

Gould Evans
TranSystems
HDR Architecture

Customer Success Story

Client: The National Oceanic and Atmospheric Administration

Autodesk® Revit® Architecture

Autodesk® Revit® Structure

Autodesk® Navisworks®

Autodesk® 3ds Max® Design

Autodesk BIM solutions helped us produce high-quality design drawings and documentation. We are very happy with the project outcome and with the role Revit Architecture played in helping us to achieve it.

—Jim Schraeder
Project Manager
Gould Evans

In recognition of the design team's exemplary work, the San Diego chapter of the American Institute of Architects (AIA) recognized the NOAA La Jolla Laboratory Replacement project with an honor award, the organization's highest form of recognition.

Collaborate. Coordinate. Complete.

Autodesk BIM solutions help design team surpass goals on stimulus-funded oceanographic research facility.



Aerial image from southwest. Image courtesy of Gould Evans.

Project Summary

In 2007, the National Oceanic and Atmospheric Administration (NOAA) initiated the La Jolla Laboratory Replacement Project at the Scripps Institution of Oceanography, a graduate school of the University of California, San Diego. Funded by the American Recovery and Reinvestment Act (ARRA), the \$102-million project will replace the existing Southwest Fisheries Science Center with a state-of-the-art building that will better support the oceanographic research efforts of NOAA's National Marine Fisheries Service. To design this complex facility, NOAA selected a proven team of more than a dozen consultants working around the country. The architectural firm Gould Evans served as the architect of record, responsible for coordinating the team's efforts. To help maximize coordination among the consultants and enable the production of high-quality construction documents, the team used several Autodesk® building information modeling (BIM) solutions, including Autodesk® Revit® Architecture software, Autodesk® Revit® Structure software, Autodesk® Navisworks® software, and Autodesk® 3ds Max® Design software.

The Challenge

The original building was located on an eroding bluff. NOAA selected a new location across the street on a steep hillside overlooking the La Jolla Cove. In addition to staying within budget, the team had to surmount numerous design challenges, including a complex building program, an aggressive schedule, and the need to preserve scenic view corridors to the ocean over the top of the facility.

Once built, the facility will include 120,000 square feet of office and laboratory space, a concealed parking garage for 200 automobiles, and a unique multistory, 500,000-gallon ocean technology test tank that must be kept acoustically and seismically isolated from the rest of the facility. The completed salt-water tank will enable scientists to perform crucial ocean-research efforts in a controlled laboratory environment. "No other research institution in the world has anything of this size and capability," says Jim Schraeder, project manager at Gould Evans.

Autodesk®

With help from Revit Structure, TranSystems performed extensive last-minute changes to the building's framing systems—fast.

Throughout the project, the team had to incorporate input from geographically dispersed consultants, all of whom—with the exception of Gould Evans—had never used Autodesk BIM solutions on a major project. TranSystems, based in Kansas City, Missouri, served as the structural and civil engineer of record. Other team members included Architects | Delawie Wilkes Rodrigues Barker, the associate architect from San Diego; and Gibbens Drake Scott, Inc., the prime consultant with NOAA and one of three firms responsible for mechanical, electrical, and plumbing (MEP) engineering on the project. HDR Architecture, Inc. (HDR) served as the laboratory, security, specifications, and sustainability consultant.

The Solution

The structural consultants from TranSystems were the first to employ BIM on the project, using Revit Structure software during the schematic design phase to help create the initial model of the building's complex dual-structural system.

Gould Evans followed suit at the start of design development, using Revit Architecture to help build a foundational 3D model of the new, structurally complex facility. "We essentially started construction drawings at that time," says Todd Ault, project architect and Revit coordinator at Gould Evans. In fact, as the design progressed, the design development documents more naturally evolved into a compelling set of construction drawings, differentiated from the earlier documents only by percentage of completion.

Collaborate More Easily

Using a common BIM platform helped the two firms improve coordination on the project. For example, throughout the design process, Gould Evans regularly passed the architectural model to TranSystems for further documentation. "When we overlaid the structural model on the architectural model, it became very evident where we still needed to refine our work," says Jeff Reeder, the project manager from TranSystems.

The architects at Gould Evans agreed. "If we both had not been using Revit-based software, it would have been challenging to coordinate the structural drawings with the architectural drawings," says Schraeder. Lack of coordination on such projects can result in design errors, construction delays, and additional costs. Revit-based software helped the team minimize these types of issues.

For example, the floors within the ocean technology test tank do not synch with those in the rest of the building. "Coordinating these floor-height changes was very difficult," says Ault. With help from Revit Architecture, Gould Evans was better able to catch and correct several potential errors—including an unintended 10-foot step into a mechanical room. "Finding challenges like that before they got into construction documents really helped our relationship with the building's users."

