INSIDERS' GUIDE

To Modern Architecture, Engineering & Construction Software Requirements

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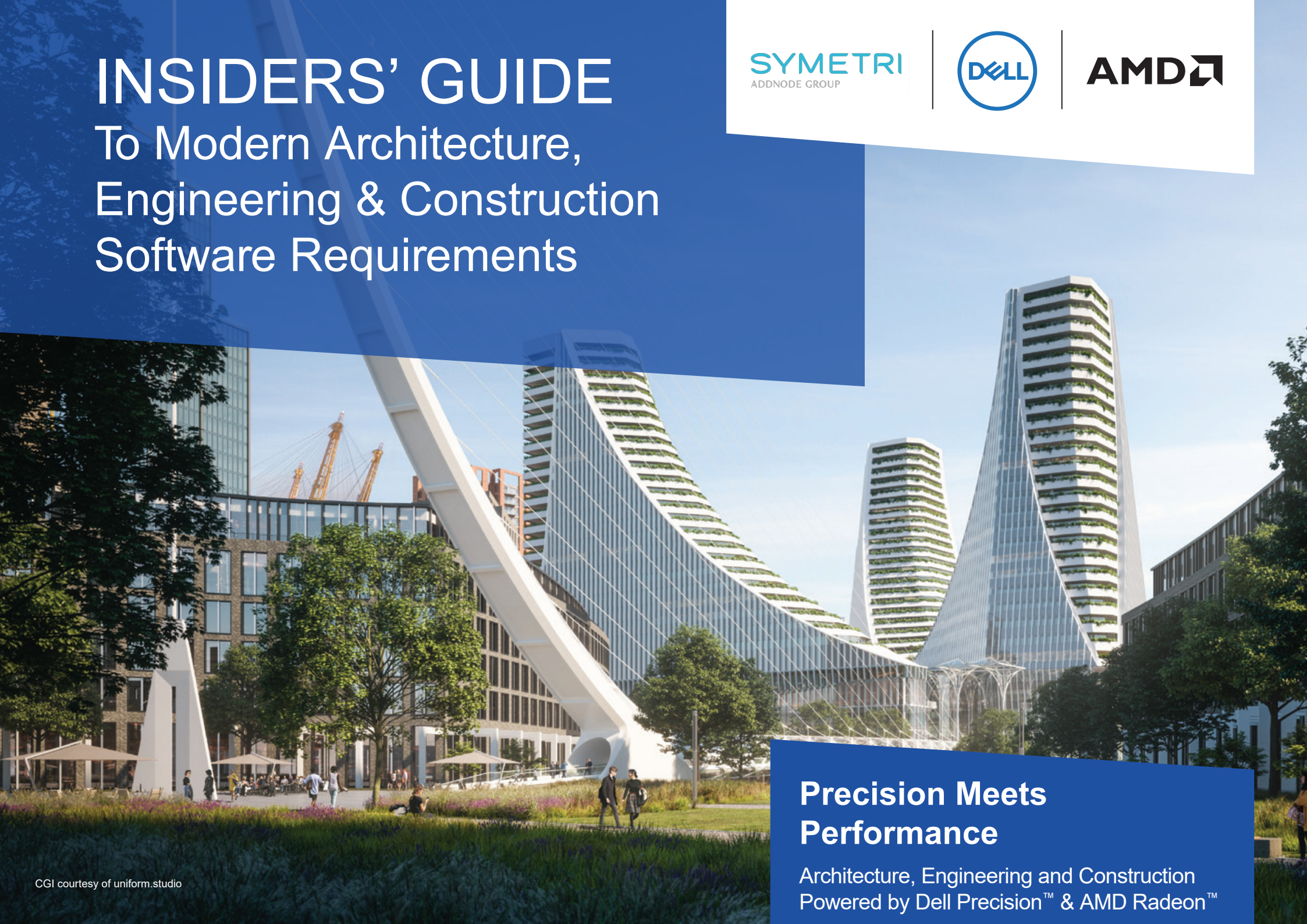


CGI courtesy of uniform.studio

Precision Meets Performance

Architecture, Engineering and Construction
Powered by Dell Precision™ & AMD Radeon™

CGI courtesy of uniform.studio

Architecture, Engineering and Construction
Powered by Dell Precision™ & AMD Radeon™ Pro Graphics

Welcome

At AMD and Dell we jointly celebrate the amazing construction projects being created around the globe. As architects utilise more complex software than ever before, the requirements on the hardware continues to grow. AMD and Dell combined solutions are built to match the increasing demands placed on them, allowing you to concentrate on creating beautiful designs.

