



February 2011

# AUGIWorld

The Official Publication of Autodesk User Group International

**Could BIM Stand for  
Build Improved Milieu?**

**Civil 3D Guide to  
10 Map 3D Tools**

**Design Options  
with Revit MEP**



CROSS-DISCIPLINE

ARCHITECTURE

MEP

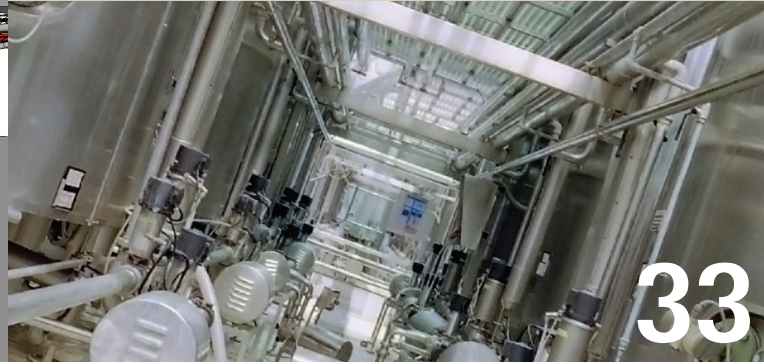
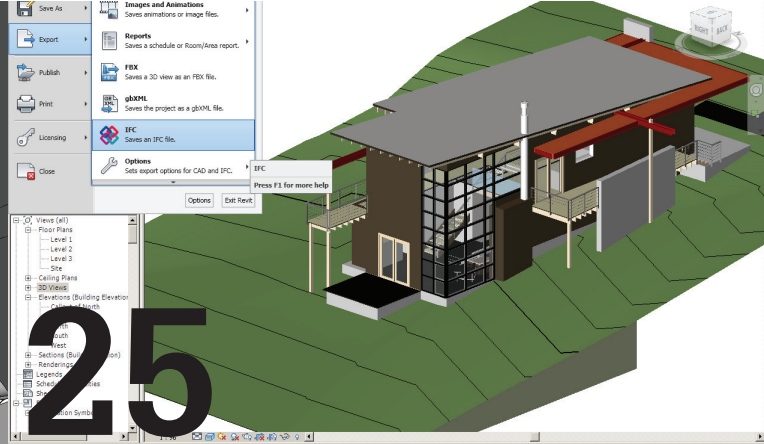
CIVIL ENGINEERING

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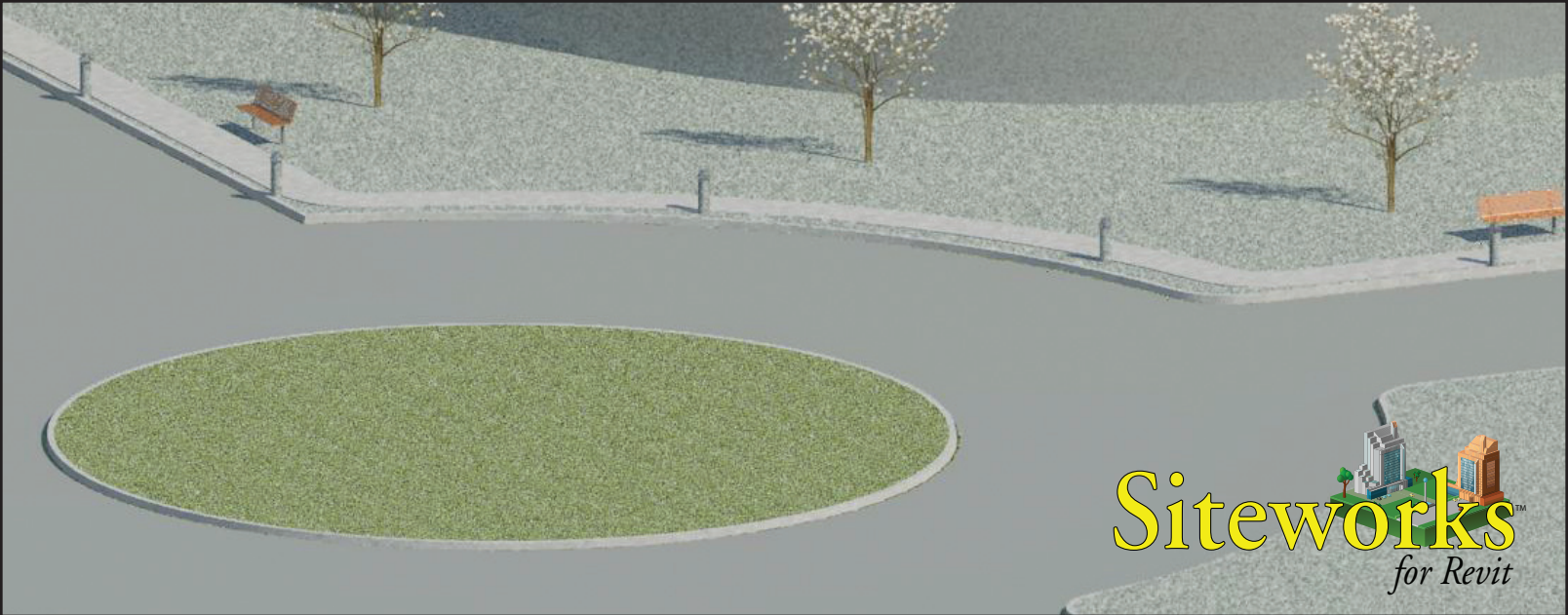
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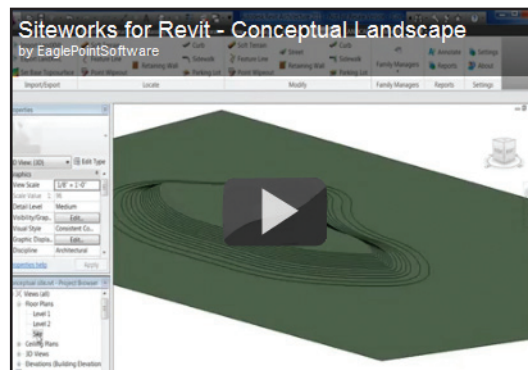
"I have a lot of praise for the tool. It is fantastic that, for those of us that want to stay in Revit for our Modeling and Visualization. The sheer capabilities of what it can model, versus the amount of time it would take to do manually, make it practically a no-brainer. I am personally advocating that my firm acquire it immediately."

*Aaron Maller, BIM Manager, The Beck Group*

Taken from the Siteworks for Revit product review in the AUGI AEC|EDGE Fall 2010 issue. [Read the full review.](#)

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# More than 20 Years of Keeping Autodesk Product Users Knowledgeable, Competitive, Productive, Efficient and IN THE KNOW



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is a monthly newsletter sent to all AUGI members via email. Reader receive timely information about upcoming events, special offers, and a number of columns and feature articles designed to deepen your understanding and enhance your use of Autodesk software.



## AUGIWorld Magazine

is a monthly magazine designed to help readers improve their use of Autodesk products and learn new techniques. Every issue is packed with product tips & tricks and other technical fare, management issues, and education trends. Distribution is worldwide.

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# AUGI



Change is one thing we can count on and we've got some changes to tell you about. If you didn't know this already, *AUGI AEC EDGE* (AAE) began with the Spring 2009 issue. Thereafter we released a new issue at the end of each season. Originally, without getting into great detail, AUGI was concerned about being able to continue using the existing magazine branded as *AUGIWorld* (AW). *AUGI AEC EDGE* (AAE) was started because AUGI wanted to expand into more discipline and software specific content but also because AUGI's Board of Directors was not confident that AUGI could continue to use the *AUGIWorld* brand. Time goes by...

This issue represents a new beginning, one where AAE and AW merge into *AUGIWorld*. AW will take on some of AAE's traits and all the authors who wish to contribute to AUGI will have their work published under the single AW brand. *AUGIWorld* will also become a monthly publication as opposed to the bi-monthly AW and quarterly AAE.

You might think I'm sad to see this happen since I helped get AAE started. Not at all, I could be blamed for getting the conversation started, the "ball rolling". The situations that faced the organization are different from a couple years ago. At times, as a member, I even felt somewhat puzzled by the overlap of the two publications we offered. I'm looking forward to seeing how the broad content that our members contribute will blend into a single richer and fuller publication.

## THE PUBLISHING TEAM

David Harrington is AUGI's new President as of January 2011. He has been shepherding the publications since rejoining the Board. He is now working with Board Member Peter Jamtgaard so Peter can take over the publication role, which will allow Da-

vid to focus on broader AUGI management. Tim Varnau and Debby Gwaltney are our Production/Layout Editors. They deal with what you see, how it is organized and presented. Marilyn Law is our Copy Editor. She helps our authors create work that is clean and clear. Tim and Marilyn have been working together on AW many years so you're probably very familiar with their work. You'll see the same careful attention to detail applied to this new AW. Mark Kiker (former AUGI President, Board Member and veteran volunteer) is helping AUGI with sales and advertising. Brian Myers will take on our AEC/BIM Content Manager role, Chris Fugitt has volunteered to be the Civil Content Manager and I will be taking on the Editor-in-Chief role for now. This is how our organization chart looks right now.

### AUGI Leadership

David Harrington – President  
Peter Jamtgaard – Publications

### Production

Tim Varnau – Production Editor  
Debby Gwaltney – Production Editor  
Marilyn Law – Copy Editor  
Steve Stafford – Editor-in-Chief  
Mark Kiker – Sales Advertising

### Content Managers

Civil – Chris Fugitt  
AEC/BIM – Brian Myers  
AutoCAD – Brian Benton  
Manufacturing – Pending  
Collaboration – Pending  
API - Pending

I'm looking forward to seeing how the broad content that our members contribute will blend into a single richer and fuller publication.

Note the pending opportunities to get involved! We are currently discussing these pending positions with members but if you have a passion for one of them please me know via email: [steve.stafford@augi.com](mailto:steve.stafford@augi.com).

#### THANKS AND RECRUITMENT

We always want to thank the authors who contributed their time and expertise to this issue, some new and some returning. Without them this magazine would be empty! They are as follows:

Brian Andresen, Christian Barrett, Gabe Cottam, Paul Crickard III, Troy DeGroot, Jason Dodds, Erik Lewis, Phil Pleiss, David Raynor, William Troeak.

If you really like a particular author's work please let us know so we can apply pressure, friendly, loving pressure, to ensure they return, often! As always if you want to be a part of this magazine as an author or as an advertiser please let us know.

- Steve Stafford - Editor-in-Chief: [steve.stafford@augi.com](mailto:steve.stafford@augi.com)
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#### PLANNING

As always we are actively recruiting for new articles for our next issue.

Thanks for Reading!

*Steve Stafford*

AUGIWorld Editor-in-Chief

AUGI Board of Directors member 2006-08

AUGI Revit Community Forum manager


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# Visibility / Graphic Overrides for Revit Links

Working as a BIM manager provides the opportunity to peer inside a wide variety of Autodesk® Revit® models from across all disciplines. What one sees while perusing often amazes and inspires. The creativity with which counterparts at other firms have tackled challenges in their own models can give you the strength and hope needed to push ahead with your own puzzles. What one sees while perusing also often shocks and horrifies. What were they thinking?! Who in their right mind would use {insert unintended category} to model a {insert intended category}? That's crazy!

What this means for those of us tasked with placing another firm's model into our own (AND getting it to show up as they intended within each of our own views) is often an ordeal. Every now and then it can also become a bit of a cat-and-mouse game as one tries to find in which category that thing was originally created in the linked model. These issues are amplified by working with a diverse range of companies and disciplines. Each group, at its own level of Revit adoption and learning and each with its own company-specific needs, is trying to meet within the limitations of the software.

Here I will discuss the essentials of visibility graphic overrides for Revit links, how to get your linked file to show you what you want to see, and some tips for chasing down those elusive elements so you can tweak them or turn them off altogether.

## THE "BASICS" TAB

From within the Visibility/Graphic Overrides dialog box:

1. Click on the Revit Links tab.
2. Highlight the link whose visibility graphics you want to edit.
3. Click on the button under the "Display Settings" column. (This will read By Host View, by default.)
4. This will open the RVT Link Display Settings Dialog.
5. We will start with the Basics tab.

The three radio buttons at the top of the RVT Link Display Settings dialog box allow you to set the graphic overrides of the linked file in this view one of three ways: By host view, By linked view, or Custom.

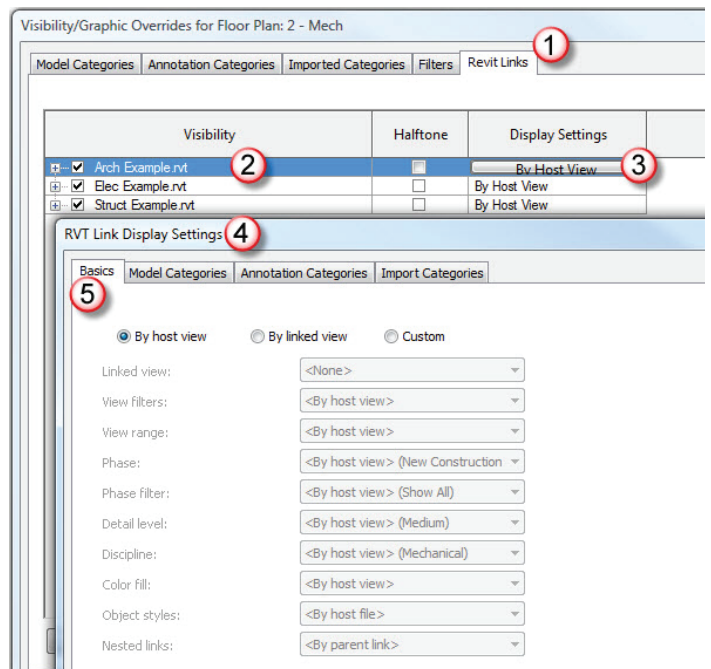


Figure 1: RVT Link Display Settings Dialog

## SETTING OVERRIDES BY HOST VIEW

The properties listed below the radio buttons will be grayed out when By host view is selected. This option will set the properties of your linked model to be the same as they are defined for this view of your model. Or, the Host view.

The properties are:

- View Filters
- View Range
- Phase
- Phase Filter
- Detail Level
- Discipline
- Color Fill
- Object Styles

Leaving these defined by the host view might cause undesired results. For example, you may wish to set your plumbing view range low enough to see waste piping below the floor. However, if your architectural model is set to that same view range, you might pick up the walls, windows, doors, or other architectural elements from that lower level as well.



The creativity with which counterparts at other firms have tackled challenges in their own models can give you the strength and hope needed to push ahead with your own puzzles.

### SETTING OVERRIDES BY LINKED VIEW

The next option is By linked view, which allows you to set the aforementioned properties to remain defined as they were created in the original Linked model. This will give you the option to select, from a pull-down menu, any view from the linked model whose properties you want shown in your current view. For an MEP firm, you may wish to link the architect's model to the floor plan view (the one placed on their sheet for printing). Which of the views this is, however, is not always obvious. The architect may have created in his or her model several views for each level of the project. These views may be named similarly and may not clearly identify their purpose. In these instances it is helpful to open the model directly and manually verify to which view you should link.

It should be noted that the views listed in the drop-down menu are only those views from the linked model that are of a similar "type" to the view in which you are currently working. For example, if you are in a Ceiling Plan view, you will only see Ceiling Plan views from the linked model in the drop-down list.

Using the By linked view option might not be ideal either. You might wish to set the linked model to a coarser detail level than it was originally authored to show an appropriate amount of detail for the type of view you are creating. Alternatively, you may wish to override the object styles of the linked model to match your host model and ignore any changes that the original model author made.

### SETTING CUSTOM OVERRIDES

The final option, Custom, allows you to select a combination of the two previous options. If you choose a view to link to then for each of these properties you can choose either By host view or By linked view. For many of them there are additional options to manually define the property for the linked view. For instance, the Detail Level property can be set to host view or linked view, or manually set to coarse, medium, or fine.

This option offers the most flexibility in defining each property as you would like to see it in your view. It is, however, more time consuming to set each of these properties in each view.

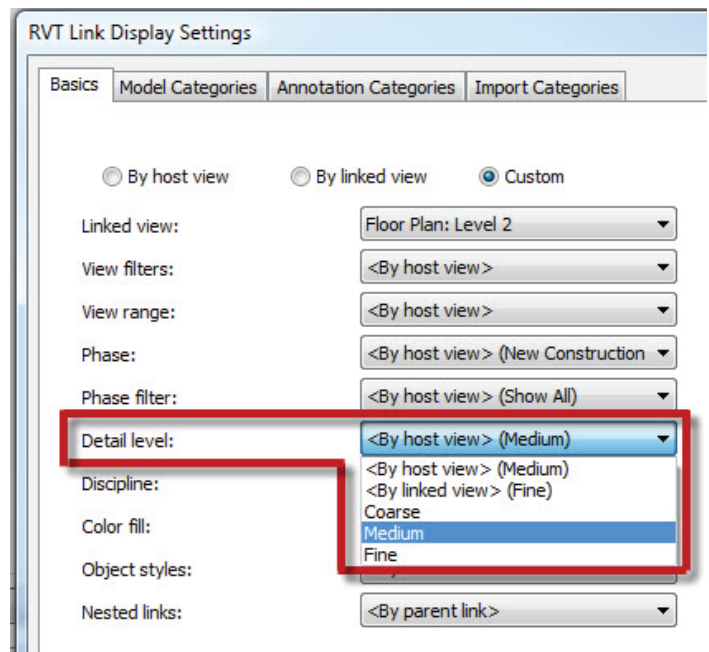


Figure 2: Detail level options

One common workflow is to set your view to "By linked view" first so that it inherits all of the linked view characteristics and then choose Custom and adjust the categories as needed.