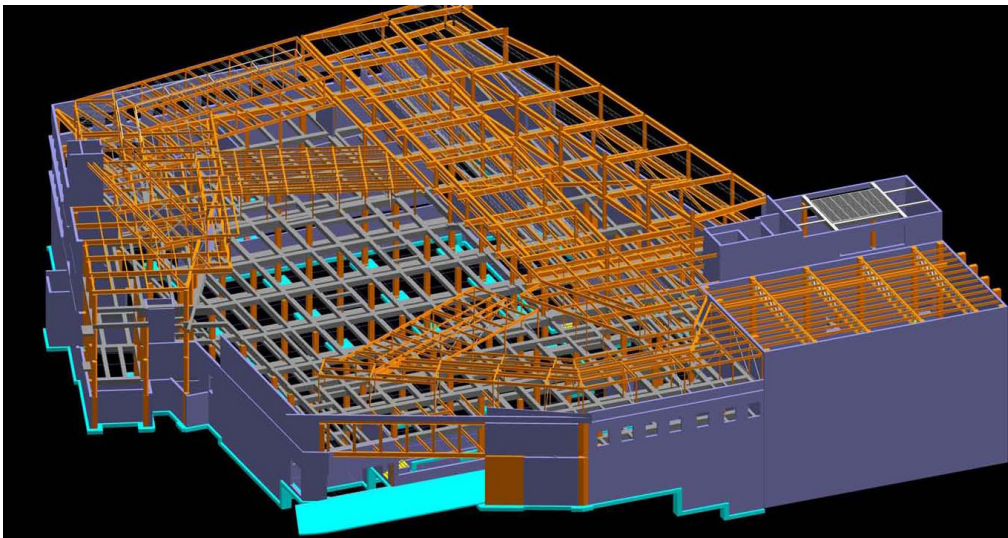
BIM's ability to produce easy-to-understand, 3D solutions for our clients is absolutely invaluable. People who use BIM do not want to go back. It just does not make any sense.

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"We also had to respond to frequent client requests for relatively small changes—such as moving a wall—that would have a ripple effect through the design," says Schraeder. With help from Revit Architecture and Revit Structure software, the architects and engineers could make a change in one location and that change would automatically update the entire model.

"The Revit platform helped make coordination and collaboration with the structural engineers so much easier," says Ault. "The fact that TranSystems was working in Revit Structure helped us save countless hours of rework, and we were better able to function as a close-knit team."

When design changes were necessary, the architects and engineers could implement them more rapidly. "For example, very late in the game, Revit Structure helped us to completely revamp some framing systems in very short order," says Reeder. "We could not have done that using a traditional 2D approach. Revit Structure was extremely valuable."



Structural frame model. Image courtesy of TranSystems.

Supercharge Design Decisions

One of the biggest advantages of using a tool such as Revit Architecture is the tremendous amount of information it provides—information that architects, engineers, and project owners can use to help make more-informed design decisions.

For example, in addition to a traditional set of design documents, Gould Evans used Revit Architecture to visualize the facility, helping to create a series of cross sections, axonometrics, and 3D closeups of numerous building components. “These additional deliverables really helped our client understand the design process and see how the finished building will appear,” says Schraeder.

In one instance, the design team used BIM to help evaluate if the end users would be able to move large pieces of marine equipment—such as ocean buoys or small submersible devices—through the facility and into the ocean tank. “The Revit model helped us to visualize in advance how to maneuver the equipment and select the best routes,” says Ault.

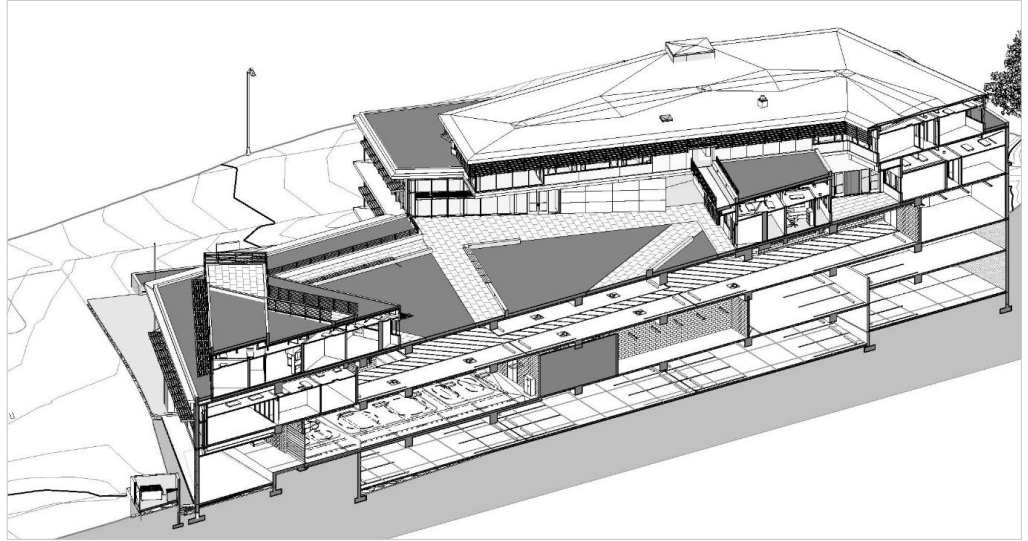
Create Stunning Visualizations

Exporting the Autodesk Revit model helped the design team to take advantage of the powerful visualization capabilities found in two other Autodesk BIM solutions, 3ds Max Design and Navisworks.

