon per day treatment system for the US Army's Fort Gordon Pointes West Recreation Area to replace a failed recirculating sand filter that had been constructed in 2003. IWS had a critical schedule as the Owner needed to upgrade their system before the summer vacation season. IWS met the challenge and was able to design, construct, and start-up the system in 120 days from Notice to Proceed.



*Fort Gordon Pointes West Recreation Area*

### **Recreation Area**

The Pointes West Recreational Area, located on beautiful Lake Thurmond near Augusta, Georgia, serves as a recreational retreat for soldiers and their families from nearby Fort Gordon, as well as for all military service members throughout in the United States. Facilities at the recreation area include a motel, cottages, cabins, boating facilities, hiking, and campsites. The 70,000 acre Lake Thurmond is the largest



*Setting tank a 30,000 gallon septic tank*

Corps of Engineer civil works projects east of the Mississippi and is a popular recreational area that offers fishing, camping, boating, and hiking around the entire lake.

### **Project Team**

IWS teamed with the Clement Group (Clement), a Montgomery, Alabama based contractor for the nearby Fort Gordon, US Army Installation. The Clement Group provides construction and design/build construction services for government, commercial, and industrial clients throughout the United States, with an emphasis on the Federal construction market ([www.clementgroup-llc.com](http://www.clementgroup-llc.com)). Dave Bergum, Project Manager for Clement, said "IWS was responsive and professional in their execution of the project. They met a very difficult schedule and completed the project without a hitch."

### **Project Challenges**

The main challenge for the project was meeting the tight schedule. IWS was able to mobilize to the site within 70 days of contract execution to begin constructing the project. The total project time from contract execution to system start-up was 120 days. Joel Breakstone, P.E., Project Engineer for the Army Corps of Engineers, summed it up: "Contractor (Clement) and his primary subcontractor (IWS) performed in an exemplary manner, delivering an excellent product on time and on budget". The Army Corps evaluation form rated the project team "Outstanding" in twenty-six of twenty-eight categories.



*Project stakeholders and IWS at the system start-up*

### **System Design**

IWS designed and constructed the 30,000 gallon per day treatment system, while utilizing the existing collection and dispersal infrastructure. In addition, IWS was able to re-use one of the existing 20,000 gallon tanks for the recirculation tank in the new system. The system was composed of: twelve Orenco Advantex AX-100 units; two, 30,000 gallon septic tanks; and one 20,000 gallon recirculation tank. Effluent was disposed in a surface water discharge to a wetlands area. •

## Unique Educational Opportunity For Youth – Sustainable Wastewater Solutions

### Unique Classroom

Since its establishment in 1936, YMCA Camp Campbell (Camp) has served tens of thousands of kids, from all over the greater San Jose, CA area, and provided them with the opportunity to learn about positive values essential for future success. The existing wastewater system did not include treatment beyond septic tanks and needed to be upgraded to meet Santa Cruz County requirements. The Camp is in the process of developing and constructing new facilities providing further impetus for the Camp to upgrade the wastewater system. Keeping with the Camp's mission, they chose a wastewater treatment process that would enhance the campus and provide the opportunity to teach campers about ecology, sustainability and responsible wastewater management.



### Living Machine® System

After researching their options, the Camp decided to install a Living Machine® system, a proprietary technology provided by Worrell Water Technologies (WWT). These are decentralized wastewater treatment systems that mimic processes found in wetland environments. The WWT patented technology uses mechanical and computer systems to enhance natural biological processes to treat wastewater. Living Machine systems provide a natural approach to wastewater treatment for communities, industries, academic institutions and government agencies. Using less energy than many other onsite wastewater treatment systems, Living Machine systems provide tertiary treatment, allowing the water to be reused for numerous applications including irrigation, toilet flushing, and wash water. Living Machine systems are fre-



*Living Machine® in process of construction*



*Living Machine® System treatment cells*

quently integrated into larger water reuse systems to increase water conservation, minimize wastewater surcharges, and meet operational requirements.