### MODEL, ANNOTATION, AND IMPORT CATEGORIES

The remaining tabs within the RVT Link Display Settings dialog are:

- + Model categories
- + Annotation categories
- + Import categories

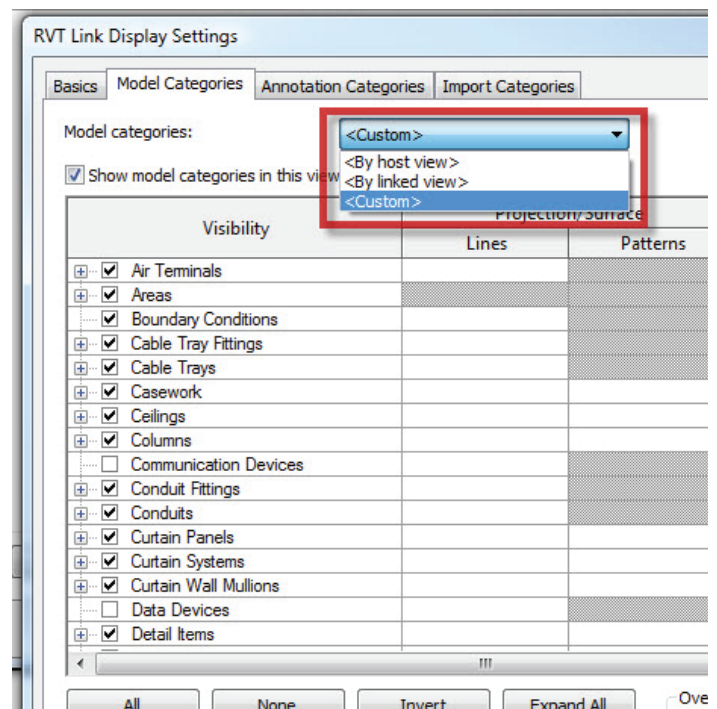


Figure 3: Custom model categories options

As a model author, try to keep in mind your project team members downstream who will be receiving your model.

The visibility of each category under these tabs is also affected by which option is chosen on the Basics tab. If you choose By host view, then all of the categories listed under these tabs will be controlled the same as they are in the Visibility/Graphics Overrides of this view. If you choose By linked view, then all categories will be controlled the same as they are in the Visibility/Graphics Overrides of the view to which they are linked. If Custom is selected, you will have the option to choose for each tab either By host view, By linked view, or Custom.

If you choose Custom on the Basics tab, then your options really begin to multiply. You could decide to set your Model Categories to By host view and your Annotation Categories to By linked view, or vice versa. Alternatively, you could set any of them to Custom, which allows you to control each category and subcategory individually. Here, I hope you are able to see how powerful this can be.

There is also a check box at the upper left corner of each of these tabs that is active when set to Custom. This allows you the option of turning off the entire tab. If, for instance, you have an electrical model linked in but you don't need to see any electrical annotations, just set to Custom and uncheck that box.

It's also worth noting that when working with linked files you will want to make sure the Show categories from all disciplines check box in the lower left is checked. If it is not checked, you will not be able to see all of the categories that you are trying to override.

### IDENTIFYING CATEGORIES TO OVERRIDE

You may already know many of the categories that you would like to override or turn off completely. The aforementioned annotations are notoriously annoying. With few exceptions, we tend to want to see only our own annotations on our drawings. Experience with a few projects will also give you a list of items that you don't want to see on

your drawings. We won't spend any time on the categories you already know you want to turn off. The tricks begin when you find something that you do not know off the top of your head how to adjust.

If you select the link in your view and right-click, you can choose Override Graphics In View, By Category. This will take you to the Revit Links Tab of the Visibility/Graphics Overrides dialog and it will highlight the link that you selected. You will want to set your display settings to Custom before we go on. Also each individual tab in the RVT Link Display Settings dialog should be set to Custom.

### OVERRIDING VISIBILITY OF LINKED ELEMENTS BY CATEGORY

Once you have gone through and set your linked file to By Link and linked the correct view, and set it to Custom and adjusted all of the known categories you need to turn off or change, then you are ready to try and identify some of the more difficult issues.

Here, the most important thing to remember is that the tab key is your friend. If you position your mouse over any element in the linked file and press the tab key, it will select just that element from within the link. With just that element selected you can see in the Type Selector which family and type it is. You can also right-click and Override Graphics In View, By Category. Or from the ribbon, on the View panel, select the paintbrush icon. This will take you directly to the correct category on the correct tab within the RVT Link Display Settings dialog. Just uncheck the box and the category goes away. Lather, Rinse, Repeat.

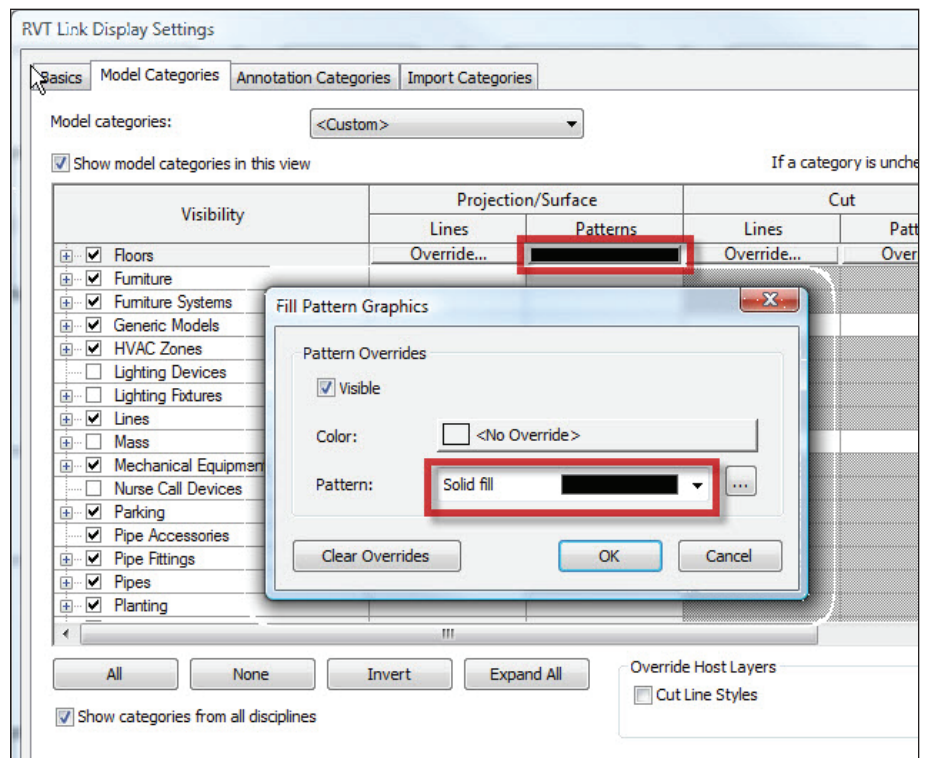


Figure 4: Override floor surface pattern

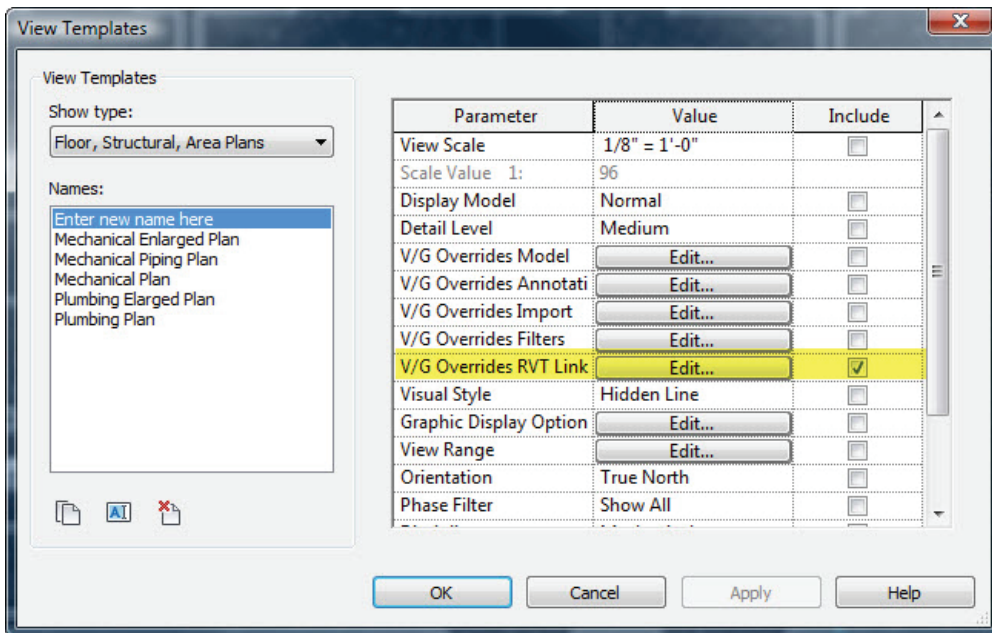


Figure 5: View template for V/G Overrides in Revit Links

If you don't want to turn the category off but only wish to adjust how the original model author chose to show it, you can choose from the other options within the RVT Link Display Settings dialog. For example, you have linked in a model with a floor that has a solid black surface pattern defined (for, we assume, a very logical reason). From the RVT Link Display Settings dialog, Model Categories tab, select Floors and click under Projection/Surface, Patterns. From there you can define a more suitable surface pattern or create a new one.

The same principle can be applied to edit the projection for cut lines, weight, color, and pattern. You can also set an entire category to Halftone or Transparent and override the detail level for that specific category.

## VIEW TEMPLATES

All of the changes we have talked about will apply only to the view you are in currently. If you need to transfer these settings from your current view to other views, use view templates. To create a view template, find your view in the Project Browser, right-click on your view, and choose Create View Template from View. If you want to create a view template that affects only V/G Overrides in Revit Links, simply uncheck all of the other categories when you create your template.

## GENERIC MODELS AND MODEL LINES

It gets more complicated when the model author creates multiple specific elements using generic categories. This makes it much harder to hide some while saving others. This is a common practice among new Revit users who have yet to identify

the proper procedures for creating the content they need. Using generic models may seem like a quick solution to a problem, but it often leads to much more work in the long run. Using Model In-place families of the proper category when you need to create a quick one-off element will allow that element's visibility to be controlled by the category to which it belongs. You can further control the visibility of category elements by creating subcategories from the Object Styles dialog box.

Likewise, using model lines or detail lines to represent actual model elements will create a challenge to hide or isolate those specific categories. Here again, you can save time in the long run by creating subcategories for lines in the Line Styles dialog

box. This will allow the visibility of those subcategories to be individually controlled.

## CONCLUSION

As a model author, try to keep in mind your project team members downstream who will be receiving your model. Try not to overcomplicate their work by planning your own work a little more thoroughly. Use modeled in-place families and subcategories for lines to allow more flexibility for your team members.

Gabe Cottam is the BIM/ Production Manager at Colvin Engineering Associates where he oversees company production standards; develops, implements, and trains staff on standard operating procedures; and trains staff on production software. Gabe oversaw the company's complete transition from 2D AutoCAD to 3D BIM modeling using Revit MEP.



Gabe teaches Revit MEP and AutoCAD night classes at Salt Lake Community College. He just completed his service as Chairman of the Wasatch Front Revit Users Group in Salt Lake City, UT where he revived the group from the dead and built it into a thriving users group holding monthly meetings.

He began his Autodesk career in 1997 with AutoCAD release 12. Over the past 13 years, he has worked in the Mechanical and Structural disciplines as a CAD Operator, Designer, CAD Manager, and BIM Manager. Contact Gabe at gabecottam@gmail.com

# Could BIM stand for Build Improved Milieu?



Everyone has read implementation plans from countless companies that have had varying levels of success with BIM. Meanwhile, several companies are waiting for all of the bugs to get worked out before undergoing such a large and expensive task. During the transition from

AutoCAD® to Autodesk® Revit® within Ulteig's Building Services Sector, we have experienced the same successes and frustrations as others that have gone before us. We have been successful at



Figure 1

implementing Revit into a multi-discipline, multi-office environment with some minor obstacles along the way. Some of the questions that we addressed while planning our transition include:

- What complications can be added when implementing Revit across several geographic locations?
- How about adding several disciplines into the mix?
- If implemented correctly and supported by management, can Revit provide efficiencies for more than just building construction?

By now, are you asking yourself, "Who is this guy and what does milieu mean?" Milieu means, "The environment surrounding you, particular people or society that surrounds you and influences the way in which you behave." I see this transition to a new software platform as a rare opportunity to start over, evaluate, and implement the best practices of the following common problems.

## Project Management

- Quality standards
- CAD standards
- Standard details

## Team Environment

- Communication
- Trust

## Marketing

- Visual marketing
- Quick and cheap



Figure 2

## PROJECT MANAGEMENT

With each discipline in several office locations, it appeared at times like we were performing as several different companies. With nearly 70 years of strategic growth, my company has expanded to eight regional offices. Some of the offices were started from scratch; others were obtained through acquisition. As we grew, standardization became a high priority because work is shared regularly across the offices. The transition to Revit expedited and streamlined this process by generating a clean slate on which to work.

The first step toward standardization was to take an inventory of all our standards and processes. This allowed us to determine the best practices from the information available and generate a single standard that could be used across all offices. We used this as an opportunity to compile, update

Once your internal and external clients are communicating more and providing positive feedback, trust begins to build among team members.

and improve quality standards, standard details, and layer/line types along with other CAD standards.

Once our standards were developed, we formed a Revit Team. This team included one enthusiastic person from each discipline (Electrical, Fire Protection, Mechanical, Plumbing and Structural) who would start out doing all Revit projects. The Revit Team was—and continues to be—responsible for producing template files and standards and keeping them current as we moved forward. Because team members are the most experienced with Revit and its processes, they provided technical support for the next phase of users on projects.

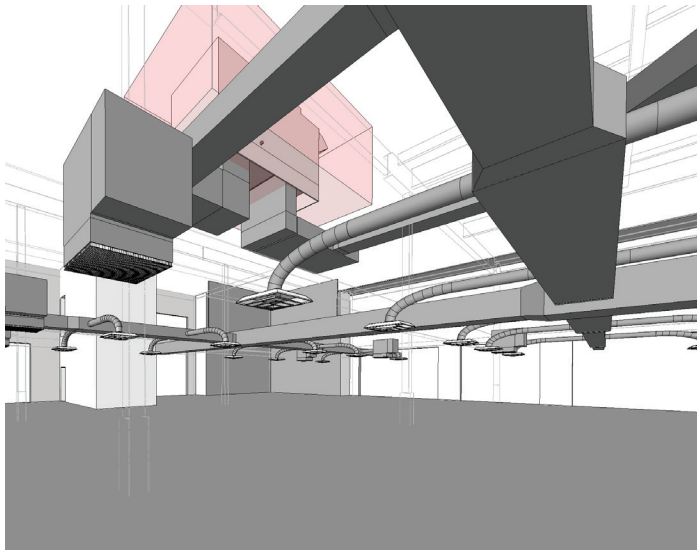


Figure 3

This support originally included project and model set up, with the remaining technicians outside the Revit Team assisting with detailing to become familiar with Revit. As the experience level of each technician progressed, additional responsibility was transferred from the original Revit Team to all of our technicians. This transition of responsibility produced the following system.

- You watch, I do.
- You help, I do.
- You do, I help.

- You do, I watch.
- You get a new apprentice. Everyone keeps on mission, passing forward the standards.

### TEAM ENVIRONMENT

There is no doubt that this new structure of sharing work has interrupted routine workflow at times. Showing someone in a different office your daily progress can be a stressful obstacle. However, the increased communication during a project can lead to partnerships down the road. Once your internal and external clients are communicating more and providing positive feedback, trust begins to build among team members. With Revit as a vehicle for change, this is when we started to see the underlying benefits it could provide. Our experience with Revit has been that the more projects we complete, the more excited people are to use and market its capabilities. I recently attended a leadership conference where the speaker said, “People who accomplish things get talked about.” Employees are proud to be part of the circle of progress that Revit implementation generates.

Revit also has given us an opportunity to communicate outside of our Building Services sector. We have started to develop a workflow between our high-definition scanner and Revit, and are looking at new opportunities to incorporate our GIS technologies as well. This will foster more com-



Figure 4

munication and new relationships with potential clients that work primarily with other sectors. Another idea brought from the leadership conference was that when communicating to a team or selling new ideas:

- 20 percent of people love it.
- 60 percent of people do whatever is popular.
- 20 percent hate it.

