Snohomish County Public Works

Customer Success Story

AutoCAD® Civil 3D®
Autodesk® Vault
Autodesk® Design Review

Autodesk Vault and Civil 3D are essential to our collaborative approach to construction project development. In fact, we believe there are no better products available to help us achieve our engineering and construction goals.

—Brad Hofman
Business Process Analyst
Snohomish County Public Works

Find what works—fast.

Snohomish County Public Works designs complex road realignment with AutoCAD Civil 3D and Autodesk Vault.

180th Street and Snohomish Avenue, aerial view. Courtesy of Brian K. Blechschmidt, Inc., photographer; and Snohomish County Department of Public Works.

Project Summary

With an annual budget of more than $294 million and a 2009 construction budget of $75 million, Snohomish County Public Works is the largest department in the government of Snohomish County, Washington. Working from a central campus and 10 outlying sites, the agency's 670 employees perform a variety of services, including road maintenance, traffic engineering, and surface water management. One of the department's most active divisions is Engineering Services, which oversees surveying, mapping, and right-of-way acquisition, as well as road and bridge design/engineering and construction. To achieve higher levels of design excellence and productivity, Engineering Services recently adopted AutoCAD® Civil 3D® building information modeling software and Autodesk® Vault data management software. "Within our division, 55 people use Civil 3D in conjunction with Autodesk Vault," says Brad Hofman, business process analyst. Since standardizing on the two products in 2007, Engineering Services has completed approximately 20 projects, including a complex realignment of a rural Snohomish County intersection.

The Challenge

"The existing intersection at 180th Street SE and Snohomish Avenue was quite askew," says Sam Therres, senior CAD technician in design. "Our major goal was to improve traffic flow and safety by installing left-turn lanes on 180th Street SE and adding 8-foot-wide shoulders to accommodate pedestrians and bicyclists." Snohomish County Public Works also wanted to minimize the need to purchase right-of-way on the $650,000 project.

Because the realignment would significantly increase the amount of impervious surface in the surrounding area, the designers had to modify the existing storm drainage system to help ensure that any proposed changes would not negatively impact wetland buffers on the north and northeast sides of the project. "Our plan was to include a pond on-site that would detain stormwater, filter impurities from runoff, and recharge the underground aquifer with clean water," says Therres. "We believe that the completed project will actually enhance and help preserve the nearby wetlands."

Autodesk®

Using Civil 3D, designers more quickly created four design options that combined different slope and widening configurations.

The Solution

AutoCAD Civil 3D and Autodesk Vault played a critical role in the successful completion of the project. "Within Engineering Services, we're working toward an end-to-end digital life cycle for our projects," says Hofman. As an important step toward that goal, the division began implementing Civil 3D in 2005. Shortly thereafter, in 2006, the division's director, Art Louie, mandated the use of Civil 3D on all new projects. "We believed that Civil 3D would deliver the productivity improvement we needed to handle our increasing project load—even in the face of anticipated staffing constraints and reduced funding."

Since a natural synergy exists between Civil 3D and Autodesk Vault data management software, the division's management team adopted Autodesk Vault in early 2007 to help maximize the hoped-for productivity gains. Fully integrated with Civil 3D, Autodesk Vault provides a repository for storing and managing Civil 3D project data, including alignments, profiles, surfaces, and pipe networks.

"The Autodesk Vault implementation was easy, especially considering that a typical business improvement with a significant IT component can take years," says Hofman. "Once we understood how the technology fit into our data-management mix, Autodesk Vault was easy to use too." During the transition, the division turned to The PPI Group, an authorized Autodesk reseller, for training and support. Currently, 55 engineers, surveyors, technicians, and analysts within Engineering Services rely on Autodesk Vault for information exchange.

Explore Multiple Design Options—Fast

Surveying for the project began in 2007. The surveyors collected data in the field, brought it to the office for processing with Civil 3D, and uploaded it to Autodesk Vault, where the designers could access information about the existing ground and features and use it as the basis for preliminary site design. "That's where Civil 3D really shined," says Therres. "We were able to more quickly and easily come up with four design options that combined different wall, slope, and widening configurations, helping us work within the existing right of way and save time and money."