We are dedicated to making technology less of a barrier in the pursuit of great architectural visualisation, compelling CAD and immersive AR/VR. Through initiatives that foster an open ecosystem, rather than proprietary lock, we believe in ensuring that all technology should continue to push quality and creativity, whilst remaining affordable for all.

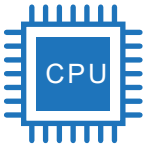
Together we stand for unbeatable driver stability, outstanding value, and ground-breaking technological advancements with a desire to inspire the next generation.

After speaking with leading architects and industry trainers to explore their latest insights, this “insiders’ guide” provides us the chance to share a range of software tips. Combined with trends and performance suggestions, this document is designed to help you make better choices for your future needs.

WHY AMD RADEON PRO GRAPHICS?

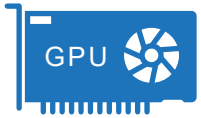
AMD’s professional graphics allow you to explore designs with the best viewport experience. Allowing you to concentrate on creating beautiful designs, but remaining within the tight budgets placed on you. The full range is built to match the increasing graphical demands placed on them, whether used in physical workstations or virtual desktop solutions, allowing you to work virtually anywhere. AMD Radeon™ Pro graphics are for the visionaries of the AEC world.

AMD.COM/RADEONPRO



The CPU is typically the first component chosen when configuring a new system, but the choices can be confusing. The main software being used on that machine should drive the decision, particularly as the majority of CAD tools are lightly threaded, we refer to this as being ‘frequency bound’, as the speed at which software tackles tasks is limited by processor clock speed (or frequency). CAD applications typically favour high clock speeds while rendering engines favour dozens of CPU cores.

Memory (or RAM) is always difficult to exactly specify, as this typically depends on the complexity of your CAD models. Most AEC software uses RAM to store the model and any dependent items while it is being worked on. Today’s CAD tools are relatively efficient with memory, but the bigger the model you are working with, the more memory you will need. 16GB will suffice for most users, although up to 64GB may help when viewing an entire masterplan.



A dedicated graphic card (GPU) is as important as the CPU. A professional, certified graphic card ensures viewports are drawn precisely, particularly when using advanced features like shadows or hidden lines. A growing trend for AEC firms is the use of real-time tools like Enscape™. These applications typically require a more advanced GPU, making it possible to multi-task in CAD and completely offload the render process to dedicated GPUs without performance hits.

To see how AMD is helping the AEC industry visit amd.com/aec

ALLPLAN TIPS FROM A BIM MANAGER

The multi-file nature of ALLPLAN, as a BIM authoring software is one of its main features, but this means you have to think about the project from the beginning and plan it in a hierarchical way. This is the core of a powerful BIM oriented workflow, giving you the possibility to mix the objects and all parts of the building structure, producing something called Model View Definitions (MVD), but how can you improve performance?

LAYERS are one of the most powerful workflow tools within any software, and this is certainly the case in ALLPLAN. Use them to manage your digital model by switching something you want to visualize on or off, not only in the viewport but also in your associated sections and views. Layers can be tricky to maintain, but bring huge time-saving benefits. This can be mixed inside one of the most important tools: smart symbols.

SMART SYMBOLS are customizable user objects, producing adaptive elements that combine both 2D and 3D content. Their power is based on instancing, so are much lighter than a group of individual elements to work with. They are adaptable to the drawing scale and drawing style. This approach gives flexibility and prevents performance issues.

SETTINGS. Whilst the above offers an efficient workflow, workstation performance can be increased by changing settings. Bitmap texture areas can be set to high quality, or not, within the OpenGL® settings. This allows you to carefully manage the balance between speed and quality with a simple slider. For better quality viewports, set to high quality antialiasing, and test the refresh rate according to your project file size needs.

DOCUMENT SIZE. Inside the Allmenu change from 256MB to 1024MB. This asks the software to obtain more memory space, which is necessary for managing multiple files at the same time without running into hardware issues.

Contributed by **Enzo Pasqua**. BIM manager and structural engineer, powered by Radeon Pro WX 9100 graphics. To follow Enzo visit ***Linkedin.com/in/enzopasqua***

AUTOCAD TIPS FROM A CERTIFIED INSTRUCTOR

Architects rarely use just one application, it is therefore advisable to look towards optimising your software settings to get the best out of your hardware. The latest version of AutoCAD puts more pressure on the GPU with increased support for multiple monitors and 4K resolution supported on Windows 10 systems.