If these ratios are true, it is possible to sell your idea to the 20 percent that love it with another 60 percent of people fol-

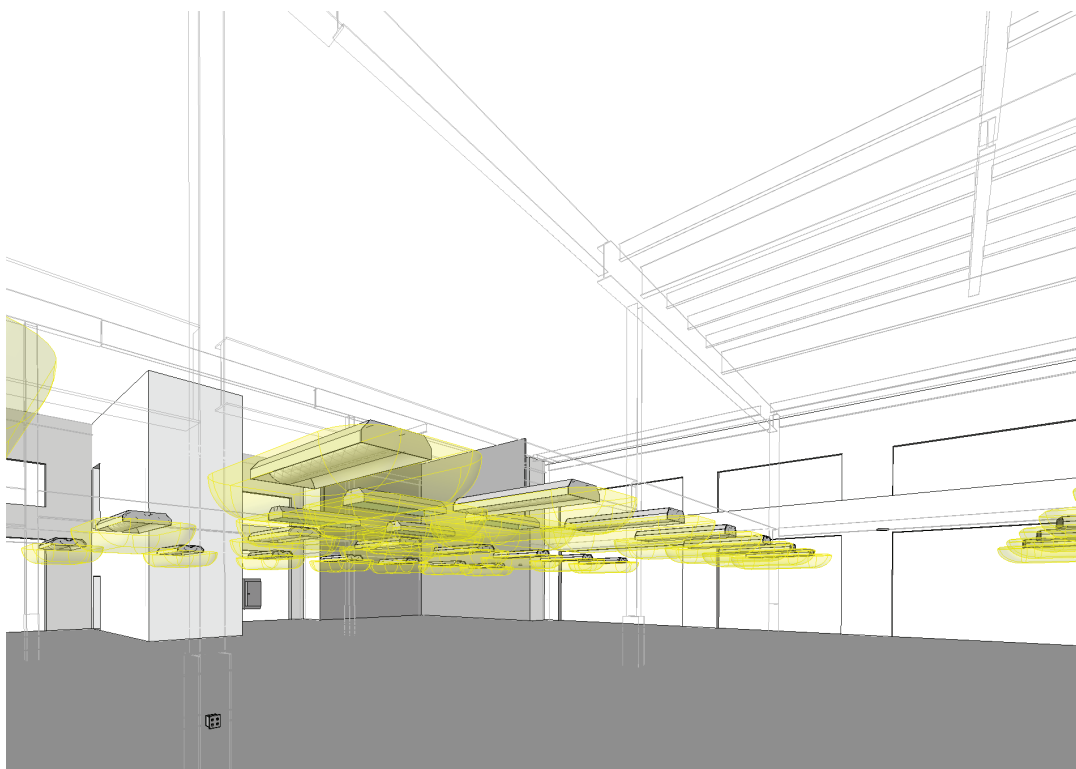


Figure 5

We still have a lot to learn, but the transition to Revit has positive benefits to all aspects of our business.

lowing suit. Before long you have 80 percent of the people on board. The other 20 percent resolve themselves in one way or another; just don't allow them to turn the tide. This process doesn't happen overnight and will take some time.

### MARKETING

With each office promoting our Revit Team and its capabilities, we were able to market to a larger number and broader range of clients. By increasing our exposure to a wider area, we have allowed our Revit Team members to expand their knowledge of the program and improve on our processes. This has promoted the transition of experience to the rest of our design team and expanded our BIM resources considerably. With each project we are able to build on template files, standard details, and other practices.

Revit allows marketing efforts to be more visual than prior technologies. Let's be honest, it takes a lot to make engineering drawings attractive. Revit allows us to export 3D images and walkthroughs to better market future projects and expand on our portfolio of projects. You will notice in these images that we have applied filters to show each discipline picked apart from the same camera view. View templates are then created using these filters and are saved to the project template file. At any given time we can create the same marketing images for all future projects in a matter of minutes.

### CONCLUSION

After reading several implementation stories, as many of you have, I hope that this has shed a light on some of the other potential benefits that are beyond building design. While some are further in their implementation than others, I think everyone understands that this technology is relatively new to all involved, and some have bigger obstacles to overcome than others. We still have a lot to learn, but the transition to Revit has positive benefits to all aspects of our business.

Troy DeGroot began his career in 1996 as a board drafter producing structural steel shop drawings for several fabricators across the United States. He then spent 11 years as an Engineering Technician before becoming BIM Manager at Ulteig Engineers. This write-up reflects some of the accomplishments during his next 2 years as BIM Manager at Ulteig, at which time this article was written. DeGroot recently took an exciting opportunity as a Senior Structural Designer at Ericksen Roed & Associates in St. Paul, MN. He continues to advance his knowledge by being on the steering committee of Minnesota Revit User Group (MNRUG), a member of the Minnesota AIA BIM Breakfast Club and as an advisory board member for Northwest Technical Institute. Troy can be contacted at [tdegroot@ericksenroed.com](mailto:tdegroot@ericksenroed.com).



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# 15 Questions with David Mills

## **W**hat is your role at Autodesk, David?

I'm the Community Programs Manager for the AEC Industry Marketing group at Autodesk. Generally speaking, my responsibilities fall into two categories: Social Media and Community. Typical projects that fall into the former category include setting the social media strategy for my group, managing Autodesk AEC social media outlets, consulting to various groups regarding social media, and running the AEC Blogger program.

It's no secret that there's A LOT of Autodesk product information available via the web; AUGI is a great example of a concentrated store of this product knowledge. Regarding the community portion of my role, I'm working to understand the interplay between these communities and how to make their information more easily discoverable by users. In so doing, I can help users to improve the way the industry plans, designs, builds, and manages projects.

## **How long have you been with Autodesk doing this, and have you held other positions?**

I've been working for Autodesk since January 2005. In the remaining weeks of that January, Boston got nearly four feet of snow...welcome to New England! My first role was the Technical Marketing Manager for Revit® Building. As I learned more tools from the Autodesk portfolio, I was more broadly described as the Technical Marketing Manager for Architecture.

In 2007, I became Technical Marketing Manager for the Strategic Marketing Group. I spent most of my time working with Autodesk® Inventor®, Autodesk® Maya®, and Autodesk® Alias® to understand how they can be applied to the architectural process.

In 2009, I became the Social Media Marketing Manager and in 2010 I took on the responsibilities of Community Programs for AEC Industry Marketing.

## **Tell us a little about your background and how you came to be doing what you do now?**

I earned my bachelors degree in Computer Science and Mathematics from Randolph-Macon College and my MBA from Bentley University. Out of college I took a job writing SQL for a nonprofit in DC and eventually realized I wanted to take my career in a new direction. I found a job working with computer-aided design, which provided a path for me into architecture. Then in December of '04 I got a phone call from Autodesk.

## **What does a typical day look like at your desk?**

I live in Boston's Back Bay. My commute varies from 20 minutes on a good day to over an hour on a bad day. September 1st, otherwise known as 'Move-In Day' in Boston, is especially abysmal. The secret to navigating Route 90 and 128 around Boston is right-hand lane management. I spend



As the world's affinity for getting information via the web expands, so does the membership of Autodesk communities and the number of interactions that they foster.

most of my days in the Waltham office, but also spend time in the Manchester and San Francisco offices. My typical day consists of an endless supply of Microsoft Office, conference rooms, and my mobile phone.

**Describe the challenges that you and those you work with face.**

The challenges that I face are very closely related to the challenges that our customers and prospects face. When a prospective customer is evaluating one of our products and needs certain criteria or information, I'm working to make it available to them. When a user wants to learn about the new features in the Subscription Advantage Pack, I'm working to make it as easy as doing a search. When a user hits a dead-end, I'm working to help him or her find the solution and the resources that are available.

**Can you say how many people work with you, or perhaps how the work you do is shared?**

One of the reasons my job is enjoyable is because I have the opportunity to interact with a wide variety of people on any given day. This morning, for example, I was working with Autodesk Finance and Procurement to negotiate the terms of a contract with a vendor.

At midday I was working with Sales and Marketing teams to prepare for the upcoming One Team Conference. This afternoon I'm working with Steve Stafford from AUGI to finalize the "Autodesk Insiders" article. All in all, not a bad day!

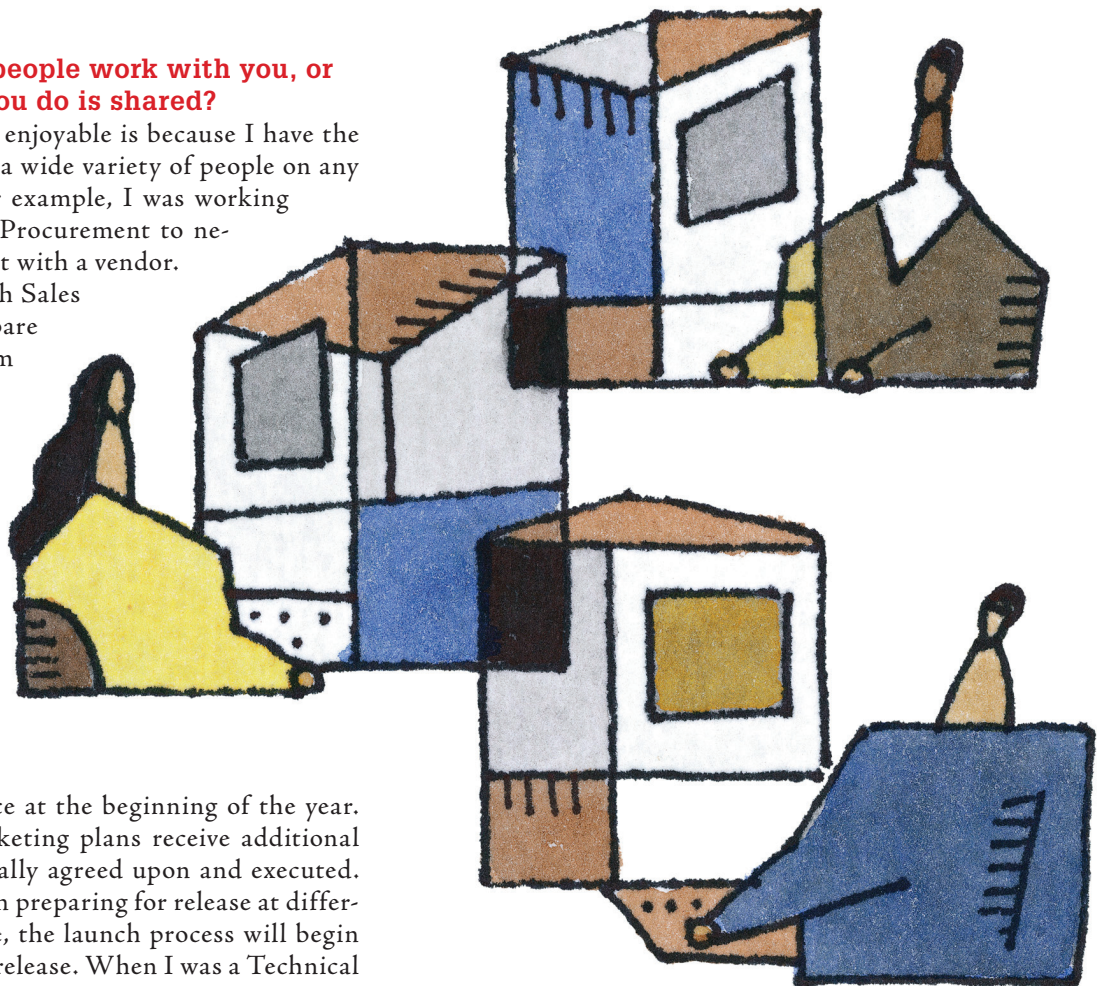
**How much time before a release do you get to really figure out how to define the marketing strategies you use?**

Strategies are usually in place at the beginning of the year. As the year progresses, marketing plans receive additional iteration until tactics are finally agreed upon and executed. Various marketing roles begin preparing for release at different times. In my current role, the launch process will begin two to three months prior to release. When I was a Technical

Marketing Manager and responsible for training our Sales channel, it would take longer.

**How do you interact with the product teams, quality assurance, and support people?**

Any release will amass large stores of information during the design, development, and QA process. My group gets increasingly more involved with the product teams as that process approaches completion. During the period leading up to a release, the marketing group works with the product teams to transfer release information into our go-to-market strategy and onto current and prospective customers.



## Autodesk Insiders

### Do you get to do any planning for Autodesk University or other events?

Yes—Blogger Day! A couple of times a year, I get the opportunity to invite a few user bloggers out to the AEC HQ in Waltham, MA to learn about the new release straight from the product teams and participate in the design process of future releases. It's a unique combination of small scale, direct access, new features, and a look into the future.

### What are the objectives of Autodesk's Communities? How are they growing?

At their core, web communities are a place where individuals can connect with one another to share and spread information around a common purpose. Web communities have existed at Autodesk for a long time. Today, The Student Community, The Area, and AutoCAD Exchange are just a few examples of the numerous communities that Autodesk hosts. As the world's affinity for getting information via the web expands, so does the membership of Autodesk communities and the number of interactions that they foster. In the future, I think we'll find a more expansive perspective of community and additional consistencies between the various sites.

### Any tricks you use to help check how successful your efforts are? In other words, do you guys get enough feedback to know that you are moving in the right direction? What can AUGI members do to help?

Fortunately, metrics abound with social media programs. I can choose from a long list of indicators to gauge the success of a program or asset. For example, impressions, ratings, comments, shares, and sentiment each provide a glimpse into success. The next time you come across something in the social media, help me by giving it a rating, contributing a comment, or sharing it with your network of peers.

I recently helped Emile Kfourri launch a new blog called BIM Apps. In its first couple of months, we're observing to determine whether or not there's a strong demand for this type of content. If AUGI members would like to cast their opinion, click onto Emile's blog: <http://bimapps.typepad.com/>.

### Do you check out the activity of other forums like ours at AUGI? How do you see them working together?

I joined AUGI while I was learning Revit in 2005 and still frequent the forums today. I'm a member of other forums also and believe they all provide a valuable resource for users. Although the opportunity exists for interplay between the various forum sites, today's unifying factor is search engines such as Bing, Google, and others.



### What sort of things do you do for distraction, hobbies, travel?

I try to get outside whenever possible. My six-year-old yellow lab and I jog year round. I play indoor soccer during the cold months and golf during warm months. One of the gifts I received over the holidays was a custom fitting at the Taylor Made Performance Labs in Massachusetts. They use motion capture technology to analyze a golf swing and determine the best type of club for your swing.

When we need to escape everything, my wife and I like to hit the road. These days, most of our travel is to/from the weddings of our friends and family. No matter what, we always make several weekend trips each year to our favorite destination, Nantucket, MA.

During the down time, I like to read. Right now, I'm finishing *All the Devils Are Here* by Bethany McLean and Joe Nocera. Before that I was reading *Masters of the Air* by Donald L. Miller. Next up? I'm open to recommendations.

### What would we be most surprised to know about you... such as being a heavy metal guitarist in your free time?

I've run 'short' road races for several years and I'm ready to take it to the next level. This year, I'm training to run my first marathon.

# Civil 3D Guide to 10 Map 3D Tools

As you all are probably aware, AutoCAD® Civil 3D® is built on top of Autodesk® Map 3D®, and Map 3D is built on top of AutoCAD®, so Civil 3D has all of its own functionality plus the functions of the other two separate pieces of software. Now Civil 3D can't really be used without using some of the commands and functions of AutoCAD. We still draw basic objects, we still plot and use layers. The list of AutoCAD tools is enormous in itself, and then we add all of the civil-specific functions and we have an enormous number of tools at our disposal. This leads me to the biggest reason why we tend to overlook all of the Map functions at our disposal: We may be overwhelmed with tools and commands, even before we start to explore all of the functionality that Map has to offer!

There is so much we can do with our Map toolbox, from drawing clean-up, to working with GIS data, and map creation, to mention just a few. I expect this to change in the near future; we will start to use the Map functions more and more, especially if we want to maintain our competitive edge and stay on top of all the changes in the civil engineering world. With the implementation of sustainable designing, whether it is Leadership in Environmental and Energy Design (LEED®) or some other sustainable design process, the implementation of Building Information Modeling (BIM) or simply our desire to produce better designs, there are Map tools that can assist us. Even if we are not concerned with any of the aforementioned design methods, Map 3D still offers many tools. In fact, we may already be using some of these tools without realizing that they are actually Map tools and not Civil 3D or AutoCAD functions.

So let's look at some of these tools and remember, this is not the entire list, but only a portion of the tools and functions of Map 3D within our Civil 3D software. With that in mind, I'll tell you that I'm a civil guy and I am as guilty as anyone of ignoring this part of Civil 3D for years. Yet this is the reason I'm writing about these functions now—to help others recognize the added options that we have within Civil 3D, even if the options are really all Map-based functions. And, yes, these functions are available in Map 3D itself and not just Civil 3D software.

