

AUGI | AEC EDGE

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Surviving the Residential Jungle with Revit

Little Details Count Too

BIM Calculations— Prove Your Results

Series: Surviving the Residential Jungle with Revit

SUSTAINABLE EXPECTATIONS



Over 1.8 million homes are built in North America every year. Tight deadlines and small budgets are the norm. Clients have expectations of seeing fully rendered 3D models of their custom designs. Most clients demand many options and sustainable design features. How can a

home designer or builder survive?

In this first article of our series we will explore how a residential designer can set expectations, focus on Revit's strengths, and design more sustainable buildings. Along the way we will be getting input from Solares Architecture, a successful sustainable residential design firm. Let's learn a little bit about them.



Solares Architecture Inc. was founded in 2005 by Christine Lolley and Tom Knezic. Tom and Christine aim to bring together sustainable design with construction practices that have minimal environmental impact. Over the past 5 years, they have earned a reputation as local experts in Passive Solar Design. Their body of work includes an off-grid rural home, a centuries-old cottage renovation, and a laneway house in Toronto.

Christine and Tom studied at the University of Waterloo, both earning Bachelor of Environmental Studies and Master of Architecture degrees. They gained work experience at some of the world's leading architecture firms in London (UK) and New York City before moving back to Toronto to establish Solares. Christine and Tom are both LEED-accredited professionals and Tom is a Licensed Architect with the Ontario Association of Architects.

SETTING EXPECTATIONS

Don't do too much, too early. This is easier said than done. The client wants to see the model before you've really been able to explore options. Whether it's a new house, renovation or addition the key is to identify a baseline design. It may be harsh but the saying 'garbage in, garbage out' holds true even with Revit®. You need accurate as-built measurements, many photos and pictures of the clients desired design features. Renderings are good but can be time consuming. They can also drive a conversation off-track, from overall building shape and feel, to 'is THAT going to be the colour of the brick?'

How does Solares set the client's expectations of what to expect when working in a 3D and BIM environment?

Revit's 3D visualization capabilities have given Solares the power to show their clients realistic images of what their homes will look like throughout the entire design process. Seeing as most of their clients have never built a custom home before or worked with a designer, they are unfamiliar with typical architectural drawings such as elevations and building sections.

Autodesk Revit Architecture® allows Solares to create vignettes of the proposed house from varied angles, enabling clients to get a strong overall sense of the design. Being able to see this kind of realistic visualization during the design process empowers their clients to provide valuable feedback, something that is extremely important to this firm. Solares believes that designing a custom home needs to be a collaborative process between client and designer and Revit's ability to produce realistic renderings has been an invaluable design communication tool. It should be noted that client perceptions of software are not always what we expect. They may be amazed that we can change the size of a window before their eyes, yet wonder why we can't tell them how many wood studs there will be in the house. Balancing these unrealistic expectations can be tricky but is rewarding.

SETTING EXPECTATIONS: BILLING

Expectations also involve billing. When working in Revit®, clients tend to think that changes are so easy that they should be free. It's been said that 'Free' is not a good business model. It's important to adjust your billing so the client understands the implications of making changes along the way. Although you will still be spending time on construction documentation, including detailing, it will not be as much as in a 2D drafting software.

Does Solares do anything different for billing as compared to a traditional 2D workflow?

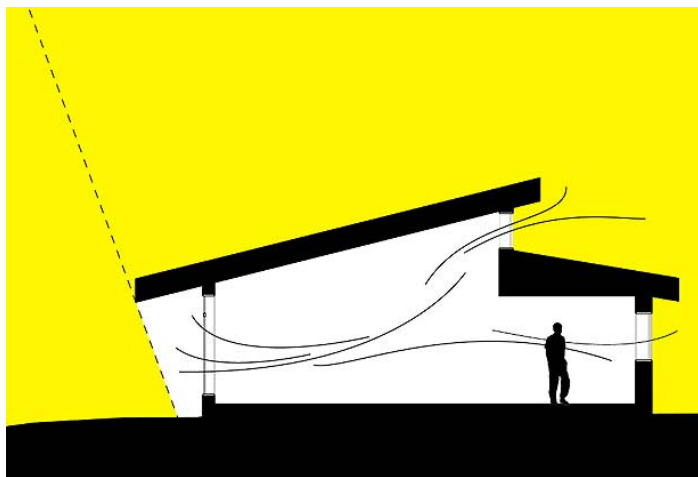
We only work in 3D. Our fees are comparable to any small architecture firm however the proportion of billing per phase might differ.

For example we put a lot more time into the Design Development Phase than Construction Documents. In DD a significant amount of effort goes into making final design decisions and modeling. Ideally, by the time CD rolls around we are simply putting the finishes touches on the drawing package.