### Design-Build Team

IWS partnered with Worrell Water Technologies, LLC (WWT) of Charlottesville, Virginia to complete the Design-Build of the *Tidal Wetland Living Machine® System* (Living Machine system) at the Camp. This project follows a previous successful design-build effort between IWS and WWT at the Esalen Institute (Esalen) located in Big Sur, CA in January of 2008.

### System Design

Camp Campbell's Architect, Aron Faegre (Arron Faegre & Associates - Portland, Oregon) and the Camp's senior management wanted a green alternative that would treat the wastewater, serve as classroom, and provide "teaching op-

*continued on page 8*



*Layout of Living Machine® cells at site*

**Unique Opportunity For Youth** continued from page 7

portunities” for the campers. The Living Machine system was designed by WWT under direction of Senior Engineer, David Maciolek, P.E. A new, shallow effluent dispersal system was designed by Andrew Brownstone of Biosphere Consulting (Santa Cruz, CA). Biosphere’s local knowledge and experience was an important element in getting the permits and in designing a dispersal system that would be effective in distributing the treated effluent in a heavily wooded area with shallow suitable soils.

The Tidal Wetland Living Machine system was constructed in a clearing on the north end of the campus near the new dispersal field. System design highlights are summarized below:

- Design flow was 4,000 gallons per day average flow of high strength wastewater.
- The recirculating Tidal Wetland technology can accommodate the high strength wastewater generated by the camp with the wide fluctuation in flow and loading that occurs.
- The two-stage engineered wetland is designed to produce high quality effluent that is required for the new dispersal system, while requiring a minimum of operator input.
- The wetland cells consist of seven fiberglass tubs set partially in the ground and filled with a special engineered media resting on an under drain system. Cell surfaces are planted with native wetland type plants.
- The design uses minimal energy for the level of treatment provided.
- The second stage cells and control panel will be enclosed in a green-house to provide year round classroom space and operator access and workspace.
- The system includes buried recirculation tanks and an effluent pump tank.
- A Shallow Pressurized Dispersal System (SPDS) was used for the treated effluent. It was constructed in 2 cells, with a total of 8 zones. Each zone has four, 60 ft long shallow pressurized channels covered by a 12 inch diameter half pipe. The SPDS totaled nearly 2,000 linear feet buried 10 to 12 inches below the surface.
- A micro-computer based control system with a touch-screen user interface automates monitors all treatment process and disposal



*Setting Jensen Precast Tank in wooded area*

- Internet communication with the controls system provides allows for automated alerts, performance monitoring and remote control access for operators.

**Project Challenges**

The camp is situated amidst the steep slopes and wooded hills of Boulder Creek, CA, where average rainfall is more than 45 inches per year. The towering redwoods and nearby stream make it a wonderful setting for a camp that focuses on outdoor experiences and learning. IWS worked with the Owner, Architect, and Engineer to address constructability and installation issues early in the process which added value to the design process and overall project. David Fisch, VP of Property for the YMCA of the Silicon Valley, said of the process, “The IWS team was a real asset during the design and project planning phase, as we addressed issues early on which made for a better project. They really added value to the process” . •

*“The IWS team was a real asset during the design and project planning phase, as we addressed issues early on which made for a better project. They really added value to the process”.*

## IWS Works Overtime to Bring Colorado School District Treatment System Online

### Primero School District

Located in southern Colorado about 10 miles north of the New Mexico border, the Primero School District includes an elementary school, middle school, and high school for children from Weston, Colorado as well as the surrounding 190 square mile rural area. Primero's phase II expansion (including an 11,000 ft<sup>2</sup> industrial arts, art, and music wing) required the installation of an advanced treatment wastewater system to serve the school. IWS was awarded the contract to construct the system as a subcontractor to Neenan Company, the prime design-build contractor.