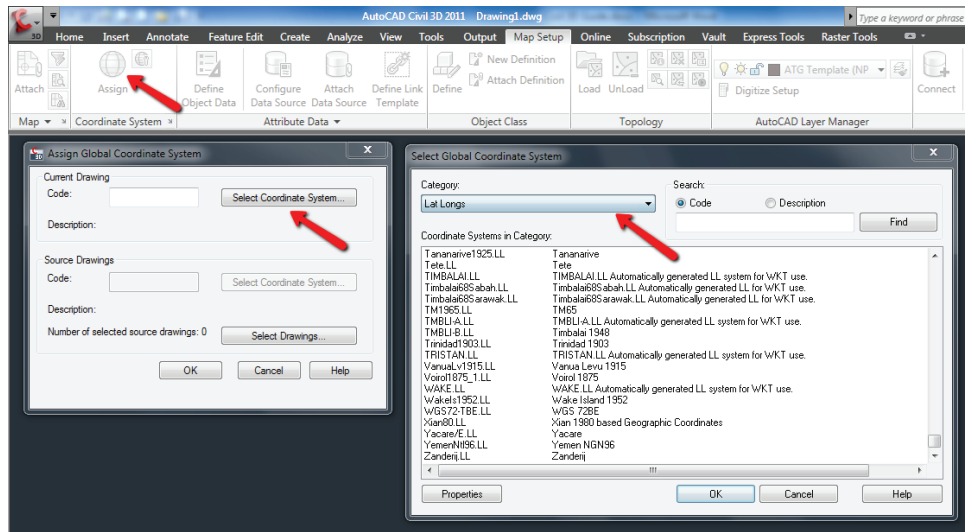


Figure 1: Tool 1 - Tool Coordinates

## TOOL 1 – COORDINATES

One of the most important abilities for many of us is to set our drawings to a defined coordinate system and then map this function. Now wait, isn't that a Civil function? Well Civil 3D has its own place for this function but Civil came after Map, so which software is this function coming from? I honestly don't know the answer to this question, but I suspect the function is coming from Map. Civil replaced Land Desktop, which replaced Softdesk, which Autodesk purchased four months after Map's first release, so I'm leaning toward it being a Map function. We can set our drawing to any coordinate system in the world, including arbitrary, and can combine drawings from different coordinate systems or zones into other drawings. I only know how to do this using Map functionality.

Map Setup tab of the ribbon – Assign in the coordinate system panel – select coordinate system category to select your system

## TOOL 2 – DRAWING CLEANUP

Drawing cleanup is a great tool, especially when you receive a drawing from another firm or source other than internal. Even when your drawing came from within your own organization it is a good idea to use the drawing cleanup tools, particularly if you plan to use existing geometry from which to create parcels. You'll find these tools in the tools tab of the ribbon. If you have questions about what you can do, use the help button to guide you.

## TOOL 3 – INSERTING RASTER IMAGES

Using the Map function of inserting raster images gives you the ability to place these images in your drawing based on

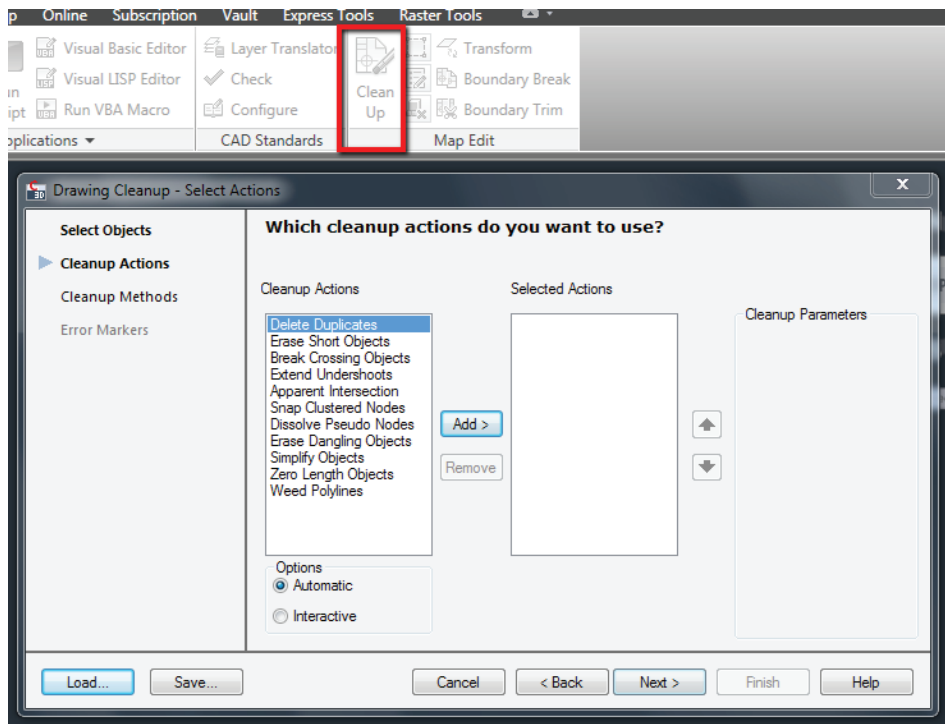


Figure 2: Tool 2 – Drawing Cleanup

their real-world coordinates. Of course, your drawing has to be on a coordinate system, but it does not have to be on the same coordinate system as your image. Map will do the transformation for you. It also tends to work better with images inserted through the use of its insert command versus the standard AutoCAD function for this, so it's a win-win.

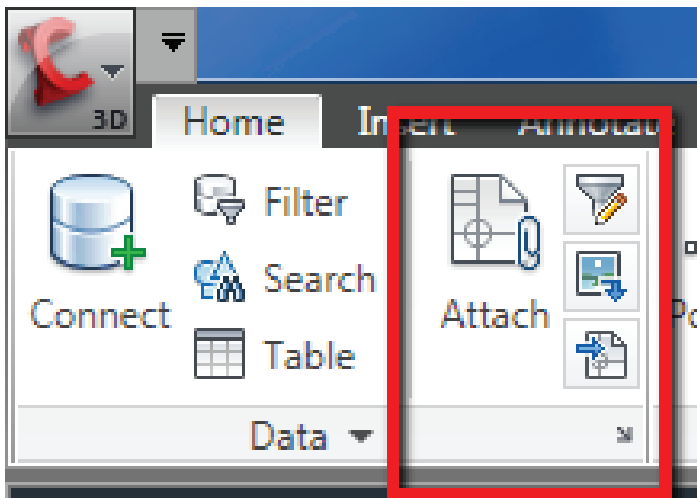


Figure 3: Tool 4 - Source Drawing Queries

The images are inserted in the right location and scale, if the images have the data file that carries this information or are embedded within the image. You can type “mapiinsert” or find this command on the Insert tab of the ribbon.

## TOOL 4 – SOURCE DRAWING QUERIES

When working with queries, we can access data that resides in other drawings without opening them, and we can also copy or place these objects in other drawings, either in a preview mode or more permanently. This includes the ability to save our changes to these objects back to their source or original drawings. We can combine multiple drawings into one or multiple drawings. We can share our data similar to external referencing, but can limit the data we want in many different ways and work in multiple user environments more easily. We have the ability to work with massive amounts of data that would cripple your normal AutoCAD-based drawings if you attempted to place the same amount of data into one drawing. I have even seen a query pull data out of a corrupted drawing, thereby saving the data from permanent loss. You'll find this in the first panel of the home ribbon tab, the Data panel.

## TOOL 5 – ATTRIBUTE DATA

Map 3D gives us the ability to add enormous amounts of data to otherwise basic AutoCAD objects such as lines, points, and polygons in ways that you normally could not do. For example, a line could represent a waterline and we can add attributes to it. We can define what type and size waterline it represents, we can list materials and installer information—literally any information can be added. We can pull this information at any point for reference, labeling, or to determine how these items are visually displayed in our drawings through the use of other Map tools.

## TOOL 6 – OBJECT CLASSIFICATION

Object classifications allow us to use standard GIS approaches to our AutoCAD-based environments. It allows us to standardize objects in our drawing or mapping systems and helps to enforce drawing standards. When working with GIS data, or moving data from a CAD environment to a GIS environment and back, object classification can be a critical step in the process. With the use of this tool, we can determine which objects meet our needed requirements or parameters, and correct them if needed. After we have determined the classifications, we can use them to create new objects, which will conform to our standards automatically.

## TOOL 7 – STYLIZING FEATURES

Stylizing features is a very useful option in our drawings; we can give our map some real power using this tool. We can have objects display in many different ways, and in many different scales, including not displaying at all unless we are zoomed to a certain zoom scale. This tool is one of my fa-

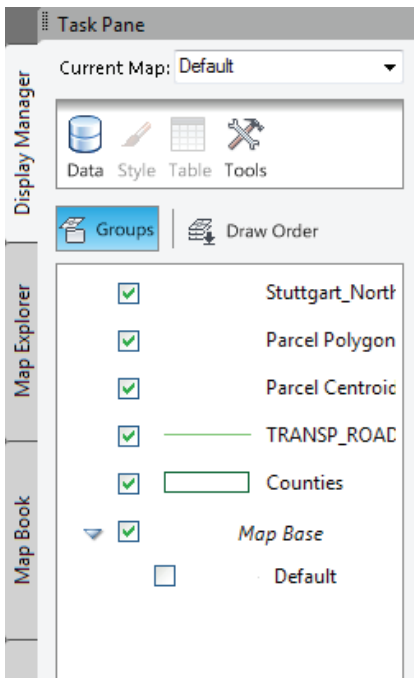


Figure 4: Tool 7 – Styling features

### TOOL 8 – MAP IMPORT

Map import gives us the ability to work directly with GIS data—importing and exporting it from GIS to MAP and back again. This opens the door for us to be able to use an almost endless amount of data—data that can be found and downloaded, often for free, from the Internet. Many states, universities, and government agencies share this data freely. In some areas or states, you can create entire stat maps of roadways, county, or city boundaries, utility information, voting districts, and more, in a matter of minutes once the data has been downloaded or obtained. One of the most common formats that I have used for this function are ESRI shape files, but there are several file formats that can be inserted through this tool.

### TOOL 9 – MAP BOOKS

Map books automate the process of breaking up our drawings into separate sheets for documentation and plotting purposes. As with many Civil projects, there are large areas we develop that do not fit onto one sheet, at least not at a scale that we can use. The map books function can assist with this issue. Map books can be used in sev-

vorite Map functions because it can quickly turn an ordinary map or drawing into something so much more powerful. A simpler explanation: It makes our drawings look good. It can even allow us to work in large data sets by turning off unneeded information or data. For instance, when you zoom out you do not need to see the fine details of your data, and only as you zoom in close enough to see this data does it need to be displayed in its full detail.

eral ways, and by default they usually create a grid system, which may not be our desired layout. Still, I have used them when I was not using a grid layout, so there are ways that we can use map books that better fit our needs. One of the advantages that map books give us is their ability to know how each map book fits with one another. In addition, the tool allows us to automate some of our sheet information, including legends.

### TOOL 10 – FEATURE OBJECT DATA

Using some of the older connection options in Map, we can connect to some of the same data formats. I am quickly leaning toward this tool being my preference when connecting to not only ESRI data, but images as well. This tool enables us to use Map 3D in ways that we couldn't in the past, due mainly to the amount of data in some mapping systems or data that we use. This function was added to Map in 2007 and has opened the door to an enormous amount of data. If you have not looked at this tool, I encourage you to do so. Even if you looked at it a few years ago, take a little time to reexamine it. Out of all the tools I have mentioned in this article, this may be my favorite. With this tool, we can now work with GIS and CAD data in one environment!

*Christian Barrett is an AEC Applications Engineer at Applied Technology Group, North Little Rock, AR. He has over 10 years of Civil and Surveying industry experience as a CAD designer using Land Desktop & Civil 3D, and has been a CAD Coordinator at Multi-disciplinary Engineering/Architectural Firms. He was the creator and author of Autodesk Users Group International's (AUGI) Hotnews column "The Civil Side," and is a Civil Engineering forum moderator for the AUGI organization. As a civil applications technician and trainer, Christian has guided many engineering firms in the implementation of Civil 3D for design and CAD management, National CAD Standards, and Building Information Modeling (BIM) workflows.*

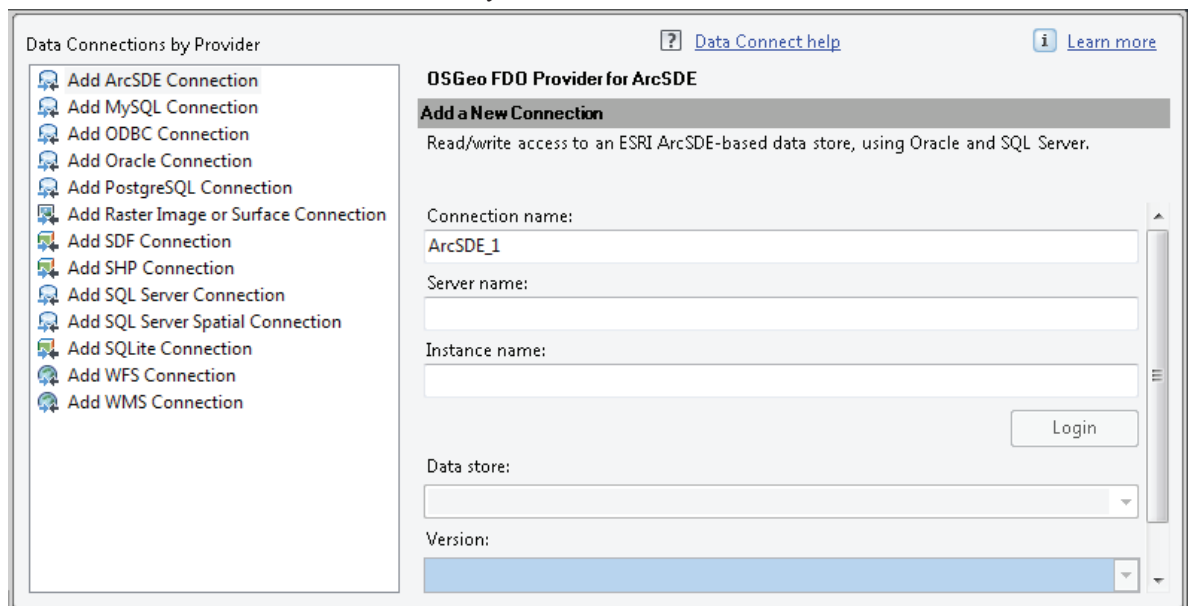


Figure 5: Tool 10 – Feature Object Data



# The Future of LUGs (Local User Groups)



Our southern California LUG has been going strong for more than seven years and we have enjoyed every minute of it! I will get to the past in a minute, but first I want to explain the title. You see, I believe we are in the midst of a major shift, and for the better, from the various options of AUGS, LUGS, and RUGS, to one uniformed goal for everyone involved, BUGS. I know BUGS doesn't sound that great, but hear me out.

There have been many groups formed over the years, from program-specific groups that focused on AutoCAD® and Autodesk® Revit® to industry-specific groups such as structural and mechanical. Over the years these niche groups have worked well because users would work together and create their parts of the projects and never needed to deal with other areas, besides the initial startup, any major changes, and, of course, project completion. Because of that, users were able to specialize in specific software and deal with one set of skills. Twenty years ago, if someone asked an architect what software he or she used, the answer

would be AutoCAD. About eight years ago, the answer could be AutoCAD or it might be Autodesk Revit. But times are changing faster now than ever, and keeping up requires moving right along with it.

## BIM IS NOW

Our drawing process is changing, and Building Information Modeling (BIM) is shifting the entire process of creating construction documents. BIM has quickly become the AEC industry standard. Clients are now asking for (and in many cases, requiring) Revit for projects. Because of that, our process of setting up and running these user groups needs to shift as well. Everyone on the planet knows what BIM is by now, so I can skip that part. I want to spend this time focusing specifically on the local user group aspect. Again, the original concept was to get a group of users together to discuss tips and tricks pertaining to a specific application or industry. Now that BIM is involved, and has pretty much taken over for the better, no one really works alone anymore.

Today everyone in the AEC industry works with multiple software options, while all levels of users are much more intertwined, both within their firms and with their outside consultants. This new system of operation requires everyone to work together. For example, the designer working in Revit can now use Ecotect and Green Building Studio to produce early schematic design energy analysis information. The graphics department can now link the Revit model into Autodesk® 3Ds Max® Design, pulling the material data and camera information. The architect is able to collaborate with the structural consultant by linking Revit models from the start. And the construction manager can discover soft clashes and begin visually constructing the projects timeline using Autodesk® NavisWorks. My point is that more opportunities are becoming available by the day.

## REVIT IS THE KEY

The result is that all these people involved need to know what is needed of them. None of it will work if users work alone. Luckily for us, Autodesk has provided the core foundational software for BIM, Autodesk Revit Architecture. And after being available for over a decade now, the program has gone from a fad to a foundational solution. It became sound and is officially taking over AutoCAD in the AEC industry. Because of that, over the past five years other programs are working to utilize the Revit model and are finally becoming expected to have and use it. Once that is recognized and understood, the elephant in the room appears; if the Revit model does not include the information needed for the other programs to pull from, it won't work.

## THE PAST

So what do we do about it? Well, first we need to get back to our LUG. In 2001, a small group of Revit users from the inland empire were, more often than not, meeting each month with Jim Balding's first South Coast Revit User Group (SCRUG) in Orange County. All of us enjoyed the great conversation, networking, and information we obtained through those meetings back then, and even to this day. After a couple years of learning from the best how to make a local user group successful, Scott Davis of WLC Architects Inc. began holding similar meetings on a different evening at his office located in Rancho Cucamonga, CA.

We started, as many others have, as a simple Revit user group—full of passion and energy for what was next in the wonderful world of Revit. Our name was RUGIE, which stood for Revit User Group Inland Empire. The meetings were held at WLC Architects and, thanks to Davis's friendly manner and amazing energy, the group continued to grow.