Using traditional design tools, generating and modifying that many options would have taken considerably longer. By contrast, using Civil 3D the designers could more quickly create and modify the designs as needed. "Building corridors is so easy in Civil 3D that I was able to handle whatever the engineers threw at me—even at the last minute," says Therres.

That level of responsiveness helped the management team make better design decisions faster. "Because we could more quickly generate and compare multiple options, we could more easily select the one that best fit the required site footprint, while also solving the site's many complex challenges," says Therres.

For example, to compensate for an already high water table and the greater levels of water flow that would result from increasing the amount of impervious surface area at the intersection, the Engineering Services division used Civil 3D and a third-party stormwater analysis tool to design a low-impact retention pond. In order to accurately determine the optimal pond size and shape, the designers had to perform many different design iterations. "The completed pond had to detain adequate amounts of water without being too deep for the site," says Therres. "Civil 3D was outstanding throughout that entire process."

"Once we nailed down the preliminary site design, the flexibility of Civil 3D helped us get down to the nuts and bolts of detailed design, when we tweaked smaller areas to get them exactly the way we wanted," says Therres. "That kind of work is easier to do in Civil 3D." For production of contract documents, such as plans and profiles, Engineering Services used the Sheet Set Manager in Civil 3D. "That helped increase our productivity—right down to the little things, like page numbering."

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> Senior CAD Technician in Design
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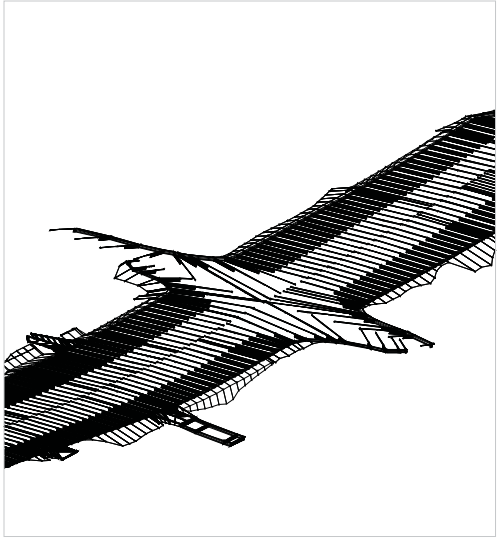
View of the southern side of the newly created pond. Image courtesy of Snohomish County Department of Public Works.

Manage and Store Design Data
Throughout the entire project, Engineering Services used Autodesk Vault to store design information. "Autodesk Vault served as our data warehouse for alignments, profiles, surfaces, and more," says Therres. "It was our main information-sharing resource. For improved coordination, data management, and true multiuser access, I just cannot see using anything else."

Autodesk Vault helped the design team manage and track design changes on the project, encouraging accountability, even within the consensus-based department. "I knew that when I pulled up a drawing I was using the most current project data," says Therres. And when something went wrong, Autodesk Vault—unlike traditional data restoration methods, which are time-consuming and cumbersome—helped designers quickly restore lost data or revert to the last acceptable version.

View from the southeast corner of the finished pond. Image courtesy of Snohomish County Department of Public Works.

Increase Collaboration
To make the most of staffing and fiscal constraints—especially during the recent economic downturn—the Engineering Services division often relies upon a network of local scientific, engineering, and financial consultants as well as extensive relationships with larger national firms, such as CH2M Hill and David Evans and Associates. "Civil 3D and Autodesk Vault are essential parts of that collaborative process," says Hofman. "They have assisted in shortening our project-development turnaround times and helped us react more effectively to last-minute changes from our consultants."



3D corridor created in AutoCAD Civil 3D. Image courtesy of Snohomish County Department of Public Works.

Keep Growing
Although the Engineering Services division has already standardized on Autodesk Vault and Civil 3D, it has more ambitious plans for the two products. "Most people cannot read plans," says Hofman. "That is why models are so useful." Currently, Engineering Services uses a limited set of Civil 3D visualization tools—such as simple 3D renderings or orbits—to share information with in-house engineers or the management team.