FOCUS ON REVIT'S STRENGTHS: SUSTAINABLE DESIGN

It is possible to make your model and families fully parametric and automate many tasks. The key is to know when to implement these and when to leave these alone. It is important to harness Revit's strengths, especially when starting out then move on to more advanced topics. When it comes to sustainable design many think that this is expensive or beyond their reach of knowledge. But this is a good example how any designer can use the out of the box tools in Revit® to create some very valuable sustainable design discussions.

Solares uses passive solar design, so Revit's shadow study feature is especially important for their projects. Passive solar design involves placing main rooms and spaces on the south axis of the house, allowing low-angle winter sun to enter large windows thereby heating the rooms for free. Shading devices placed over these south-facing windows must be provided to block the high-angle summer sun thereby keeping the house cool in the summer months.



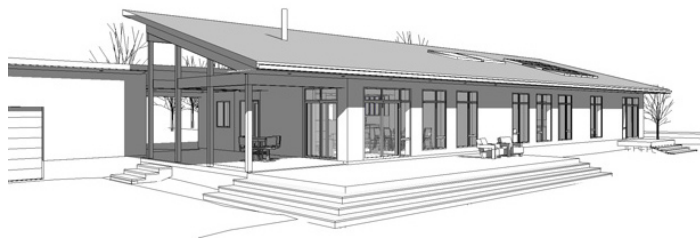
The firm performs precise shadow studies on their proposed designs so that they can size roof overhangs and shading devices accurately. While the science of passive solar design is not particularly complex, accuracy is important, otherwise the energy performance of the house may suffer. With Revit® they can be confident that the passive solar design strategies work prior to construction.

Solares Design Build's Co-owner Christine Lolley provides some insight into The Country Trail House, designed using Revit®:

"We wanted the design of the County Trail House to be very modern and minimal. The house has a very unique section: the main roof slopes up from the south façade to create a 15' ceiling along the main corridor of the house. The north roof is offset from this roof, creating a line of high-level clerestory windows on the north face of the building. These windows light the main corridor as well as providing passive ven-

tilation. Because the house doesn't have a mechanical air-conditioning system, these high-level windows play an important role in keeping the house cool in the summer. We wanted this high ceiling to be impressive without being over-bearing. Using Revit® we were able to model the main corridor, roof line and high-level windows so that we could evaluate the effectiveness and proportion of the space.

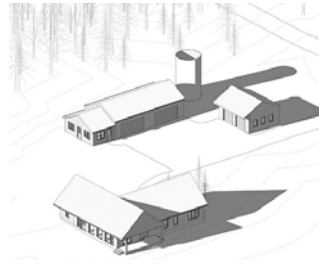
It's amazing to stand at the front door of the completed house and compare it to the image of the model we built. We aren't the best renderers out there, but the 3D visualization of the space is very accurate!"



Once you start to master these basic principles in Revit® you will want to take on even more challenges. Solares is doing this with their most recent project, Black Bank Hill. Situated on one of the highest points in rural southern Ontario, this home is designed to the Passive House standard(see box). With electric in-floor heating, superior insulation, and the use of thermal mass within the building envelope, the house is projected to have a heating bill of only \$250 per year.

What is a Passive House and what are its challenges?

A Passive House is a certified house or building that follows the strict standards as laid out by the Passive House Institutes of Germany and the US. In general a Passive House uses 90% less energy than a typical home or building. Passive House designers accomplish this by creating super insulated (sometimes insulation levels are as high as R-100 in roof and wall assemblies) and air-tight building envelopes. The result of this additional effort means that mechanical systems are tiny to non-existent depending on the climate. The challenge we face as sustainable designers in Canada as we adopt the Passive House is, of course, the climate. The standards for Passive House are the same whether your building is located in California or Sudbury so we have our work cut out for us!



PASSIVE HOUSE LINKS

Passiv Haus
<http://www.passiv.de/>

Passive House US
<http://www.passivehouse.us/passiveHouse/PHIUSHome.html>

Passive Buildings Canada
<http://www.passivebuildings.ca/>

Black Bank Hill Project
<http://www.solares.ca/BlackBank.php?p=Construction>

tools we can facilitate communication quickly and effectively. Our clients respond to this and share our desire to use sustainable design practices. Managing expectations can be tricky but as long as we focus on Revit's strengths we can make our way through the Revit® residential jungle.

Jay has twelve years of national and international design and drafting industry experience. He is a Leadership in Energy and Environmental Design Accredited Professional (LEED AP), as well as an Autodesk Revit Certified Implementation Expert. In addition to these accreditations, Jay has managed a wide variety of technology implementation projects. He is also the founder and moderator of the Ontario Revit Users Group (ORUG). A highly respected Trainer, Jay has taught over six-hundred students with much positive feedback.



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How can Revit® assist in the Passive House design?

Revit works well with the Passive House energy modeling software PPHP (passive house planning package) because it provides a lot of information that the PPHP needs: wall and glass areas, room volumes and most importantly solar orientation at the different faces of the building.

CONCLUSION

As we have seen in this article, our clients love being integrated into the BIM process. There is no need to put off sustainable design practices. By making use of Revit's powerful visualization