For the next two years the group grew to a solid 30+ regular members before Scott went to work for Autodesk in late 2005. Taking over for him was Mark Kiker, the CIO of HMC Architects in Ontario, CA. He continued as the president for the next two years, dedicated to RUGIE and making sure everything worked out so the group could continue to grow and learn more about Revit. The meeting place began to go back and forth be-

tween HMC Architects and WLC Architects depending on the topic and presenter. Mark was a great host and continues to attend our meetings as often as possible.

In 2007, Mark stepped down, allowing me to become RUGIE's third president. The group continues to grow as more and more see the benefit of using BIM and Revit as the dedicated modeling tool for the job. In 2010, Nickolas Kramer stepped up to become the fourth president. We work together to provide the best option available for a user group experience. We agree that the more we put into it, the more we get out of the group. Users continue to share, network, learn, and enjoy the time spent monthly with our group and we always look forward to providing more opportunities for our members.

I believe we are in the midst of a major shift, and for the better, from the various options of AUGS, LUGS, and RUGS, to one uniformed goal for everyone involved, BUGS.

## BUGIE

In July, we decided to go for it and do something new—to go to the next level. We saw the industry shift—the BIM and green movement, the need for a more open source of information, and integration of all AEC disciplines. We wanted to open the core structure of our group from Revit to BIM. We knew keeping Revit the main foundational software was necessary, but it was time to introduce other software options to work with and/or from the Revit model. The goal was to learn and share more tips and tricks, more project examples, and allow more overall networking from a broader, more informed audience of multiple disciplines.

That month, we announced our concept to the group and they loved it! That night we changed the name from RUGIE (Revit User Group Inland Empire) to BUGIE (BIM User Group Inland Empire). We wanted to keep the core Revit users happy so we split the meetings in half. The first half is structured to include a specific topic in the form of a presentation, speaker, or panel, while the second would always remain an open forum for Q&A regardless of the software or platform.

We then spit up the first section bi-monthly between A, and EC. So the topic in February would cover the Architecture Industry, while March would be Construction oriented. With this schedule, we could focus on more Revit and other Autodesk software that utilizes the Revit model, promoting the BIM movement, and

## AUGI Local Chapters

As the world's affinity for getting information via the web expands, so does the membership of Autodesk communities and the number of interactions they foster.

including the latest and greatest plug-ins and Add-ons, all at the same time!

### TRADITIONS

We're continuing, and embellishing, another tradition started a few years ago. Since 2008 our January meeting has been titled "AU Review." This was started because each year we were met with a large percentage of the user group that weren't able to attend Autodesk University. Those of us who had attended AU gathered as much information as we could possibly remember and spent the entire meeting sharing everything we could. This always ended up being a great event.

The other annual meeting, "What's New in Revit [insert release year]," is held in April. We always have someone from Autodesk at this meeting, usually our very own Scott Davis, to showcase the newest features and updates for Revit that year. Both of those meetings are probably our best attended and people look forward to them every time.

On top of that, in 2011 we are going to take the AU Review concept even further. We realized there is a large group of AU speakers living in the southern California region. We also noticed there are at least four large Revit user groups in the area and wanted them to be involved. So we are having our first AUR (AU Review) 2010 event combining all four groups. We'll have six speakers in an all-day event with sponsors providing food, drinks, and prizes. The event will hopefully be a great success, allowing us to continue these traditions for many years to come.

### THE FUTURE

This year looks great for our BUG with even more opportunities including a new website ([www.meetup.com/bug-ie](http://www.meetup.com/bug-ie)) with message boards, forums, announcements, and downloads. These tools will allow our members to stay connected, between regular meetings. Another new focus for our group is a member newsletter featuring tips and tricks, workarounds, the latest and greatest information available, along with surveys to help keep our group as connected as possible.

We are beginning to record and post our meetings for current members who can't make it to a given meeting. We are also committing to offering at least four major training events throughout the year. AU Review is our first, along with a Family Creation hands-on lab, a NavisWorks versus Revit course, and a complete construction documentation overview. All are eight-hour

Saturday classes with food and drinks provided by resellers and member supporters.

### THANKS!

All of these things are being done for users, by users, to help them learn more, network better, and achieve a higher standard of work ability thanks to the hard work and effort from every single member involved. Our current membership is roughly 40-50 members with more than 400 on the mailing list.

The group's activities aren't possible without serious support, so I want to take this opportunity to thank some people. Special thanks to our main sponsor Chuck Keeley with Autodesk. Other sponsors include Ed Talmadge with Kelar, and Sean Cooperrider with USCAD.

Thanks to President Nick Kramer from HMC for providing a wonderful meeting location. And last but not least, thanks to our members, who are what make this group exist. Thanks for showing up each month for the last eight years with something new to discuss, someone to network with, and being there to bounce ideas back and forth. The concept remains true: "The more you put into the group, the more you will get out of it!"

*Brian Andresen is the Director of CAD Systems with WLC Architects Inc. in Rancho Cucamonga, California. He has been using Autodesk Revit since 2001, and with over nine years of experience, has worked very hard to simplify the processes involved with the program for the end user and continues to do so by providing CAD/BIM support, training, management, implementation, and standards throughout. Brian is also president of the local AUGI chapter, BIM User Group Inland Empire (BUGIE) which meets once a month to discuss all things Revit. Each day he continues to grow and strive for excellence with the qualities and abilities he brings to the table, and has always been determined to provide his best work given the opportunity. He can be reached at [bandresen@wlcarchitects.com](mailto:bandresen@wlcarchitects.com)*





# Revit to PDF: An Interactive Model Viewer

**I**n my work as an educational facility planner, I use Autodesk® Revit® to draw floor plans and to create 3D models of the facilities on which I am working. The information contained in the models is used to create the facility master plan. While the master plan is valuable, I have been looking for a way to share the models and the information they contain in digital form with my clients. The easy answer is to submit my Revit files; however, my clients have no need for a full version of Revit nor do they have the expertise to use it. My solution has been to submit my models as a 3D PDF. By exporting my Revit models to IFC, I am able to import both the geometry of the model as well as the data contained in the model in to an interactive PDF file that can be viewed from the free Acrobat Reader. In this article, I will show how a 3D PDF can be used as a viewer for Revit models and offer some suggestions on how to expand their use in your practice.

## FROM RVT TO IFC, THEN PDF

Once you have completed your Revit model, the first step in creating a 3D PDF is to export the model using the IFC option.

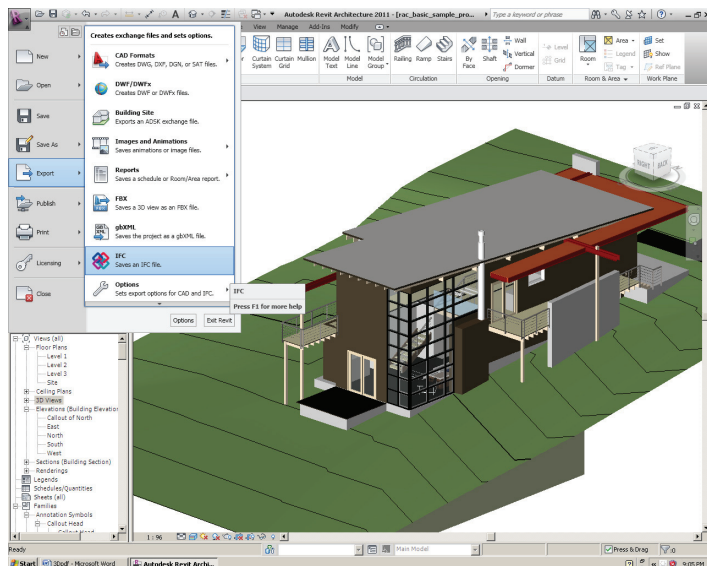


Figure 1: Exporting the sample model to IFC.

Before exporting you can view what element categories will export by selecting R -> EXPORT -> OPTIONS -> IFC OPTIONS. Each object is assigned to an IFC Class; for example, Areas exports to IfcSpace. If you are familiar with the IFC Classes, you can modify the default settings in the options.

Once your model has been exported, the next step is to import it into a PDF. You can create a PDF from a file, from a blank page, or from a 3D capture. I have had very little luck importing a Revit model through the 3D capture. Furthermore, we want to import the IFC data with the

model, so a capture may not be the right choice. The simplest option is to create a PDF from a blank file. To import your IFC model, go to Tools -> Multimedia -> 3D Tool and draw a box on the blank page. After drawing the box, you will be presented with a window asking for the location of the IFC file as well as some options for displaying your model.

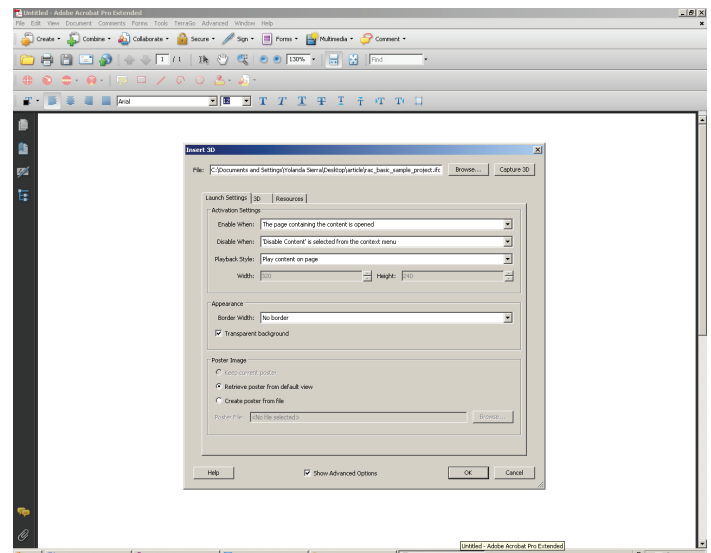


Figure 2: Select your IFC file and modify any of the default settings.)

Save your PDF and you now have an interactive 3D PDF. The PDF can be viewed by anyone using the free Acrobat Reader. One benefit of placing your IFC file into a PDF is that the file becomes much smaller. The IFC file used to create the PDF is 5.19MB and the finished PDF is a mere 424KB.

## HOW TO INTERACT WITH YOUR MODEL

When you open the PDF in Acrobat Reader, you may have to click to activate the 3D content. The main window contains the 3D model.

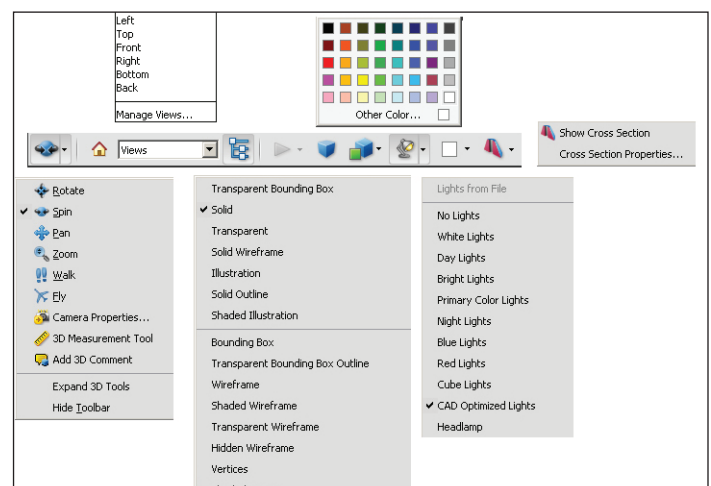


Figure 3: Model tools and options

The three boxes on the left are the model tree, the views (if any have been predefined), and the properties, which will be displayed when an object is selected in the model or in the tree.

Interact with your model as you would most other 3D programs: Scroll your mouse wheel to zoom in and out, left click and move your mouse left, right, up, and down to move the model. For other controls and to modify the model, there is a toolbar floating above the 3D model box. These tools allow you to change the appearance of your model. You can select predefined views, change the rendering mode, change the lighting used in the model, change the background color, and cut cross sections through the model.

Interacting with the model in the PDF has been much more intuitive for my clients. The limited number of tools and menus, as well as the ability to work in a program with which they are familiar makes them feel comfortable, confident, and more willing to interact with the model.

## VIEWING THE IFC DATA BY SELECTING OBJECTS

The data in my models is as valuable, if not more valuable, than the models themselves. Being able to embed the data in a 3D PDF allows me to share it and not worry about it being modified. The easiest way to view IFC data on an object is to click on the object in the model. When you select a component, it will highlight, the model tree will expand, and you can select the node of the component.

In Figure 4, I have selected the fireplace. The model tree expanded and highlighted the node (object) I selected. The node is under IFCWALL > FIREPLACE.

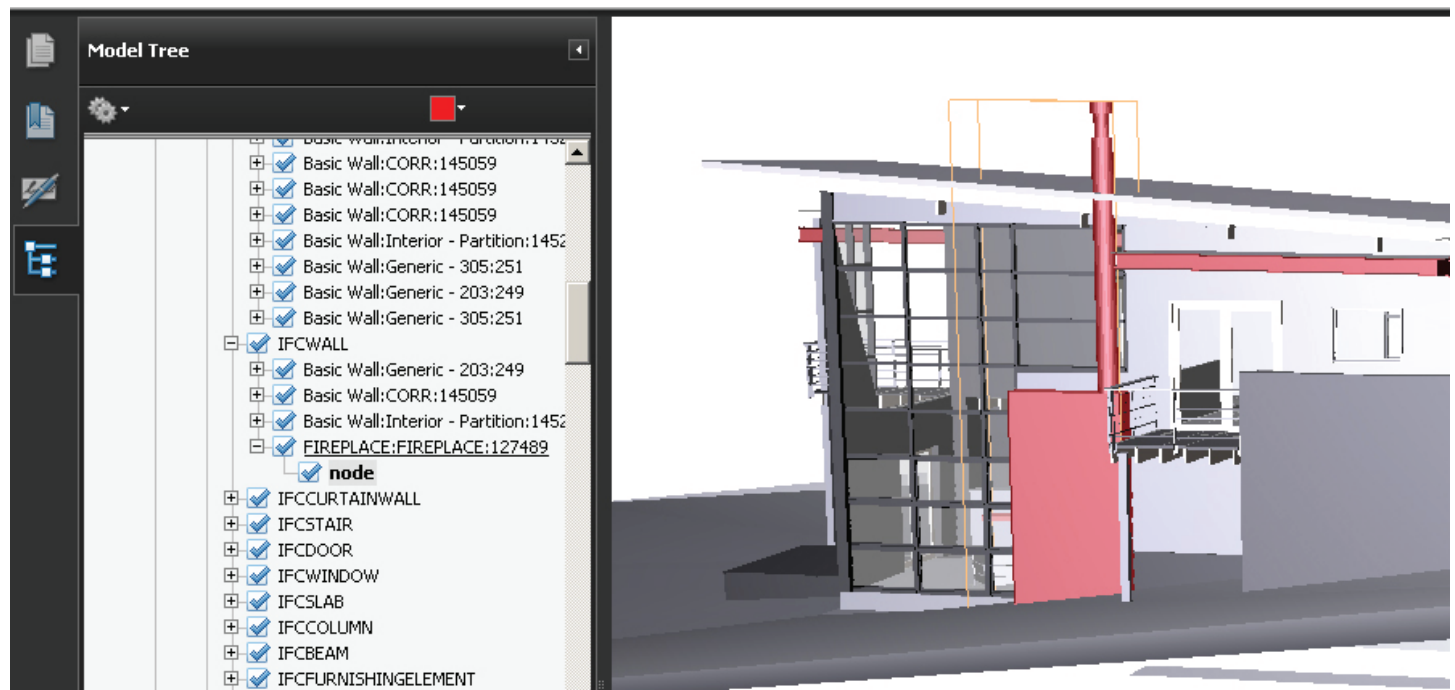


Figure 4: Selecting a component and locating it in the model tree

If you are working with clients who have Revit, the best option for sharing your models is in Revit; however, 3D PDFs can still be valuable to your practice as a marketing tool.

To see the properties of the component, choose the object to which the node belongs (one branch higher than the node). All the IFC data will display in the properties window on the lower left side of the PDF. Select the FIREPLACE and the IFC data for the selected object will appear in the properties window.

In this example, the properties displayed are the default Revit properties. Any parameters you create, be they project or shared, will export with the model and be visible in the PDF.

