BORA

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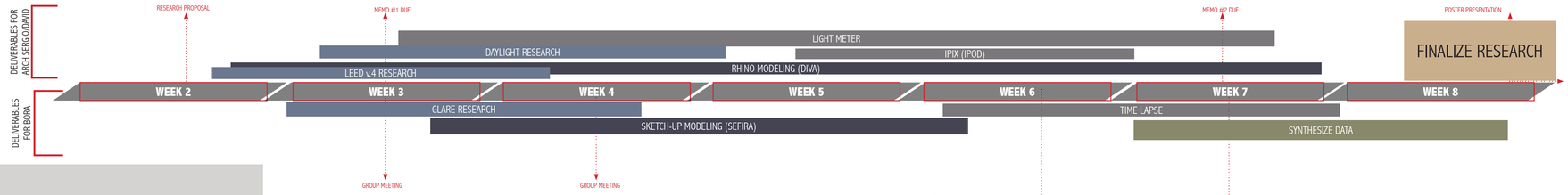
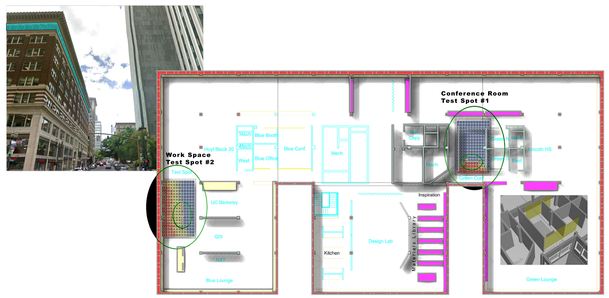
DAYLIGHT & GLARE

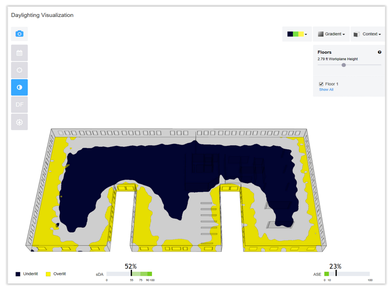


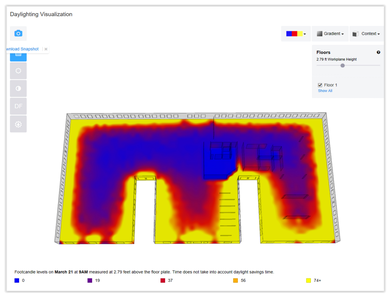
ABSTRACT

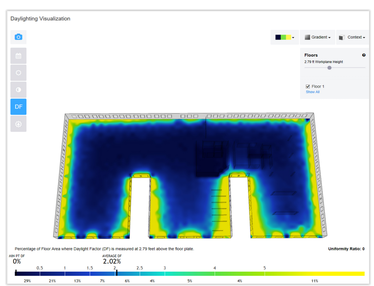
We conducted a daylighting and glare study for Bora Architects within their Portland business office space. The project was to examine the quality of daylight, consider the effectiveness of borrowed light, and strive to discover what LEED-compliant daylight autonomy really looks like. In addition we were tasked with running computer simulations to measure excess glare and look for ways to combat its effect. We were able to explore the effects of glare with in Bora's workspace as it currently exists and look for interventions to improve perceived lighting level contrasts. The control of glare and daylighting can be an effective internal strategy to maximize visual comfort and reduce energy use. Our goals for investigating the current daylight conditions within Bora's office spaces included using a variety of tools to measure light and glare, including Diva (for Rhino), Sefaira (for SketchUp), IpiX(for Iphone) and a light meter. We conducted various "rounds" of site observations and measurements within two key areas of Bora's office space, including a conference room, as well as, an individuals typical work space.