GRAPHICSCONFIG. Within AutoCAD launch the GRAPHICSCONFIG command to optimize it for the hardware it is running on. By default, Hardware Acceleration is enabled, allowing AutoCAD to assume a suitable discrete graphics card is present. Within this setting are three different 2D Display Settings; Basic, Intermediate and Advanced. With the Radeon Pro WX professional range you can enable the highest level for advanced viewport fidelity. If not running an AMD professional GPU you can choose the lower settings to ensure AutoCAD supplies a lesser graphics load for the system to handle.

INTERACTIVE PERFORMANCE. Typically, AutoCAD users require fast interactivity and as such it is recommended to be paired with a graphics card that offers 4GB of memory, is DirectX®11 compliant, and offers at least 106GB/s bandwidth. This last measurement suggests a mid-level GPU is recommended. However, GB/s relates to video memory speed, which is impacted by project size. In essence, the higher this value the faster and higher quality displays can be drawn. Practically there is more to it than that and this is where application certifications are critical to ensure all parts of the GPU behave as expected. In most cases AutoCAD will support a basic speed of 29 GB/s, and a very low 1GB of memory. This opens up the door to the entire Radeon Pro range of professional graphic cards, which start with 2GB support and 48GB/s bandwidth as standard. Remember an expensive GPU does not always mean better performance. Looking towards the CPU, AutoCAD benefits significantly from a processor with 3GHz plus of speed (or 3 billion cycles per second). For larger datasets combine a fast CPU and GPU with SSD (Solid-State Drive) storage for faster software response.

Contributed by **Shaun Bryant**. Autodesk expert elite certified consultant, powered by Radeon Vega graphics. To follow Shaun visit ***cadfmconsult.co.uk***

CGI courtesy of www.wearerealm.co.uk

AMD: 50 YEARS OF INNOVATION

- 2000 — First to break the historic 1GHz barrier
- 2003 — World's first x86-64 BIT architecture
- 2008 — First GPU to break the Teraflops performance barrier
- 2009 — First to break the 1GHz GPU barrier
- 2011 — Introduced the world's first APUs
- 2013 — Inside every major gaming console
- 2016 — World's first $199 VR GPU solution
- 2017 — World's first 16-core high-end desktop processor
- 2018 — 2nd Gen Ryzen™ named Best CPU[1]
- 2019 — World's first 7nm graphics card

AMD50.COM

[1]For More information, visit *http://www.techradar.com/news/best-processors*

Architecture, Engineering and Construction Powered by Dell Precision™ & AMD Radeon™ Pro Graphics

Radeon Pro™ WX 3100 GPU

Super small form, punchy performance.

The Radeon™ Pro WX 3100 graphics card delivers workstation features, reliability and certification on many of today's most popular AEC applications. The graphics card is a small form factor solution, and is equipped with 4GB of graphics memory to handle workflows using small to medium project scales.

Ideal for entry level CAD work.

Radeon Pro™ WX 5100 GPU

Thin, and packed with power.

The Radeon™ Pro WX 5100 graphics card offers amazing value, by delivering great performance and comprehensive features in an efficient, compact form factor. With four DisplayPort 1.4 outputs to drive the latest 5K displays, and 8 GB of memory to handle large and complex projects, making it the perfect graphics option for mainstream professional users.

Ideal for Mainstream 3D work.

Radeon Pro™ WX 7100 GPU

Ready for VR workflows

The Radeon™ Pro WX 7100 graphics card is your gateway to virtual reality. This single slot form factor graphics card is equipped with 8GB of graphics memory to handle large and complex datasets, and can drive up to four 4K displays at 60Hz. The Radeon Pro WX 7100 graphics card has the performance to tackle tomorrow's AEC workloads.

Ideal for advanced CAD and entry VR work.

RADEON™ PRO WX 3100 VS P600

150% — 150% More Memory bandwidth. (96 GB/s vs 64 GB/s)

105% — 105% More TFLOPS for faster viewports (1.25 vs 1.19)

200% — 200% More DDR5 Memory for greater responsiveness (4GB vs 2 GB)

4K 4K 4K | 5K | 8K

Display support for up to three 4K, one 5K or one 8K display.

RADEON™ PRO WX 5100 VS P1000

200% — 200% More Memory bandwidth. (160 GB/s vs 80 GB/s)

205% — 205% More TFLOPS for faster viewports (3.89 vs 1.894)

200% — 200% More DDR5 Memory for greater responsiveness (8GB vs 4 GB)

4K 4K / 4K 4K | 5K 5K | 8K

Display support for up to four 4K, two 5K or one 8K display.