## USING 3D PDFS IN YOUR PRACTICE

If you are working with clients who have Revit, the best option for sharing your models is in Revit; however, 3D PDFs can still be valuable to your practice as a marketing tool. At my firm, our project sheets contain all the information on a specific project as well as a few photos. With a 3D PDF we can include the same information and the building in 3D for the prospective client to view. On projects that have not

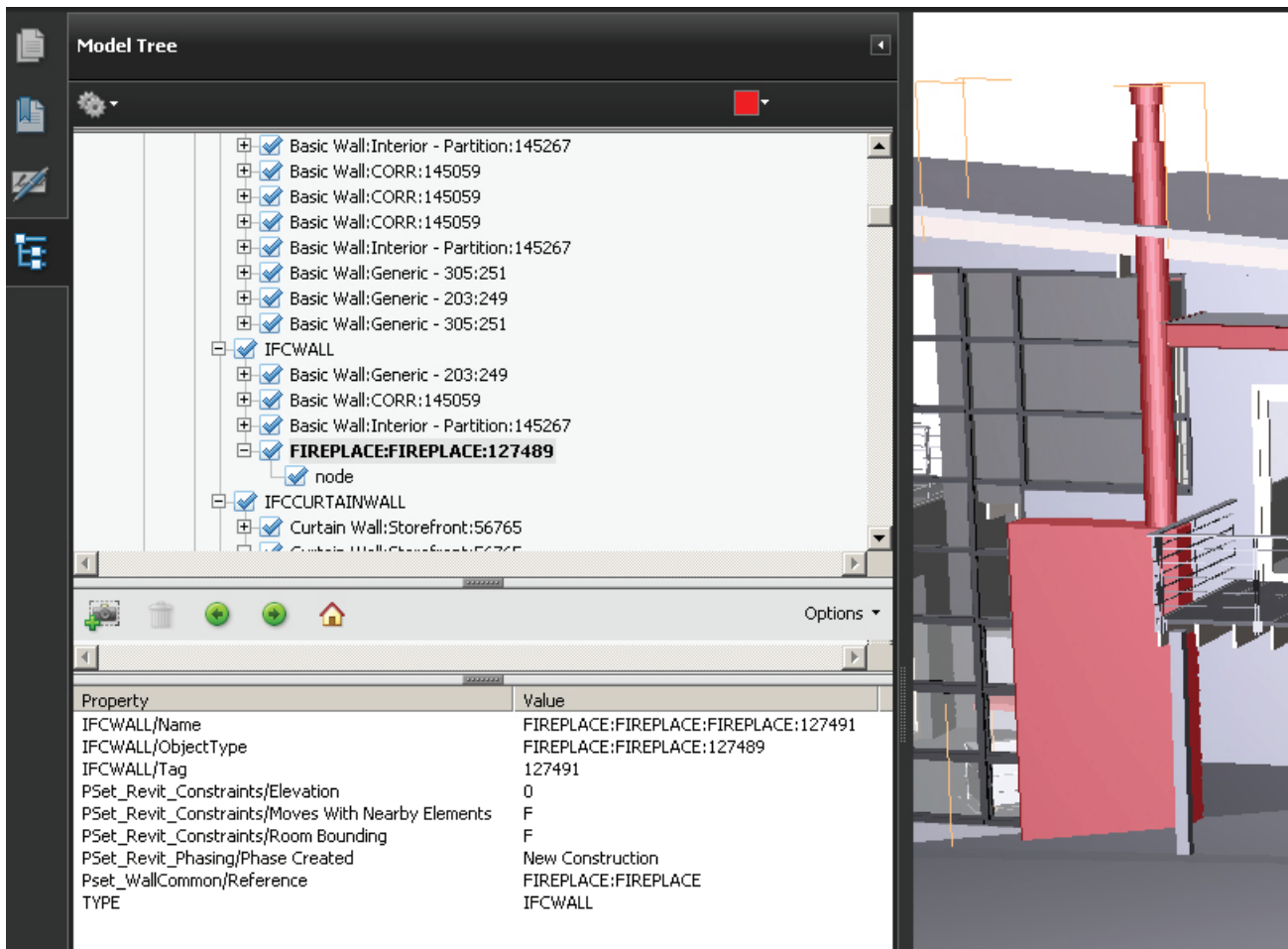


Figure 5: Properties for the fireplace selected in the model

been built, we have the model that created our construction drawing set. Insert that model in to a PDF and now we have a representation of the building to accompany the 2D rendered images.

For product manufacturers, the ability to embed a 3D model of their product into a specifications sheet allows clients to have a better understanding of the product. The architect can “play” with the product prior to receiving a sample. The more information we provide to our clients, the more informed their decisions.

## CONCLUSION

I use Revit in my work as an educational facility planner because it simplifies my workflow, guarantees that changes I make in a schedule are reflected in the plans, and allows me to work smarter. My clients are learning that these models also have value to them because they do not have Revit nor the expertise to use it. By importing my Revit models into a 3D PDF, I am able to give my clients a 3D model and the data it contains. Slowly, I am exposing them to the value of BIM in managing their facilities.

A 3D PDF is also a powerful marketing tool. Firms can include a complete model in their project sheets. For product manufactures, clients can “play” with the products. The more information we can convey to prospective clients, the greater the probability they become clients.

There are other IFC viewers, but none are as widely used as Acrobat Reader. We create massive amounts of data on a daily basis. Let’s put it to use.

*Paul Crickard III is an educational facility planner in Albuquerque, New Mexico. He is one of the first planners to adopt Revit and Building Information Modeling (BIM) in the preparation of master plans for the state. Currently, he has been working on the integration of Revit and BIM in Geographic Information Systems (GIS) with the goal of submitting the first completely digital master plan in the state of New Mexico.*



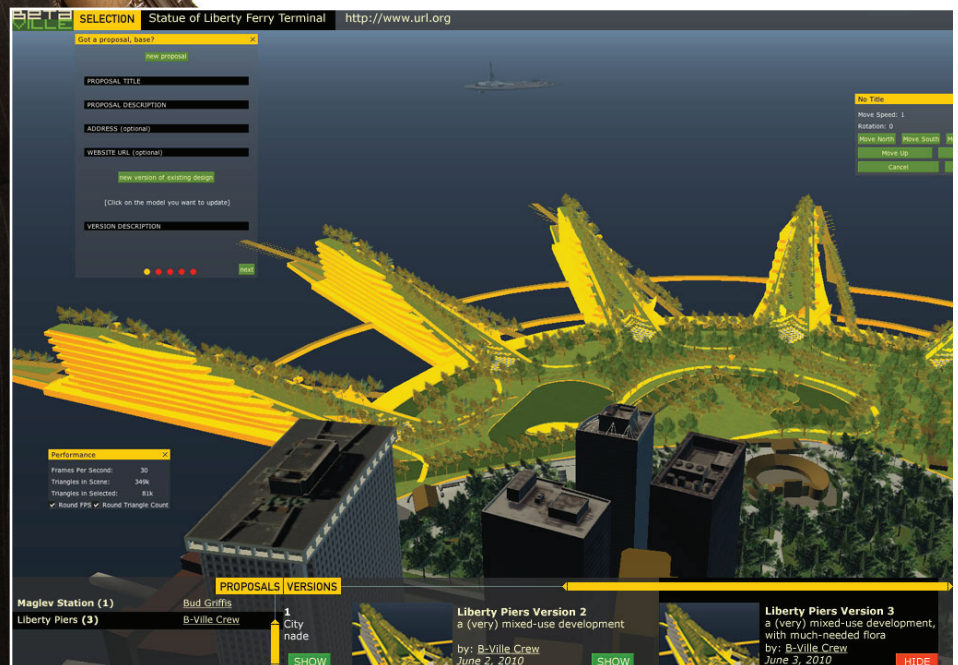
*With a Masters degree in Political Science and a background in Community, Regional, and Educational Facility Planning, Paul combines rigorous social science theory and techniques to practical planning and architectural projects. He has presented papers at the United States Naval Academy’s Foreign Affairs Conference and the American Journalism Historians Association Regional Conference in Salt Lake City. He has given demonstrations on the use of Revit, BIM and GIS to the Public School Facility Authority in New Mexico and the Albuquerque BIM505 Users Group.*

# Inside Track

## BXMC: BETAVILLE

Betaville at Brooklyn Experimental Media Center (BxmC)  
<http://bxmc.poly.edu/betaville>

From BxmC's website: "Betaville is an open-source multiplayer environment for real cities, in which ideas for new works of public art, architecture, urban design, and development can be shared, discussed, tweaked, and brought to maturity in context, and with the kind of broad participation people take for granted in open source software development..."



Betaville Interface

## AUTODESK RESEARCH: PROJECT DASHER

Project Dasher at Autodesk Research  
<http://www.autodeskresearch.com/pages/dasher>

The Overview reads: "Project Dasher is a web-based application that helps to augment existing Autodesk® Revit® design models with real-time building submeter and sensor data on electricity and occupancy. Using meter and sensor data, Autodesk Project Dasher aims to demonstrate the value of integrating Building Information Modeling (BIM) and building instrumentation to



Revit to Fabrication

*provide building owners more insight into how existing buildings perform in real time and throughout the lifecycle of the building.”*

Overview video available at <http://www.autodeskresearch.com/pages/dasher>

**CTC: FREE REVIT FAMILY TOOLS**

Revit Family Tools at CAD Technology Center (CTC)

<http://www.cadtechnologycenter.com/>

The Overview reads:

- Efficiently delete Revit’s backup files throughout your directories
- Automate the conversion of type catalogs from.csv to .txt
- Compare shared parameters of the families within your content library
- Quickly and easily merge shared parameters
- Detect the version in which families were last saved

Free Download available



CTC’s Revit Family Tools

**EASTCOAST CAD/CAD: BIMLINK**

EastCoast CAD/CAM

<http://www.eccadcam.com/index.shtml>

Overview: “MEP Fabrication Version 1.0 uses the EastCoast patented “Design to Fabrication“ workflow to provide sheet metal contractors and engineers with an elegant, yet simple process that takes generic engineering models, in Autodesk Revit MEP or AutoCAD MEP, and automatically converts their HVAC system layouts to real manufacturer geometry and specifications to create fabrication-ready AutoCAD MEP drawing.”

**BIM APPS: API APPLICATIONS FOR AUTODESK’S BIM TOOLS**

A blog: <http://bimapps.typepad.com/>

Note: This Blog is in a **trial period and will continue or not based on the** interest of its readers. Visit today and show your support.

From the first post: “...a blog that’s devoted to the many API-based applications available for Autodesk BIM software products. In so doing, I hope to provide a resource for users of Autodesk BIM tools and raise awareness for the really exciting array of technologies that are produced by Autodesk developer partners and individuals.”

Until next issue!

If you have some news to share with us for future issues, please let us know. Likewise, if you are a user of a featured product or news item and would like to write a review, we want to hear from you. Contact the editor: [steve.stafford@augi.com](mailto:steve.stafford@augi.com)

# HEADS UP!

Updates, Service Packs and Top Known Issues obtained from product pages at Autodesk.com

## **AUTOCAD/ACA/AMEP**

### **How to perform an automated uninstallation of AutoCAD**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=16077500&linkID=9240617>

### **2011: AutoCAD installation and licensing training videos**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15768659&linkID=9240617>

### **2011: How to uninstall AutoCAD Mechanical cleanly**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15649507&linkID=9240897>

### **2011: How to use trackpad multi-touch gestures in AutoCAD for Mac**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15833633&linkID=15839490>

### **2011: AutoCAD for Mac won't run on hard drive with "Mac OS Extended (Case-sensitive, Journaled)" format**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=16158903&linkID=15839490>



**2011: AutoCAD for Mac licensing**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15833616&linkID=15839490>

**2011: How to transfer a stand-alone license in AutoCAD for Mac**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15837877&linkID=15839490>

**2011: AutoCAD for Mac splash screen never closes**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15916540&linkID=15839490>

**2011: AutoCAD for Mac crashing when launched**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15852823&linkID=15839490>

**2011: AutoCAD for Mac cannot launch with unsupported Mac OS language**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15860222&linkID=15839490>

**2011: Palettes and palette icons are not visible when AutoCAD for Mac is launched**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15907633&linkID=15839490>

**Autodesk Materials Library 2011 Update 1**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=14835465&linkID=9240618>

**AutoCAD Architecture & AutoCAD MEP 2011 Update 1 Object Enabler**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=14896252&linkID=9240618>

**Certified Hardware XML Database Update (Jan. 2011)**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=7440746&linkID=9240618>

**AutoCAD and AutoCAD LT Layer Manager Hotfix**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15629571&linkID=9240618>

**AutoCAD for Mac Update 1**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=16105699&linkID=15839491>

**AUTOCAD CIVIL 3D****Tips: How to Find File, List of System Variables and Its Settings, and more (blog post)**

[http://beingcivil.typepad.com/my\\_weblog/](http://beingcivil.typepad.com/my_weblog/)

**Civil Engineering Resource Center**

[http://resources.autodesk.com/civil/Ask\\_James](http://resources.autodesk.com/civil/Ask_James)

**Mr Sid and ECW image format not recognized**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=12845221&linkID=9240697>

**Subscription Advantage Pack for Civil 3D 2011 (videos)**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15737938&linkID=9240697>

**AUTODESK NAVISWORKS****QTO 2011 HotFix 1 – Various Fixes**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=16114634&linkID=10381885>

**Autodesk Navisworks NWC Export Utility**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=13947462>

**AUTODESK REVIT ARCHITECTURE 2011****Revit network license troubleshooting**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=14633513&linkID=9243099>

**2011: Launch warning reads “Some features may not be fully supported by the video card and driver on this computer”**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=14633513&linkID=9243099>

**Revit 2011 products hang when creating or opening a project**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15040187&linkID=9243099>

**Random Crash in Autodesk Revit Architecture/Structure/MEP 2011**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=15979440&linkID=9243142>

**Dimension problem when exporting Revit to DWG**

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=16193793&linkID=9243142>

## Heads Up

### Revit Server Installation

[http://wikihelp.autodesk.com/Revit/enu/2011/Help/Revit\\_Server/Revit\\_Server\\_Installation\\_Guide/3Revit\\_Server\\_Overview](http://wikihelp.autodesk.com/Revit/enu/2011/Help/Revit_Server/Revit_Server_Installation_Guide/3Revit_Server_Overview)

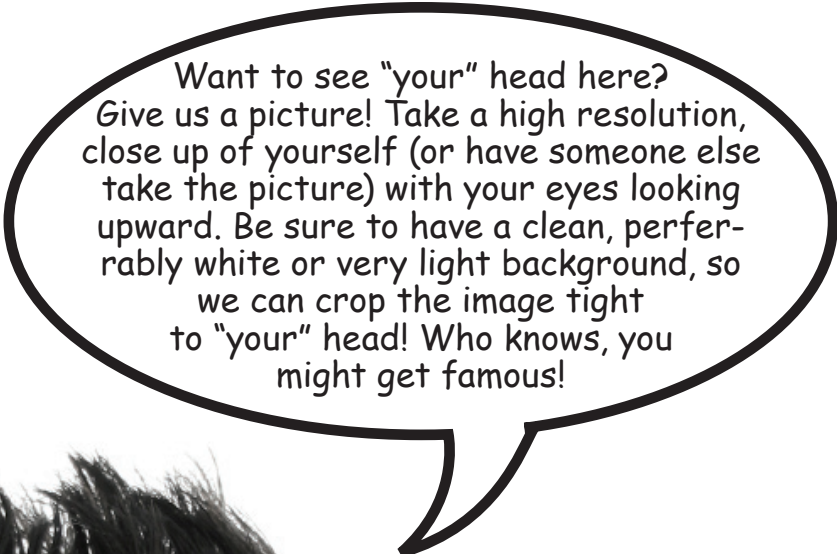
### Revit Server: Setting it up right the first time (Video)

[http://wikihelp.autodesk.com/Revit/enu/community/Videos/Revit\\_Server%3a\\_Setting\\_it\\_up\\_right\\_the\\_first\\_time](http://wikihelp.autodesk.com/Revit/enu/community/Videos/Revit_Server%3a_Setting_it_up_right_the_first_time)

### REVIT MEP 2011

#### Revit MEP Pipe Filters not working

<http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=16180244&linkID=9243142>



Want to see "your" head here? Give us a picture! Take a high resolution, close up of yourself (or have someone else take the picture) with your eyes looking upward. Be sure to have a clean, preferably white or very light background, so we can crop the image tight to "your" head! Who knows, you might get famous!





# Design Options with Revit MEP



For those who are not familiar with the Design Options tool in Autodesk® Revit®, understand that it is intended to illustrate options to a primary design. My grandfather used to say, “There are enough ways in the world for each to have his own.” Well, this tool is a way to explore the different ways to solve a problem. Then the different solutions can be evaluated to determine which one is best. A simple example would be a house with a covered porch or a wraparound porch. The porch design is an option to the house (aka, the primary design). Once a choice is made, that option can be accepted within Revit and it becomes part of the primary design. Design Options allows designers to provide choices to the decision makers, and integrate those choices into the model.

Recently our mechanical and electrical engineering design firm had an opportunity to exercise the abilities of Design Options a bit beyond its intended purpose. We were designing the plumbing, fire protection, HVAC, and electrical systems for a four-story, 31,000 sq. ft. dorm renovation of six nearly identical buildings (184,000 sq ft total). Instead of using Design Options to illustrate options, we wanted to use it to represent the differences between the similar buildings. The design team decided this would be a good tool to keep the documents consistent while reducing the amount of duplicated effort on all six buildings.

For the areas where the six buildings were alike this approach worked great. The areas where they were different, while more challenging than expected, still worked out pretty well. Three of the dorms lined the east side of a quad; the other three lined the west side. The central core of the east buildings flipped relative to the west buildings (see Figure 1).

You can see the central stairs, elevator, kitchen, and entry foyer all mirrored along the center of the building. In addition to that difference, two of the dorms on the east side had different apartments on the first floor, and one of the dorms on the east side had a third apartment. Also, the basements of these buildings did not flip as the floors above did, but the elevator shaft obviously had to. Finally, each building had some unique, site-specific conditions.

