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Shaping the Horizon

September 2006

Innovative Biological Phosphorus Removal to Meet New Discharge Standards in Plainview-Elgin, Minnesota Sanitary District

The Plainview-Elgin Sanitary District, serving the Cities of Plainview and Elgin, Minnesota including three industries, began construction of Wastewater Treatment Facility Improvements in June 2006. The District initiated the project to provide additional capacity as well as accommodate new discharge requirements from the Minnesota Pollution Control Agency (MPCA). This project is one of the first Biological Phosphorus Removal Facilities being constructed in the State of Minnesota under the new discharge standard of 1mg/L. Biological Phosphorus Removal (BPR) is a method to remove phosphorus in the activated sludge process of wastewater treatment.



The project will involve the expansion of most of the treatment processes within the activated sludge/extended aeration facility. In addition to the BPR process, the project includes the addition of a final clarifier and extended aeration basin, grit removal, raw sewage pump and various process pump replacement, construction of a biosolids storage tank, digester improvements, UV disinfection, electrical system and controls updates. The addition of static screens and raising the elevation of existing screens will provide the required hydraulic capacity for the new processes. Improvements to the Elgin Lift Station are also included in this project. WHKS is working with the contractor and plant staff to provide the coordination and planning necessary to implement the improvements during continued operation of the existing facility.

Wastewater Treatment Facility Superintendent Rick Turri says, "It's exciting to see the construction progress. I'm looking forward to putting some of the new processes online." WHKS has worked closely with Turri and the Sanitary District Board on this project.

WHKS provided engineering services for the facilities plan, preparation of plans and specifications and construction management and observation for the wastewater treatment facilities upgrade.

The contract was awarded to Gridor Construction, Inc. of Buffalo, Minnesota. Construction of the \$5 million project is expected to be complete by September 2007.



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Railroad Bridge over US 20 Bypass in Moorland, Iowa

WHKS is currently developing plans for a new railroad bridge to be constructed north of Moorland in Webster County, Iowa. The new structure carries a Union Pacific line over the US 20 Bypass of Moorland.

The bridge consists of two through plate girder interior spans flanked by shorter deck beam approach spans. Interior spans are 121 ft and 107 ft long and the approach spans are 47 ft long for an overall length of 322 ft. Approximately 486 tons of structural steel will be need to construct the bridge superstructure. Stub abutments and wall piers founded on steel H-piles support the superstructure.

WHKS is working closely with the Iowa DOT and another consultant to coordinate construction of the bridge with the construction of the US 20 Bypass. Bridge construction will be preceded by excavation for the roadway underpass and construction of a rail shoofly. The rail shoofly will maintain rail service by diverting train traffic around the bridge construction. Once the bridge is completed, train traffic will be transferred from the shoofly to the final alignment across the bridge and the shoofly will be removed. Roadway construction and paving will then be completed.

This project is scheduled for letting in February of 2007 and should be completed by Fall of 2007 or Spring of 2008. Check plans were recently submitted to Iowa DOT for approval.

WHKS Presents Options to Alleviate Intersection Flooding in Ames

The City of Ames, Iowa retained WHKS to perform a design concept analysis to determine feasible design options to improve storm water drainage at the Stanton Avenue and Chamberlain Street intersection in Ames.

The intersection is in a depression and storm water that is not carried by the existing system “ponds” in the intersection until the system can drain the water. During heavy rain events, the ponded water overtops the sidewalk, landscaping and parking lot curb north east of the intersection and then continues northeasterly along the historic flow path for this basin. The overland flow path has an overtopping elevation that hinders pedestrian traffic and access to businesses on the southeast corner of the intersection when the water ponds.

The existing intakes have the design capacity to handle design storm water flows, however the older storm pipe system has approximately one quarter of the required capacity and is therefore the limiting factor.

The project is challenging because the existing storm water system has several physical constraints, including the capacity and invert elevations of the existing piping. The project is located in built-up urban area and vehicular and pedestrian traffic disturbance could be significant.

WHKS has evaluated and discounted pipe bursting due to expected significant pavement heave, the proximity of an adjacent gas main, and the need to trench to “fix” existing pipe invert elevation problems. WHKS is currently evaluating an alternate alignment option for a portion of the system. Construction for the improvements is planned for summer 2007.



View from north of Chamberlain St. looking southerly during ponding (Photo Courtesy of the City of Ames)

Roadway Design

Project Automation Resource for Iowa Department of Transportation

The Iowa Department of Transportation (Iowa DOT) selected WHKS to develop an electronic Project Automation Resource (PAR) for the Office of Design. The purpose of the project is to create an electronic manual that will document and standardize tools and processes that relate to Iowa DOT highway design practices. The final product will be a tool will be used by Consultants providing services to Iowa DOT and by DOT staff.

The project requires an extensive understanding and experience with MicroStation and GEOPAK software. WHKS has extensive roadway design experience in Iowa and software expertise relating to Iowa DOT design and procedures, since the firm has provided services to Iowa DOT for over 45 years. The team is complemented by technical services of Axiom, a Florida software company that provides services exclusively to MicroStation users.

The PAR will be designed in a chronological order that is consistent with roadway project development and will also explain to users the reasoning for the use and application of DOT automation tools. To determine and document these processes, the WHKS team will begin by conducting surveys with Iowa DOT staff at different points in the process to determine planned and future software use and review of existing policies and manuals relating to design. The first phase of the project will conclude with a report that summarizes the results of the surveys, provides an inventory of current and planned software and provides initial PAR design information based on the results of the survey. The first phase of the project is expected to be complete by Fall 2006.

Peer Review of the Damage Inspection and Load Rating Process of PPC Deck Beam Bridges for Illinois DOT

WHKS is currently conducting a peer review of the bridge inspection and load rating policies and procedures for “critical” Precast, Prestressed Concrete Deck Beam bridges as carried out by the Illinois Department of Transportation (IDOT), Bureau of Bridges & Structures (BBS). The inspection and load rating process, developed by the BBS, in response to the National Bridge Inspection Standards (NBIS) mandated by the Federal Highway Administration (FHWA) is currently being updated to reflect the results of a recent study performed by the University of Illinois at Urbana-Champaign. The BBS has commissioned WHKS to study and evaluate the process and make recommendations for improvement where necessary.

As part of the study, WHKS will interview BBS personnel significantly involved in the development and execution of the

process. WHKS bridge inspection staff will also accompany IDOT inspection personnel during “Damage” and “Special Feature” inspections as well as perform independent inspections of randomly selected bridges throughout the state in accordance with NBIS. To aid in the evaluation of the rating segment of the process, WHKS will perform independent load ratings of several bridges recently analyzed by BBS staff.

The time duration to complete the entire process is a key concern, so the BBS has also requested that WHKS determine and evaluate the time requirements at current staff levels. To accomplish this goal, WHKS will study the complete time interval by selecting 50 random bridges, which have been through the entire process. Evaluation and recommendations will be based on a review of Department records for these bridges and through discussions with key staff.

This project is the first assignment for our Various-Variou contract with the Bureau of Bridges & Structures.