RADEON™ PRO WX 7100 VS P2000

160% — 160% More Memory bandwidth. (224 GB/s vs 140 GB/s)

191% — 191% More TFLOPS for faster viewports (5.73 vs 3.0)

160% — 160% More DDR5 Memory for greater responsiveness (8GB vs 5GB)

4K 4K / 4K 4K | 5K 5K | 8K

Display support for up to four 4K, two 5K or one 8K display.

To see how AMD is helping the AEC industry visit amd.com/aec

Radeon Pro™ WX 4100 GPU

Flexible, Fast and Quiet.

Architects who want a flexible, fast and quiet small form-factor workstation can turn to the Radeon™ Pro WX 4100 graphics card. Purpose-built for AEC workloads, it is equipped with four mini-DisplayPort outputs for multi-monitor setups and 4GB of memory, making it an ideal solution to tackle design and visualization of medium sized projects.

Ideal for multiple displays at 4K.

Radeon Pro™ WX 9100 GPU

Ultimate performance.

The ultimate solution for demanding professional workloads ranging from design and rendering to real-time walk-throughs. With a wealth of innovative technologies, such as HBCC for smoother VR, Error Correcting Code memory, AMD secure processor, 16GB of HBM2 memory for larger project support, as well as outputs for six 4K monitors.

Ideal for advanced visualization, VR and Real-time rendering.

CGI courtesy of James Lawley

TIP: UNSURE WHAT GRAPHIC CARD YOU NEED?

Ready to find the right AMD professional workstation graphic solutions that match your needs? Start by using the online GPU wizard and selecting your application. **AMD SOLIDWORKS GPU Selector** AEC industry.

MAKING THE RIGHT CHOICE: INTEGRATED OR DEDICATED GRAPHICS

Integrated graphics refers to systems in which the graphics processor is integrated in the CPU itself, which is common among entry-level desktop and mobile systems. While integrated graphics are sufficient for basic tasks such as web browsing or office work, they often lack performance and dedicated graphics memory required for more demanding CAD tasks, simulation or visualization. One aspect of application certification is the GPU must deliver a minimum experience level for the application, and integrated graphics often struggle to. Trimble® SketchUp explicitly recommends you do not use integrated graphics, and instead rely on a dedicated GPU[1].

[1]Source: *https://help.sketchup.com/en/sketchup/sketchup-hardware-and-software-requirements*. Accessed on 09 May 2019.

TIP: GPU FANS & THE WEATHER

Graphic card fans are relatively simple but have the critical task of blowing hot air away from the GPU. This airflow ensures predictable performance when the GPU is under workload strains. Changing seasons, however, can mean new thermal conditions. With enterprise drivers 18.Q3 onwards, you can manually control fan speed, giving performance boosts of up to 2x in applications like Autodesk® 3ds Max® compared to default. Learn more at bit.ly/GPUfans

RADEON PRO

CGI courtesy of Jamie Cardoso

TIP: VIEWPORT STUTTERING

Always select at least 2GB of dedicated graphic card memory for CAD software.

What happens if you do not have enough GPU memory?

1/ Viewport stuttering,

2/ 'Tearing' (visual artifacts of multiple frames) and

3/ a drop in viewport Frames Per Second (FPS).

REVIT TIPS FROM AN EXPERT TRAINER

The ideal Revit workflow is for all the information to live in one project file. However, the amount of information required from a BIM project can lead to big files and sluggish performance. Having a strategy to deal with model performance from the outset is essential. What's considered acceptable performance also needs thinking about, as large projects will always be slower than smaller ones.

MANAGE VIEWS by making sure settings of individual views are optimised. This can make a huge difference to model performance. Ensure the Far Clip values for Section and Elevation views are enabled and set appropriately will make them respond quicker. Using the Selection Box tool to crop 3D views will help speed them up. This tool is great for isolating specific objects in 3D. Setting the appropriate detail level, hiding unneeded categories and worksets, turning off shadows and not using Realistic or Raytraced shading modes will all help to maintain speed on larger files.

MANAGE DWGs by always linking DWGs to Revit projects. Importing them will add the file into the Revit database, making it bigger and difficult
to clear out. When bringing in images, size them accordingly beforehand as the entire image file is also added to the database, scaling it down once it's imported won't reduce its file size, importing a 4K image when that quality isn't needed just adds to the weight of the model. Also, check the graphical limits of the DWG. Often there are stray bits of linework and other issues that will extend beyond the 32KM working range of Revit.
Using the Wblock command to copy the required drawing geometry into a new file is a good method to get a clean DWG for linking in. If a DWG is bought into a Revit Family for tracing over or re-modelling, make sure it's purged from the Family before using it in a project.