For example, using 3ds Max Design, Gould Evans imported portions of the model to help simulate the sun’s movement across an intricate lacework of terra-cotta sunscreens on the west face of the



Building’s main entry. Image courtesy of Gould Evans.



North-south building section. Image courtesy of Gould Evans.

building. This process generated data that helped the team balance the need for preserving view corridors to the ocean with energy and comfort considerations, such as solar gain and visual glare. To help solidify buy-in to the design by NOAA, the University, and the greater La Jolla community, Gould Evans used 3ds Max Design to help create a series of near-realistic, cinematic-quality renderings of the completed building.

The Navisworks product proved equally valuable. Near the end of the project, TranSystems used Navisworks software to help create an interactive walk-through of the ocean technology test tank for the owner. “Being able to simulate walking inside and around the tank before it was built was an excellent selling point,” says Reeder. “The client was quite impressed, especially with the visualizations.”

This walk-through proved instrumental in obtaining the final sign-off on the project. “Being able to visualize the tank in 3D on the fly was great for the client,” says Schraeder. “It helped them understand that they would be able to use the facility in the way they wanted. Navisworks software was very useful.”

Keep It Green

Whenever possible, the client incorporated sustainable design features in the project. In this respect, the ARRA funding was crucial, helping the team to meet the basic project objectives, while incorporating numerous sustainable features, including an

extensive rooftop photovoltaic system, vegetative roofs for stormwater management, recycled and regionally sourced building materials, natural ventilation systems, and a variety of corrosion-resistant materials, such as poured-in-place concrete and stainless steel exterior fixtures.

Revit Architecture played an important role in the implementation of several of the sustainable strategies. For example, many of the LEED® sustainable design certification categories—such as area or volume calculation—require extensive quantity takeoffs. “With help from Revit Architecture, those are easier to obtain,” says Ault.

With help from Autodesk BIM solutions, Gould Evans produced high-quality design drawings.

In its role as the sustainable design lead on the project, HDR used Revit Architecture to help perform volume calculations more quickly and easily in designing the building's laboratory spaces. During the design process, HDR also created numerous Revit-compatible digital models of laboratory equipment and casework and, in several cases, challenged suppliers to create similar models of their own equipment. These models helped HDR integrate the lab equipment, casework, and building systems into the lab design. "Furthermore, we have been able to reuse them on many other projects, helping to save valuable time and improve the quality of our designs," says Regina Filipowicz, senior laboratory planner at HDR.

The Result

In July 2009, Gould Evans issued initial bid documents for major site excavation and soil retention work, followed shortly thereafter by a full set of bid documents. Construction is underway and expected to be completed in 2011.

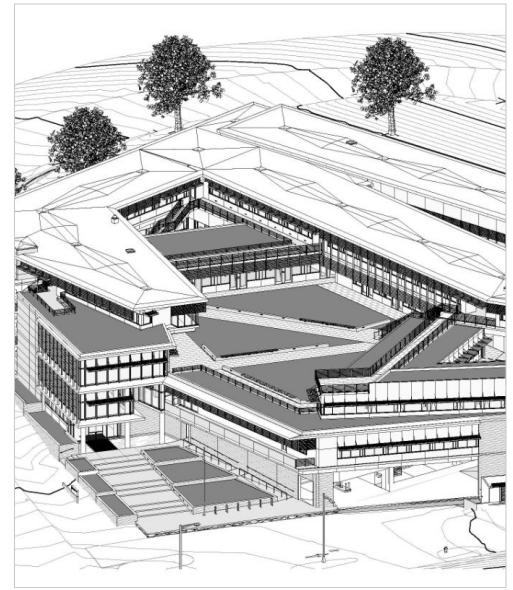
"Autodesk BIM solutions helped us produce high-quality design drawings and documentation," says Schraeder. "We are very happy with the project outcome and with the role Revit Architecture played in helping us to achieve it. Our goal was to maximize the use of Revit Architecture in coordinating work among the many consultants; we were extremely successful."

TranSystems experienced similar results with Autodesk BIM solutions. "Revit Structure and Navisworks helped us to more quickly visualize a very complex structure," says Reeder. "They were extremely useful on this project; I recommend the BIM approach wholeheartedly."

In recognition of the design team's exemplary work, the San Diego chapter of the American Institute of Architects (AIA) recognized the NOAA La Jolla Laboratory Replacement project with an honor award, the organization's highest form of recognition. Gould Evans also anticipates attaining LEED Gold certification.

Ultimately, Revit Architecture, Revit Structure, Navisworks, and 3ds Max Design helped the design team make more-informed design decisions; improve the quality of productivity; and produce higher-quality, better-coordinated design documents, as well as near-realistic visualizations. "BIM's ability to produce easy-to-understand, 3D solutions for our clients is absolutely invaluable," says Schraeder. "People who use BIM do not want to go back. It just does not make any sense."

For more information, visit www.autodesk.com/government.



Consolidated building axonometric. Image courtesy of Gould Evans.



View from third-level terrace. Image courtesy of Gould Evans.

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