

Figueiredo Ferraz

Customer Success Story

Clients:
Development Company of the
State of Amazonas
Secretary of State for Infrastructure,
Government of the State of Amazonas

AutoCAD® Civil 3D®

Autodesk® 3ds Max® Design

Autodesk® Revit® Structure

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Autodesk BIM solutions help us develop, visualize, and study more design alternatives, enabling us to deliver higher-quality engineering designs more efficiently to our clients.

—Charles Neilson
Business Development Director
Figueiredo Ferraz

Urban Renewal with Building Information Modeling

Figueiredo Ferraz uses Autodesk BIM solutions on an Amazon recovery project.



Rendering of planned Franco watercourse. Photo by Warrington Redmel. Image courtesy of Figueiredo Ferraz.

Project Summary

Figueiredo Ferraz is one of Brazil's foremost engineering companies, with a reputation for delivering innovative solutions for complex engineering challenges that minimize environmental impacts. Founded in 1941, the firm has designed many of South America's most important highways, subways, and infrastructure projects. Figueiredo Ferraz adopted Autodesk building information modeling (BIM) solutions in 2008 to help deliver maximum value to its clients—primarily governmental agencies—whose large, multidisciplinary projects require design agility, coordination, and efficiency. The company uses AutoCAD® Civil 3D® software and Autodesk® Revit® Structure software for civil and structural engineering design, Autodesk® 3ds Max® Design software for visualization, and AutoCAD® software for drafting and documentation.

One of the firm's recent BIM projects targets environmental recovery for the Sapolandia, Franco, and Quarenta watercourses in Manaus, Brazil. Currently under construction, this government project aims to protect these watersheds and improve the quality of life for nearby residents and businesses. The project includes urban renewal of the land adjacent to the watercourses, implementation of drains and sewer systems, and construction of bridges and pedestrian overpasses.

The Challenge

The public lands along these watercourses were riddled with substandard self-constructed housing, often lacking the basic infrastructure for sewage, drinking water, and electricity. This situation led to the pollution of the watercourses and choked the natural water flow, provoking further environmental degradation in the area and contributing to the cycle of diseases such as malaria and dengue fever.

"The recovery targets approximately 50 acres of an urban area and affects the relocation of more than 10,000 people," explains Charles Neilson, business development director at Figueiredo Ferraz. "For a project of this scope, we needed a multifaceted solution that addressed drainage, traffic circulation, sewage collection and treatment, as well as the urban renewal, revegetation, and landscaping of the stream banks. And in addition to the engineering aspects of the project, we had to reach design consensus with various city, state, and local groups involved in the project."

Autodesk BIM solutions help create, coordinate, visualize, and evaluate sustainable design options.

The Solution

“Civil 3D software helped us develop and study a series of sustainable design alternatives for each watercourse,” says Marcos del Nero Millan, engineer at Figueiredo Ferraz. “Our BIM approach helped us quickly alter specific features of a design—a bridge crossing or a roadway alignment for example—to more efficiently create, coordinate, visualize, and evaluate design options.”

Coordinate and Evaluate Design Alternatives

The team used existing imagery and geospatial data combined with project survey data to coordinate their designs with existing city infrastructure. BIM design processes also enabled Figueiredo Ferraz to coordinate its designs with the other members of the extended design team. For example, the project architect used Figueiredo Ferraz’s grading and alignment models to coordinate its building designs with the infrastructure designs.

In addition, Figueiredo Ferraz used 3ds Max Design software to help aggregate cross-discipline design models into a single visualization of the project in order to better facilitate design reviews, approvals, and public outreach efforts. This helped various oversight committees better understand and evaluate design alternatives, helping to speed their decision making.

React More Quickly to Design Changes

Throughout the design process and the sequence of design iterations, the team used Civil 3D software to assist in identifying and resolving conflicts—helping to keep the documentation set (of almost 700 drawings) coordinated and the project on schedule.

BIM processes also enabled Figueiredo Ferraz to react more quickly to design decisions and changes. “At one point we discovered a mismatch between an existing street and a planned viaduct over one of the watercourses,” recalls Millan. “But construction of the bridge abutments was about to start, and this work had to be finished before the seasonal flooding of the Amazon River caused the water table to rise. Civil 3D enabled us to more quickly make some grading adjustments and produce new drawings for the construction team.”

The Result

After evaluating many alternatives, the project team settled on optimal environmental strategies for the watercourses. The final designs are complete; the cleanup and construction of these watercourses is underway, and Manaus citizens are looking forward to their new waterside environs.

Figueiredo Ferraz now relies on Civil 3D software for all of its civil engineering projects and is beginning to use Revit Structure software for projects involving bridge, viaduct, and tunnel design. “Autodesk BIM solutions help us develop, visualize, and study more design alternatives, enabling us to deliver higher-quality engineering designs more efficiently to our clients,” says Neilson.



Franco watercourse rendering. Photo by Warrington Redmel. Image courtesy of Figueiredo Ferraz.

For more information, visit www.autodesk.com/civil-infrastructure, www.autodesk.com/gov, and www.autodesk.com/bim.



Photo of existing Franco watercourse. Photo by Warrington Redmel. Image courtesy of Figueiredo Ferraz.

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—Marcos del Nero Millan
Engineer
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