Contributed by Paul Grimston. Expert trainer and consultant, powered by Radeon Pro WX 3100 graphics. To follow Paul visit *Linkedin.com/in/paulgrimston*.

ENSCAPE TIPS FOR LARGE PROJECTS

A powerful graphics card with VR-ready capabilities is key for immersive real-time rendering. Enscape generally scales well with huge AEC projects, ensuring stable frame rates without a a visual quality loss. However, to manually tune your project further, consider the following:

TEXTURES should typically be downscaled if gigantic. In some cases, you may want 4K textures, but usually they are not necessary and consume a significant amount of GPU memory if not optimized. Today's GPUs have more memory, but this should still be used wisely.

USE SECTION BOXES when dealing with projects that span multiple real-world miles with several highly detailed buildings allowing you to constrain it to the area of interest.

ENSCAPE ASSET BROWSER should be used for trees, people and furniture. Enscape ships with many high quality and performance optimized assets, which are built to scale in large projects saving you time.

RENDERING QUALITY can be modified within Enscape's settings. The difference between "High" and "Ultra" is often subtle for the viewer, but costly for hardware calculations. As each project and scene is unique, it's recommended to explore these settings to see if they have an impact on visual quality vs performance.

THE AMD TRICK. For demanding real-time workloads you need more memory on your GPU, but this comes at a financial cost. If you choose
a GPU with too little memory, then the application can crash when it gets full. With the Radeon Pro WX 9100 however, you can utilise unique features like HBCC, allowing the GPU to use the wider workstation resources via the AMD Pro driver. Thus allowing you to load larger projects than your GPU memory would typically allow.

Contributed by Thomas Schander. CEO and founder at Enscape. To follow Enscape visit *Enscape3d.com*

TIP: ENSURE STABILITY AND PERFORMANCE

Dell Precision™ workstations featuring AMD Radeon™ Pro graphics deliver a powerful and reliable platform for advanced architectural and visualization workflows. The entire AMD Radeon™ Pro range of graphics are certified by leading Independent Software Vendors (ISVs) to help ensure stability and performance under extreme AEC compute intensive workloads.

AMD.COM/CERTIFIED

GREAT FOR TOUCH INTERACTION

The Dell Precision™ 5530 2-in-1 is a mobile workstation, designed for precision pen and touch interaction. Featuring a 360-degree hinge, it can function as a laptop or tablet, with a 15.6-inch 4K Infinity display. For modelling, the 2-in-1 is powered by AMD Radeon™ Pro WX Vega M GL graphics.

JUST LAUNCHED

GREAT FOR GRAPHICS INTENSIVE CAD

The Dell Mobile Precision™ 3540 is powered by AMD Radeon™ Pro WX 2100 graphics. Introducing Dells smaller, lighter and more accessible Precision workstation. Built to empower productivity in CAD and other demanding applications.

- Windows 10 Pro 64bit
- 4, 8, 16 or 32GB DDR4 non-ECCC Memory options
- M.2 256GB PCIe Solid State Drive
- Pre-configured with Radeon™ Pro WX 2100 graphics.

GREAT FOR MOBILE USERS

Powered by a choice of AMD Radeon™ Pro WX 4150 or VR ready WX 7100 graphic options, the Dell Precision™ 7730 offers you superior power in a smaller design. The 17" laptop is engineered to be the most powerful of its kind. Featuring enhanced performance, faster memory speeds, and a thinner and lighter frame.

- Windows 10 Pro 64bit
- 8GB DDR4 non-ECCC Memory
- M.2 256GB PCIe Solid State Drive
- Pre-configured with Radeon™ Pro WX 4150 or WX 7100 options.

GREAT FOR EXPANDABILITY

Powered by a choice of AMD Radeon™ Pro WX 2100 up to VR ready WX 7100 graphic options, the Dell Precision™ 3630 Tower offers small but mighty VR creation. Harness the power of workstation performance, VR content creation and reliability in an affordable, smaller yet expandable tower design.

- Windows 10 Pro 64bit
- 16GB DDR4 non-ECCC Memory option
- M.2 256GB PCIe Solid State Drive
- Pre-configured with Radeon™ Pro WX 5100 option.

GREAT FOR SMALLER OFFICES

The Dell Precision™ 3430 Small Form Factor is powered by a choice of AMD Radeon™ Pro WX 2100 up to WX 4100 graphic options. Discover workstation-class performance and affordability in a new, small form factor design. Featuring next generation graphics and powerful processors.

- Windows 10 Pro 64bit
- 16GB DDR4 non-ECCC Memory options
- M.2 256GB PCIe Solid State Drive
- Pre-configured with Radeon™ Pro WX 3100 or WX 4100 options.

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