"Now, however, people in Snohomish County are starting to see the benefit of visualization tools," says Therres. "I envision us digging much deeper into visualization in the near future." To facilitate faster review and round-tripping, the division also plans to pursue a widespread implementation of Autodesk® Design Review software in 2010.

Set High Standards
One of the most important benefits the division of Engineering Services has realized through adoption of Civil 3D and Autodesk Vault is standardization of its data-management structure. "Until recently, CAD data could have been stored on any number of individual or network drives," says Hofman. "There was a lot of data duplication—the kind of mistake most organizations commit until they understand the benefits of a formal data management process. Sometimes, we even ended up using the wrong files, wasting valuable time and effort."

Much of the impetus behind adoption of Civil 3D, a standards-based application purpose-built for civil engineers, was a desire among the management team to encourage the development of better and more comprehensive standards. "Civil 3D helped us reduce much of the process wheel spin that would result from people using out-of-date blocks," says Hofman. "It also gave our files a much more consistent look and feel."

"That is really important for the people who build our roads and bridges," says Hofman. "Our contractors will actually give us higher project bids when we provide them with inconsistent-looking plans because they are less certain of how predictable our work will be."

By consolidating files in Autodesk Vault, Engineering Services can access all of its project data quickly and efficiently.

"Now that we have consolidated all of our project files in Autodesk Vault, there is no more guessing," says Therres. "We know where data is and can access it quickly and efficiently." To create new projects, Engineering Services relies on standardized Autodesk Vault project templates, which save time and are also quite convenient and easy to use. "Autodesk Vault and Civil 3D are really nice products to use. Adopting both of them has been an excellent decision for Snohomish County."

The Result

Public Works completed the realignment at the intersection of 180th Street SE and Snohomish Avenue in autumn of 2009. "Autodesk Vault and Civil 3D are essential to our collaborative approach to construction project development," says Hofman. "In fact, we believe there are no better products available to help us achieve our engineering and construction goals."

"They absolutely helped us improve design quality," says Therres. "Using Civil 3D, we more quickly generated multiple design scenarios and developed a good feel for what would work—and what would not. That helped us move forward on a solid design faster."

"Autodesk Vault was vital to the success of the realignment project," says Therres. "It helped us remain confident that we were sharing the most up-to-date and accurate data, and that everyone on the team was looking at the same version."

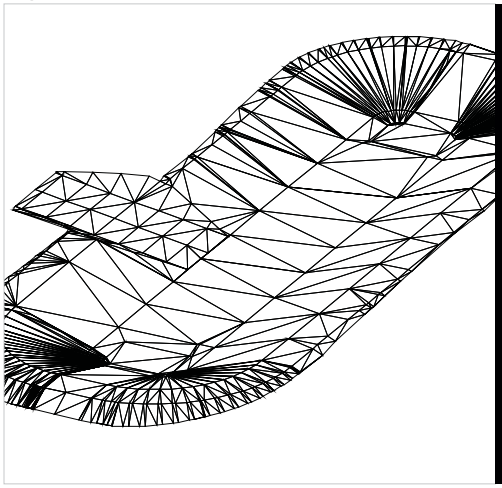
Another division within Snohomish County Public Works, Surface Water Management, has enjoyed similar success using AutoCAD Civil 3D on design projects requiring faster turnaround and close coordination with the survey, engineering, and design consultants.

Snohomish County Public Works has a 20-year history of success with Autodesk products. "They help us work more efficiently, both within our project teams and with our consultants," says Therres. "Civil 3D is here to stay, and I do not ever see us using anything other than Autodesk Vault—unless Autodesk comes up with something even better."

For more information, visit **www.autodesk.com/government**, **www.autodesk.com/civil3d**, and **www.autodesk.com/vault**.

New left-turn lanes and shoulders on 180th Street SE improve traffic flow and safety. Image courtesy of Snohomish County Department of Public Works.

Pond plan for intersection of 180th Street SE and Snohomish Avenue. Image courtesy of Snohomish County Department of Public Works.



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