*The mountains surrounding Weston, Colorado*

### Project Challenges

In addition to a very aggressive construction schedule, the site was challenging due to shallow groundwater four to six feet below grade. IWS utilized extensive shoring and dewatering to excavate trenches for the tanks and pipelines. IWS also assisted the project engineer to obtain a dewatering permit from the Colorado Water Quality Control Division to discharge and pump groundwater to the Purgatoire River. To complicate the expedited schedule, it was necessary to execute the project while school was in session, which required performing major construction activities on weekends. IWS worked very closely with school representatives and the Neenan Company (Design-Builder) to quickly resolve issues that arose during construction to remain on schedule. The Neenan Company (Fort Collins) is the leading design-build firm in Colorado ([www.neenan.com](http://www.neenan.com)).

### System Design

The wastewater system is designed to treat 10,000 gallons per day of wastewater from the school and includes the following components: four AX-100 treatment units; two 15,000 gallon tanks and one 8,000 gallon septic tank; one



*IWS encounters shallow groundwater in shoring structure. Jack hammer is breaking up bedrock.*

10,000 gallon recirculation tank; one 2,000 gallon grease interceptor; UV disinfection, and a control building. Treated effluent was discharged to the Purgatoire River.



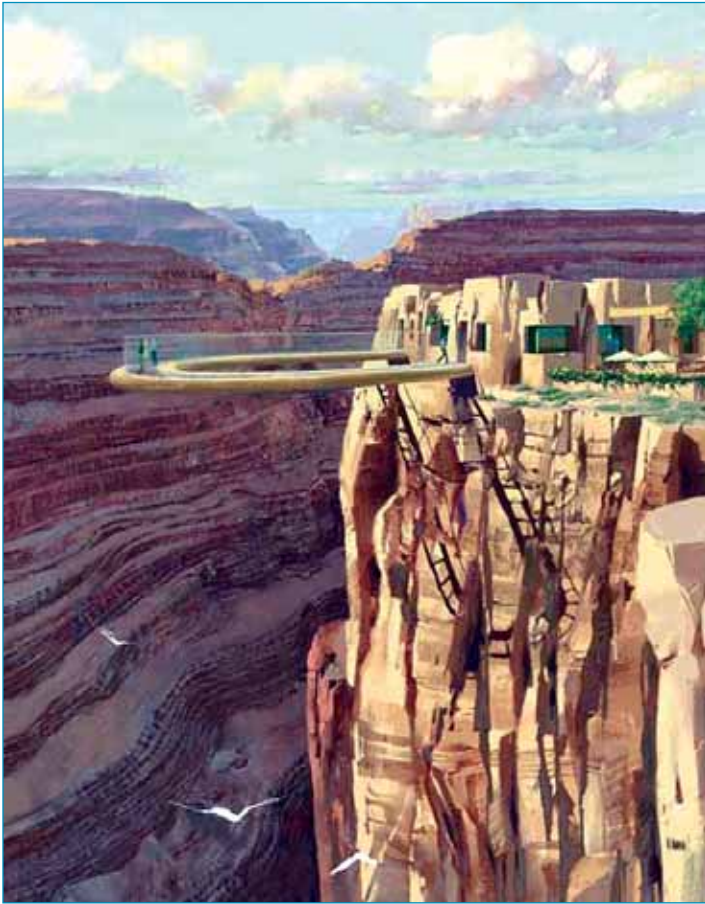
*IWS setting tank in shored structure*

The project was well received by all the stakeholders. Mike King, Project Manager of Neenan Company described the IWS effort; "IWS was able to mobilize quickly, integrate with the project effectively, and get the job done on time. IWS did what it took to meet our schedule without sacrificing quality. I look forward to working with IWS on future projects". Since completion of the Primero wastewater project, Neenan selected IWS to design-build another school project in Colorado. •

## Grand Canyon West Airport Takes Flight

### Major Attraction

The Grand Canyon West is Arizona's fifth busiest airport, due in large part to the nearby Grand Canyon Skywalk attraction on the Hualapai Indian reservation. The airport is undergoing a long term \$45 million expansion to accommodate larger aircraft. Up to 5,000 people per day visit the Canyon Skywalk attraction, which is located about 120 miles southeast of Las Vegas, NV on the southern rim of the Grand Canyon.