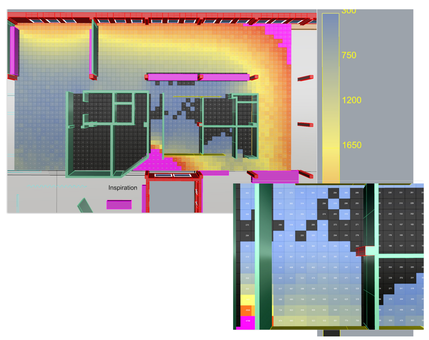
DAYLIGHT STUDY



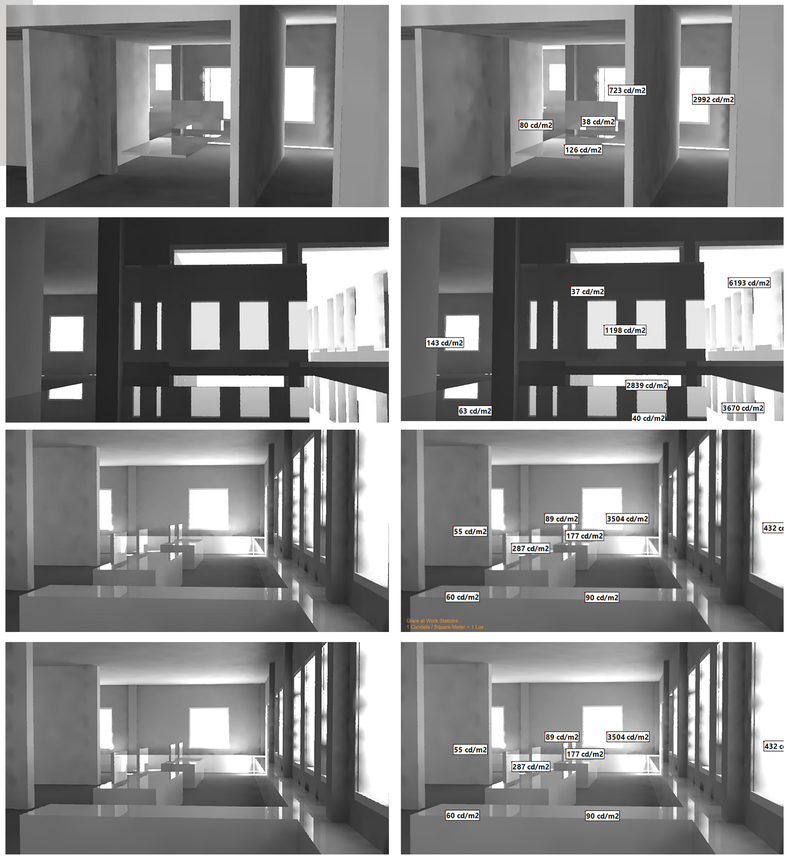


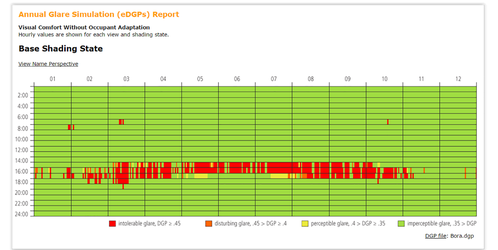


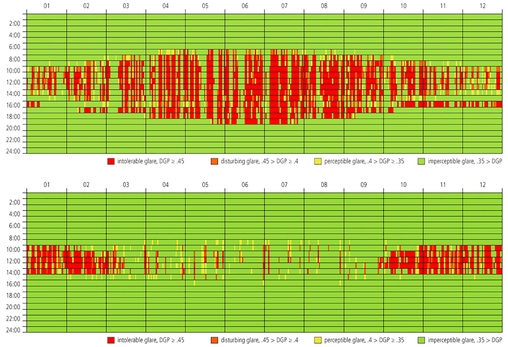




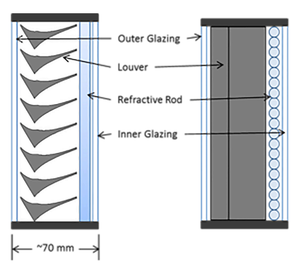
GLARE STUDY

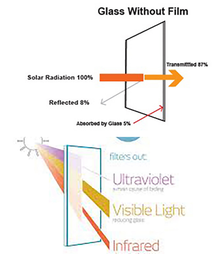






POSSIBLE SOLUTIONS





Results/Findings

Analyzing existing lighting conditions through Diva's parametric design process offered immediate insight into the effects of current lighting levels. The simultaneous collection of field data allowed us to translate the real world experience of the space in reference to digital modeling. It was our aim to find balance between optimum day lighting levels, while keeping glare levels to an acceptable range. It was our experience that DIVA for Rhino is a more optimal and useful tool for this type of data collection

Results/Findings

than Sefaira for SketchUp. We have discovered that it is certainly possible to use Diva as a design tool, and calculate accurate information used to achieve LEED v4.0. After making additional adjustments to weather data files, custom materials pallets and overall extensive detailing of input data, the Diva findings were exceptionally close to the field data readings that we collected. It is important to know that these tools could be used in the future to accurately predict the daylighting autonomy for a given

Results/Findings

design in order to express veracity to customers and clients seeking this level of detail and attention int he design process. Unfortunately, we discovered that adequate daylight comes at the cost of increased glare. Initial research suggested that changes in glazing and additional louvers could be added to help maximize daylight while simultaneously reducing the effects of glare. Additional research could be collected to determine more effective and creative ways to combat these conditions.