## PROJECT SETUP

Initially we all worked in just one model and designed just one building without setting up design options. We wanted to get as much done to one building as possible before splitting it up. This approach enabled us to do a lot of the common work in one project. After our 50 percent submission, we decided to split the project in two ways. First, along discipline lines (plumbing, HVAC, electrical, and fire protection). Second, one project per building that initially would be just for printing. Upon project completion, we wanted to be able to bind the projects together and deliver six sep-

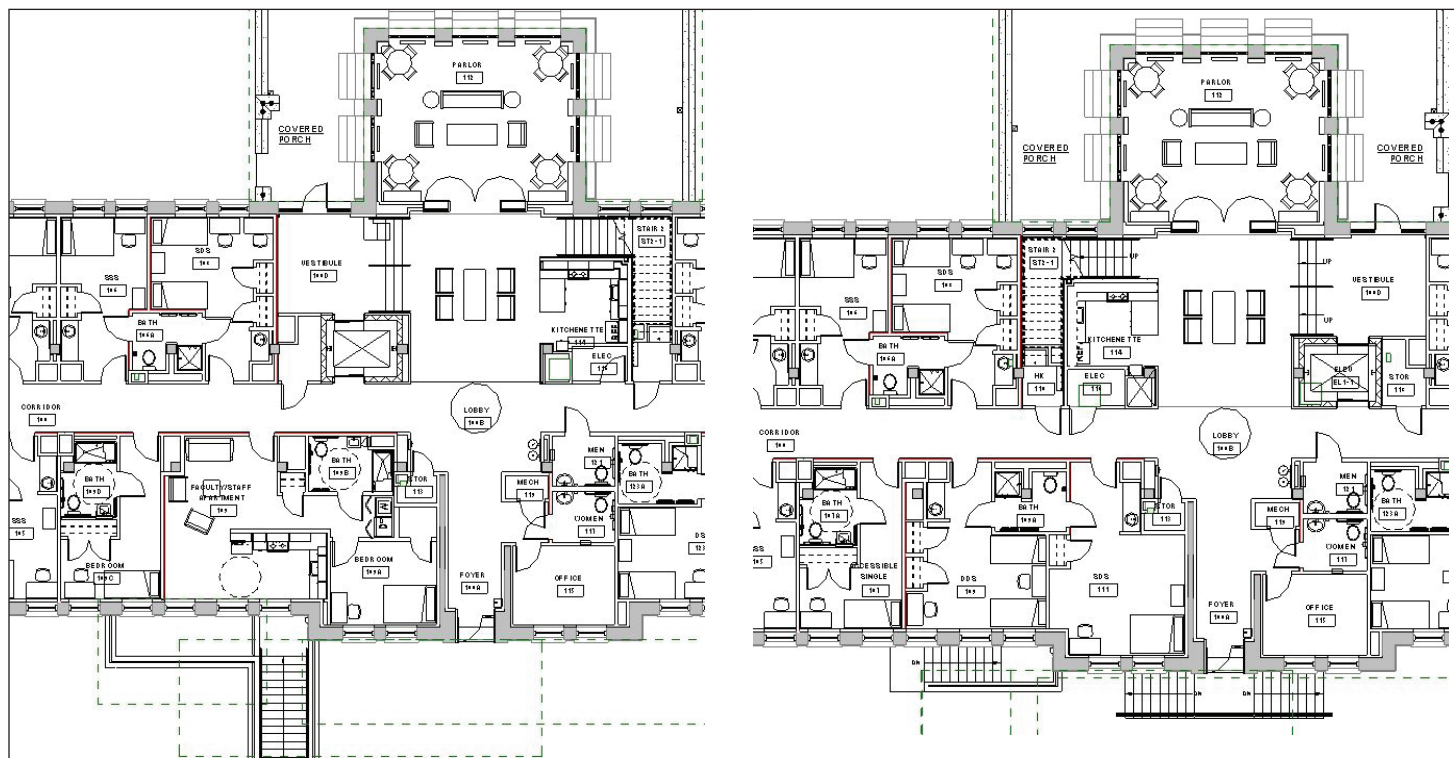


Figure 1: East and west buildings core, respectively

arate models to the contractor. Each project has the same files linked into it, so we could just accept the respective design options in the discipline projects and bind the links in the building projects.

To split it up, first we created all the design options within the one project file we had, then we made copies of that one project. For the discipline-specific projects, we deleted the worksets not pertinent to that trade (thereby removing all the objects no longer needed in that project). Then we made a copy for each of the buildings and deleted all of the discipline worksets from it as well. Then we interlinked each working project into the others. The discipline projects then needed to be linked into the sheets projects. See the linked file diagram in Figure 2. We keep the buildings separate at the sheets level so that when we turn the project over to the owner, we can bind each link, with the design options for that building set to primary within the linked file, and deliver six separate buildings. These easily could have been one sheet files, with the same views for the different buildings.

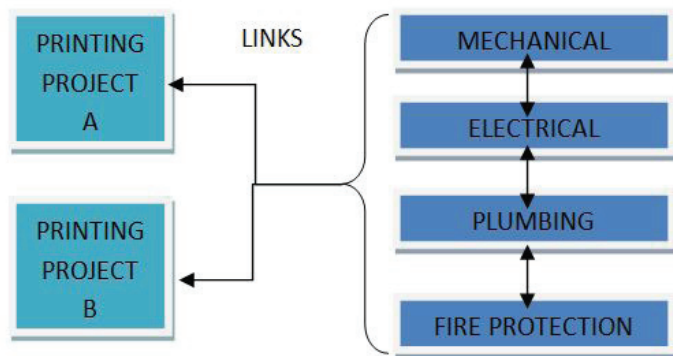


Figure 2: Linked file diagram

Some important notes to realize about all of this interlinking is how to assign a specific design option to a view. While the project is still one file, the visibility graphics, per view, can be set to show a specific design option. Once Design Options is enabled for a project, a new tab is available under visibility graphics properties for each view as shown in Figure 3. If you are trying to show a design option for a linked file, as we were doing, then look under the RVT Links tab to make select which design option should be shown (see Figure 4).

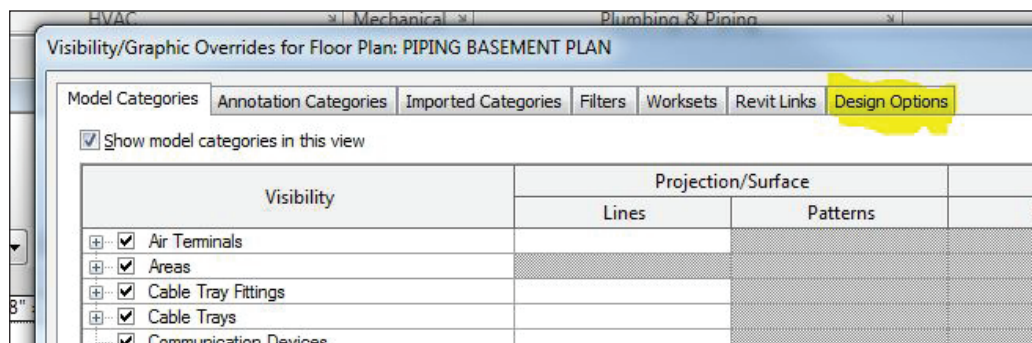


Figure 3: V/G control of Design Options in same file

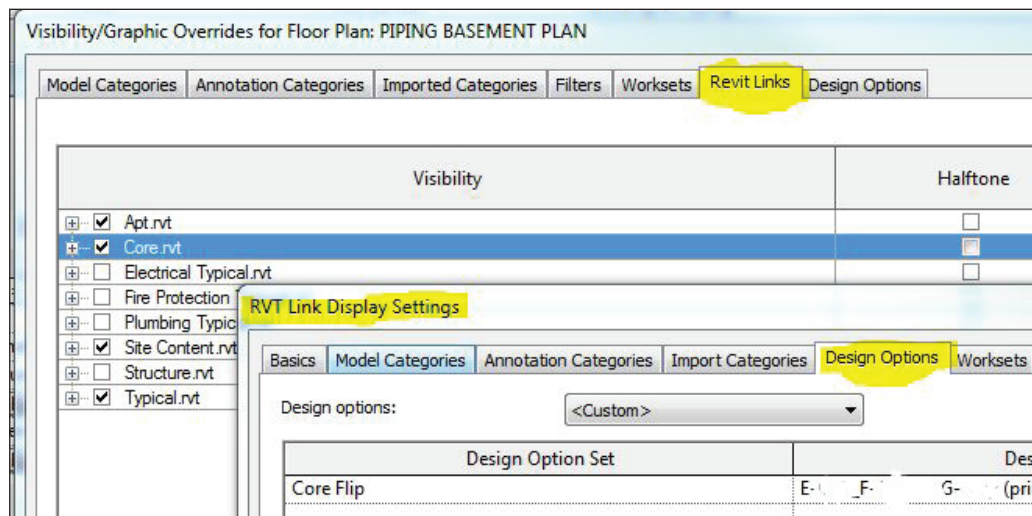


Figure 4: V/G control of Design Options in linked file

Be prepared to spend some time on this, particularly if you have multiple files. View templates do not help this process because they have only one button for all RVT Links, not per RVT Link. Either make one view template per level, per design option, or manually set each view to each design option.

Another complication that arises from all of these linked files is the need to make a change to a file that is linked into your current model. Revit will not allow having a linked file open at the same time. To get around this you can open a second session of Revit (Note: it does not take a second license) and within that session open the linked file. But don't try to copy objects between the two sessions as that can only be done within the same session. (Tip: You can open a file detached from central in the same session and copy if needed) The only other trick would be to have a workset dedicated to your linked files. If you unload that workset, you can then open the linked project.

## SYSTEMS WITH DESIGN OPTIONS

In general, yes, you can use systems in your design options; however, there are some unfortunate limitations. Families in a design option will not be able to connect to systems not in the same option. A good example is any room that is an option will need to have receptacles in it. The electrical connector for the receptacle in the design option will not be able to connect to the electrical panel that is in the primary design. However, you can create new

systems in each of the options. This will work fine if you are just using the systems for filters. If you are using systems for equipment loads, schedules, or any calculations, than I would suggest picking your worst-case design option.

Mechanically this meant that certain air terminals were not connected to the main distribution system. Thus, the air handler could not calculate the connected air flow without giving it some additional flow. Also, some of our piping branches were not connected to the main systems.

Electrically we could not use Revit's much improved panel schedules as they did not represent the true load for each building. They were missing the loads on devices outside of the primary design option. Initially we did attempt to copy all devices to each design option and continue using the panel schedules. As the design developed this quickly became unmanageable. We exported the panel schedules to AutoCAD®, and maintained them there for the remainder of the project.

### WORKING BETWEEN OPTIONS

There are some choices for coping objects between design options. First, after Design Options are enabled, some new buttons are available at the bottom right of the screen (see Figure 5).

If you have the objects to be copied in your selection, then simply press the "Add to option set" button and the dialog shown in Figure 6 will appear. If you are currently in a design option (other than the main model) you can uncheck the Exclude Options box and select the objects to be added directly to the current option by pressing the same "Add to option set" button. Select the options that apply for the selected geometry and hit OK. If you are a fan of the clipboard, you can also select your geometry and copy to your clipboard. Then change the current active design option to the one being copied to and press "Aligned to Same Place" button. It's found if you press the little down arrow under the word Paste (see Figure 7).

Once you have the geometry in place, it isn't going to be connected to any systems that may have been made in the different design

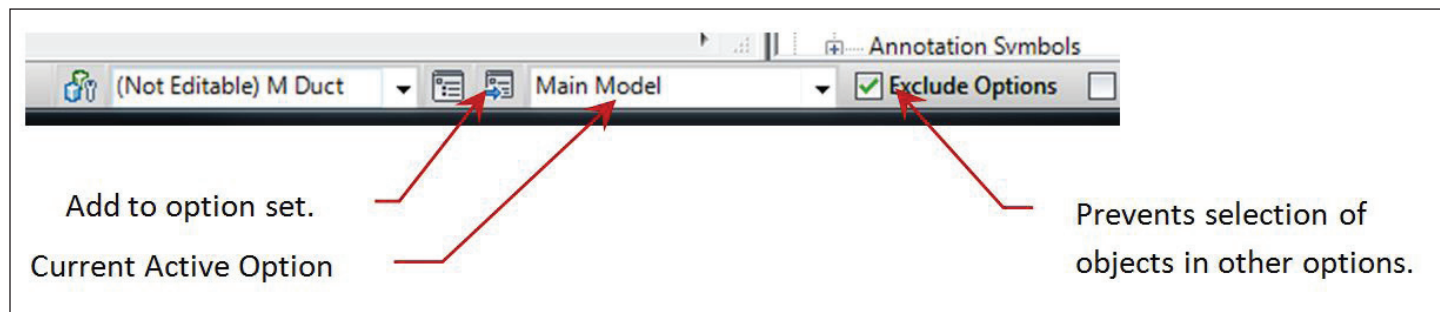


Figure 5: Design Options toolbar

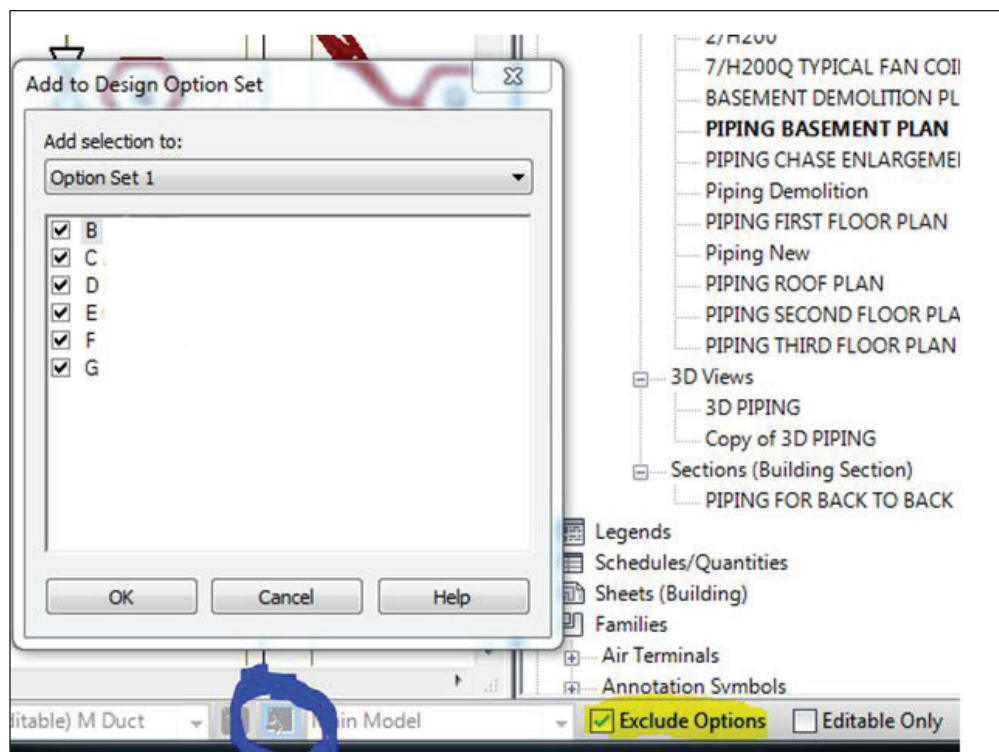


Figure 6: Add to Design Options

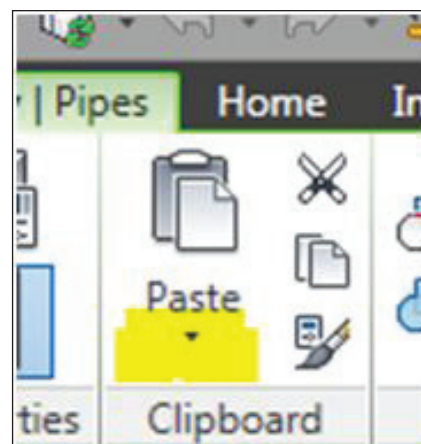


Figure 7: Design Options

options, so you will have to fiddle with the connectors to join the systems. “Fiddle” is the technical term for stretching or trimming the ends to the connection points desired.

### ANNOTATION

Tags work great with Design Options, even through a linked file. If the object tagged is not in a design option, the tag does not display. Annotation that is not associated with any geometry is going to display on all options. We use an annotation symbol with an instance-based text label embedded in it to designate the key notes. Since they are not tied to any geometry, we could use those only on common notes. This same complication is true for any annotation object. (Tip: Revit treats wire as annotation.) So if you are printing from the project, you simply create a new view to place on the sheet, and in that view, make the necessary changes to the annotation.

If you are using a separate project to print, you can create new views and redirect your linked views in your sheets project, costing lots of time depending on how many you have to re-link.

Alternatively, you can use a Multi-Category Tag. The advantage of the multi-category tag is that it is one annotation symbol that can be used on all object types. So where you can't have a duct tag apply to a piece of pipe, this tag will work on any object. And since the objects obey design options, so does the tag. (Tip: you can also make one that is just text if needed.) Note that the property the multi-category tag is editing (likely the comments property) may already be in use, so be careful. For example, if you have a pipe riser with a key note #1 in the basement and it is also tagged on the first floor as #3, when you change it in one place, you are changing it in both.

As for the key notes and general notes on the sheets, I have yet to find a satisfactory solution. Currently we are using text boxes on the sheets and are very careful to make sure that when one note gets edited for one project, the respective notes get edited

appropriately. Another (probably better) solution would be to use drafting views for notes in the working project and views in the printing project linked together and placed on the sheets. Again, this is a tedious process that takes a bit of time to set up, but in retrospect this approach would have kept the notes more consistent.