Artist rendition of the Grand Canyon Skywalk attraction

### Project Team

IWS teamed with Show Low Construction (Show Low), the general contractor, to construct the onsite wastewater facility being built as part of the expansion. The site geology was challenging, with two feet of top soil and then solid bedrock. Show Low provided the blasting services to enable IWS to set the tanks and run the interconnecting piping. Rock had to be blasted down to depths of 16 feet in some areas. Clint Neff, PM for Show Low, summed it up, "IWS was a valuable team partner and did a great job".

### Challenging Schedule

The project schedule was extremely tight for the wastewater



Tanks set in excavated bedrock

treatment system as there were other site improvements that were being constructed concurrently which put the wastewater system in the critical path. IWS mobilized and completed construction within 45 days onsite.



Advantex AX-100 treatment pods installed at grade elevation

### System Design

The treatment system was designed for a flow of 30,000 gallons per day and composed of the following: three, 25,000 gallon septic tanks; one 20,000 gallon recirculation tank; one 15,000 gallon dosing tank; twelve Orenco Advantex AX-100 treatment pods; and Geoflow drip disposal. Due to the bedrock conditions, the dispersal area was designed to take advantage of evapotranspiration in the high desert environment. •

## IWS Exhibiting AT WEFTEC Conference in Orlando

### Largest Wastewater Conference in USA

IWS will be exhibiting at the Water Environment Federation Technical Exhibition and Conference (WEFTEC) October 12 to 14, 2009 in the Orange County Convention Center, Orlando, FL. WEFTEC is the largest exhibition of its kind in North America, with more than 20,000 attendees. IWS will be in booth 1867, so please stop by and say hello.

### Enter Drawing

IWS will be collecting business cards at the booth for a drawing of some great California wine. Jay Alman, IWS VP, lives in Sonoma County and has bragging rights for the best wine



in the country. Jay has found some great wine for the contest.

### Denitrification

IWS will also be showcasing its Denitrification Upflow Filter and will have our engineers and designers in the booth to answer all your denitrification questions. •

## IWS Company News

### New Aircraft in its Fleet

Dave Patton, CEO of IWS, has recently purchase a twin engine 340 Cessna airplane which promises to give Dave the opportunity to spend even more time on the road meeting clients and making things happen in the field. In addition to the professional benefits of easier travel to remote sites and avoiding the hassles of airline check-in and security, Dave is an avid aviator.



*Dave Patton and Peter Balas preparing for a flight*

### New MBA on Staff

IWS would like to congratulate Jodi Henry on completing her course study and receiving her MBA in International Finance and Accounting. Jodi worked hard to receive her degree over the past 3 years while working full time.



*Jodi on the mountain*

### IWS Reaching New Heights

This summer Peter Balas, IWS COO, climbed Mount Whitney in California. At 14,500 ft, Mount Whitney is the highest peak in the continental US. The 12 mile hike included an elevation climb of 6,500 feet, all done in about 8 hours with a pack.



*Peter still standing*

### A Summer Wedding

Congratulations to Dale (IWS Director of Construction) and Joanne Hemstad on the marriage of their daughter Jennifer to Nicholas Gault this summer in Arnold, CA. It was a beautiful ceremony enjoyed by all in attendance.



*Dale and Jennifer*

## About Us

Integrated Water Services, Inc. (IWS) provides services to municipalities, developers, communities, and businesses to address their water and wastewater needs. IWS leverages its extensive experience in permitting, engineering, construction, project management, site development, and project finance to provide a range of services to its clients with the ultimate objective of providing a solution that meets all the stakeholders' needs. IWS teams with engineering firms, consultants, suppliers, and other contractors to provide the client best value for their specific project needs.

## Corporate Information

Please visit our web site ([www.integratedwaterservices.com](http://www.integratedwaterservices.com)) for additional information or contact us at the following locations:

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