Space Tags is one last piece of annotation to consider. Spaces do not obey design options; therefore, there are no space tags for the unique portions buildings. Rooms do obey, however, so we ended up making room objects for those areas only.

### CONCLUSION

This project was technically very challenging and had an aggressive schedule (don't they all these days?). Our goals for using Design Options were to keep the drawings for each building as consistent as possible and get the benefits of not repeating work six times. There were some learning curves, some interoffice training required, and countless gripes about having to manage all six Design Options. However, no one complained about not doing the work six times. We had two goals in mind when we decided to use design options on this project: to make the drawings as consistent as possible and to save time by not repeating common work. To that extent, we were successful.

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# Calculating Flows For Sizing Duct and Pipe

Over the course of my last few Autodesk® Revit® MEP projects, I have been able to use the information in the models to calculate flows, which has assisted with sizing of duct and pipe. This has made the process more productive and eliminates the need to calculate everything on paper. In addition, it has made it easier to adapt to changes as the design process evolves. While this works well on simple projects, it can get challenging when applying it to more complex designs. In this article, I intend to show the capabilities of using Revit MEP for these calculations.

## HOW IT WORKS

Revit MEP is doing these calculations based off the properties in the duct and pipe connectors within the families. The connectors have system type properties for supply air, return air, exhaust air, hydronic supply, hydronic return, domestic cold water, domestic hot water, and sanitary systems. Depending on the system type and flow stream, the connectors are set up in different ways to calculate CFM, Fixture Units, and GPM.

## LESSONS LEARNED

- Everything must be connected. No exceptions!
- Depending on the source of the Revit MEP family, the connectors might need to be edited in order to calculate accurately.
- Some of the plumbing fixture families may be in the architect's model. For this reason I have created connector placeholder families with parameters for cold water fixture units, hot water fixture units, waste fixture units, and diameter of pipe. Ideally these should be set up at the beginning of the project to match the plumbing fixture schedule and the fixture load based on the IPC.
- Hot water circulation systems are not currently available in Revit MEP. I used a separate domestic hot water system for the hot water circulation. I did this by creating a domestic hot water connector with 0 flow on one side. On the other side is domestic hot water with an input for HWC flow.
- Vent systems are not currently in Revit MEP. I used a separate sanitary system that calculates waste fixture units for the vents. I did this by creating a sanitary connector with 0 fixture units on one side. On the other side is a sanitary connector with an input for vent fixture units. Vent lengths will need to be added up manually for sizing.
- Duct, hydronic, and domestic water systems need to be closed. Any open ends need to be capped.

- Sanitary and vent systems need to have one open end. The open end is typically the pipe leaving the building.
- Creating information schedules has been a great way to manage the parameters in the families.
- Some scenarios need to be calculated manually. For example, complex duct and piping in a mechanical room.
- These systems have proven to be accurate and easy to troubleshoot. For example, if you click on a duct or a pipe and the flow is 0 that means something is not connected or there is an opening in the system somewhere.

## CALCULATING CFMS AND SIZING DUCT

The CFM airflows are entered into the supply diffusers and all the duct is connected back to the terminal unit. Revit MEP calculates the CFMs all the way through the duct back to the VAV unit. You can click on a duct anywhere in the system and see the calculated airflow (see Figure 1). It can then calculate the total airflows between the terminal unit systems and the air handling unit.

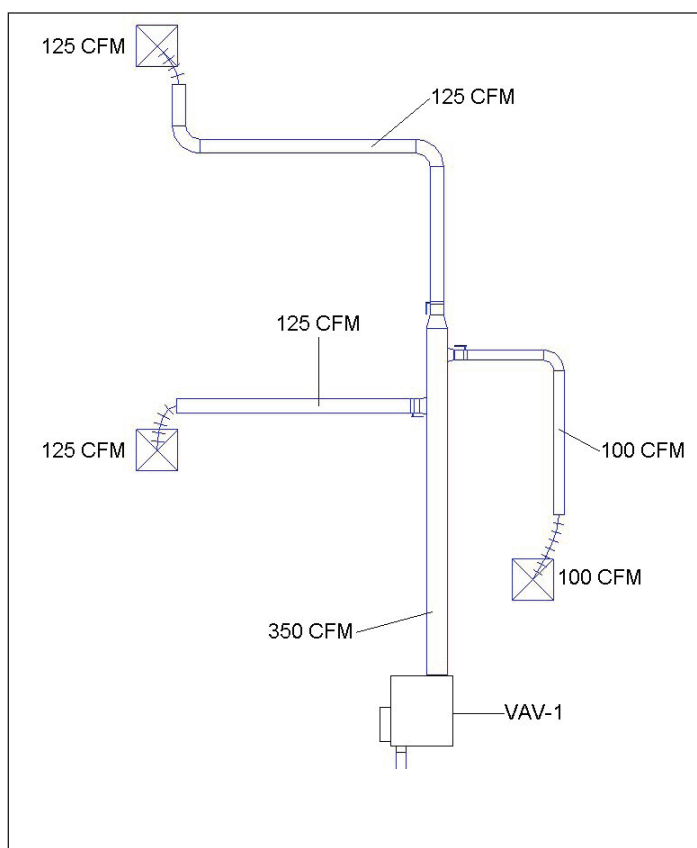


Figure 1: Duct air flows

### CALCULATING GPM AND SIZING HYDRONIC PIPE

The GPMs are entered into the terminal units using a simple information schedule (see Figure 2). Revit MEP calculates the GPM all the way through the pipe back to the mechanical room. You can click on a pipe anywhere in the system and see the calculated GPM (see Figure 3). If a GPM changes on a unit, you can go to the schedule and change the flow. Then go back to the model, view the calculated GPM, and change the size if necessary.

HVAC HP Flows	
Mark	Condenser Water Flow
HP-1	2.0 GPM
HP-2	1.8 GPM
HP-3	1.5 GPM
HP-4	1.3 GPM
HP-5	2.3 GPM
HP-6	1.5 GPM
HP-7	1.5 GPM
HP-8	2.0 GPM
HP-9	2.8 GPM
HP-10	2.0 GPM

Figure 2: Hydronic flow schedule

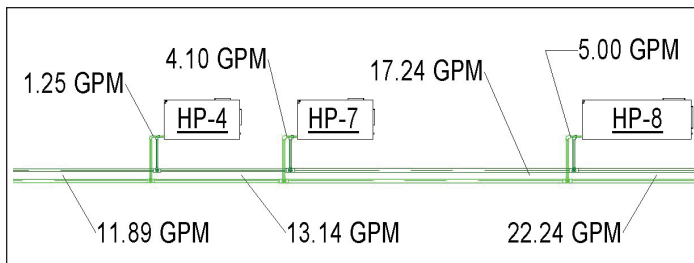


Figure 3: Hydronic pipe flows

### CALCULATING FIXTURE UNITS/GPM FOR SIZING DOMESTIC WATER PIPE

Revit MEP will do the conversion from fixture units to GPM using the values from the 2006 International Plumbing Code (IPC). It does this for both flush tank and flush valve systems. This will work for domestic cold water and domestic hot water systems.

*Note: I created a separate domestic hot water system for the hot water circulation. Revit MEP does not currently have a system type for HWC.*

The GPM totals shown are calculated from all the fixture units in the building. From top to bottom: CW, HW, HWC (see Figure 4).

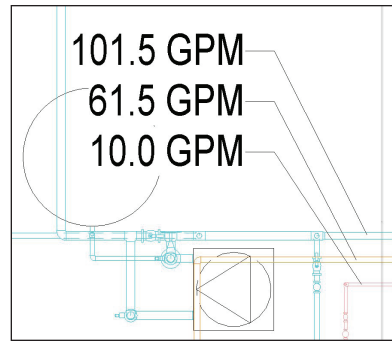


Figure 4: Mechanical room domestic water flows units [86.5] being converted to (63.2) GPM using predominantly flush valves (see Figure 5).

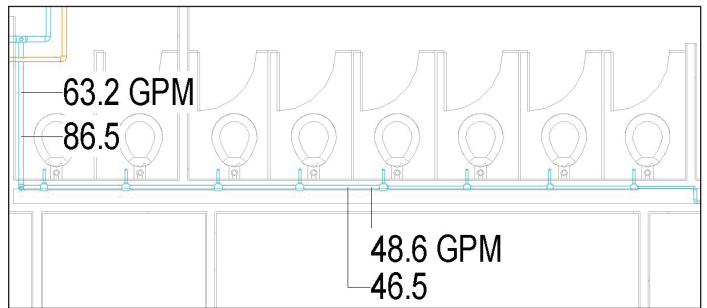


Figure 5: Domestic cold water flows

### CALCULATING FIXTURE UNITS FOR SIZING SANITARY AND VENT PIPE

Revit MEP will calculate fixture units through sanitary pipe based on the fixture units assigned to each fixture family. The total fixture units in the sanitary pipe leaving the building are calculated. Revit MEP automatically calculates the fixture units all the way through the pipe to the open end leaving the building (see Figure 6).

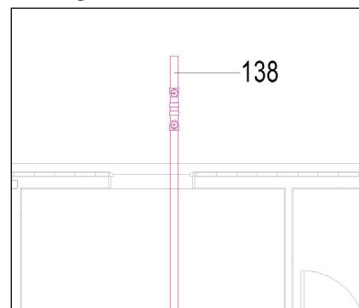


Figure 6: Total sanitary fixture units

You can click on a pipe anywhere in the system and see the calculated fixture units. If a fixture unit changes on a fixture or you have to reroute piping, you can view the calculated fixture units and change the size as necessary. There are 93 total waste fixture units for this bathroom (see Figure 7). The same applies to the vents for this bathroom (see Figure 8).

*Note: I created separate sanitary systems for the vents. Revit does not currently have a system type for vents.*

### DUCT AND PIPE FLOW LEGENDS

I set up a view with a duct legend, an editable legend that can be set up to apply colors to ducts based on the flow. I was able to use this to help size duct based off the flows calculated from a ductulator (see Figure 9).

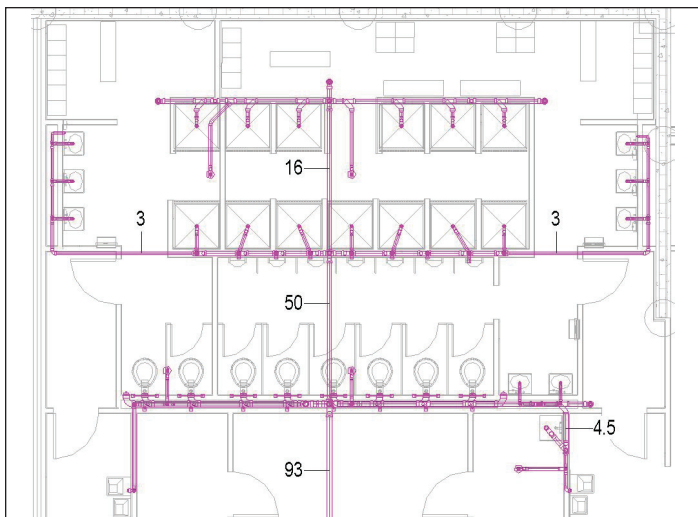


Figure 7: Bathroom sanitary fixture units

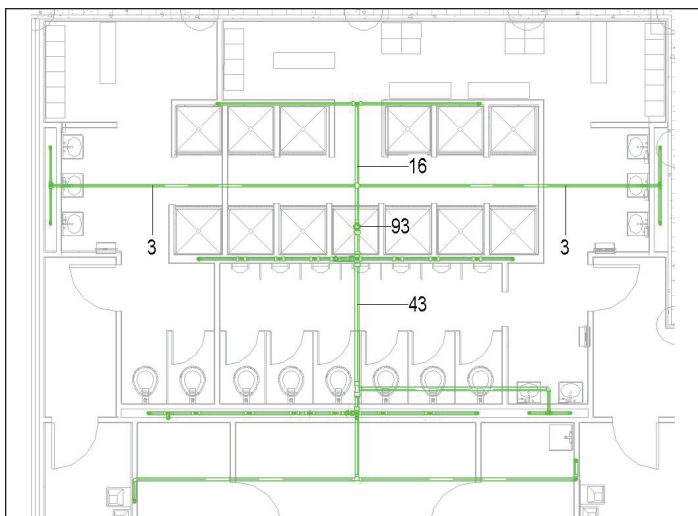


Figure 8: Bathroom vent fixture units

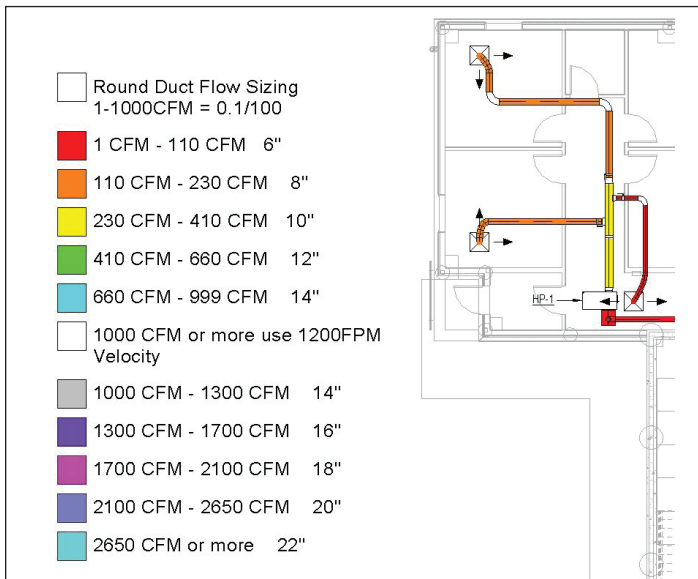


Figure 9: Duct flow legend

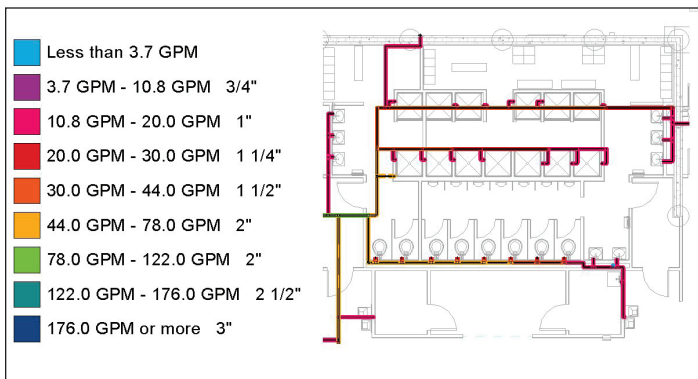
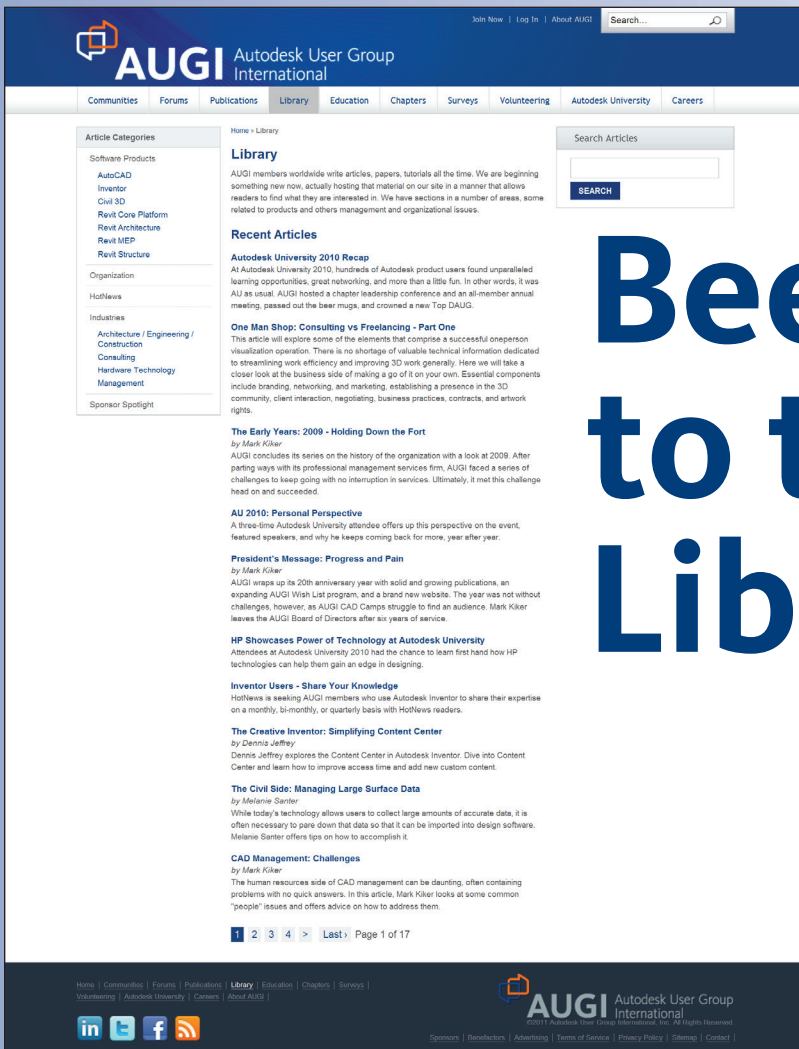


Figure 10: Pipe flow legend

I set up a view with a pipe legend. I was able to use this to help size pipe based off the 2006 International Plumbing Code Figure E103.3(3) Friction Loss in Smooth Pipe (see Figure 10).

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