



**AUTODESK**  
Official Press

**Eric Chappell**

# **Autodesk® InfraWorks® 360 and Autodesk® InfraWorks® 360 LT**

## **ESSENTIALS**

**Second Edition**

**SYBEX**  
A Wiley Brand

# **AUTODESK® INFRAWORKS® 360 AND AUTODESK® INFRAWORKS® 360 LT ESSENTIALS**

***AUTODESK OFFICIAL PRESS***

Second Edition

Eric Chappell



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Copyright © 2015 by John Wiley & Sons, Inc., Indianapolis, Indiana  
Published simultaneously in Canada  
ISBN: 978-1-119-05948-6  
ISBN: 978-1-119-05935-6 (ebk.)  
ISBN: 978-1-119-05940-0 (ebk.)

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**Library of Congress Control Number:** 2015941964

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# **AUTODESK® INFRAWORKS® 360 AND AUTODESK® INFRAWORKS® 360 LT ESSENTIALS**

Second Edition

*To Emerson*

# ACKNOWLEDGMENTS

*So much has happened* since I wrote the first edition of this book a year ago! InfraWorks 360 has evolved and matured very rapidly and is gaining momentum in the industry as a powerful engineering tool. I'm so fortunate to be involved with this product and working for the company that has created it, especially in my current role as Community Evangelist for InfraWorks 360. I feel a huge responsibility to serve the InfraWorks user community and make sure that it has whatever it needs to be successful with this amazing tool.

And speaking of my great fortune of being able to work at Autodesk in such an amazing role, I'd like to thank Neal Niemiec for taking me under his wing, taking an interest in my path, and being a powerful source of encouragement, insight, and inspiration. Neal, it's been a very exciting couple of years, and I wouldn't be where I am without your help.

As for this book, I'm extremely fortunate that Wiley has given me the opportunity to write a second edition. I'd especially like to thank Stephanie McComb for helping to push things through and for being so flexible. Also, a special thanks to Kim Wimpsett for fixing all my mistakes and keeping the book at the high level of quality that is expected of Wiley. And of course, many thanks to Tom Richardson for picking apart all of the technical aspects of the book and making sure I got it right.

And finally, for yet another year, my family has endured my scarceness, late nights, and stress level: all things that come along with the extra load of "book-writing season". Thank you, Dixie, for being so patient, for picking up the slack for me, and for not complaining. I couldn't do this without you. I love you.



# ABOUT THE AUTHOR



*Eric Chappell has been* working, teaching, writing, and consulting in the world of civil-engineering software for more than 20 years, and he is a recognized expert in the world of Autodesk® InfraWorks® 360 software. Eric joined the Autodesk family in September 2013 as a Premium Services Specialist and has recently taken on the role of Community Evangelist for InfraWorks 360. In the 12 years prior to working

directly for Autodesk, he wrote training materials and performed training for end users, trainers, and Autodesk employees around the globe. He has even worked with Autodesk in authoring and developing two Autodesk certification exams. He also served as design systems manager for Timmons Group, a civil engineering and surveying firm based in Richmond, Virginia, where he managed software, standards, and training for more than 200 users. Eric is also a highly rated instructor at Autodesk University, where he has taught for the past 10 years.

Prior to writing and consulting, Eric spent nearly 10 years in the civil engineering and surveying fields while working for the H. F. Lenz Company in Johnstown, Pennsylvania. During his time at H. F. Lenz, he gained considerable practical experience as a survey crewman, designer, engineer, and CAD supervisor. Eric also has a B.S. degree in Civil Engineering Technology from the University of Pittsburgh at Johnstown and is certified in Pennsylvania as an EIT.

Eric is originally from southwestern Pennsylvania, but he has lived in the Richmond, Virginia, area for the past 14 years with his wife and four children. He enjoys being outdoors and spending time with his family. He can sometimes be seen playing drums for the band Sons of Zebedee, which performs at a variety of events in the Central Virginia area.

If you would like to contact the author regarding comments or suggestions, please email [InfraWorksEssentials@gmail.com](mailto:InfraWorksEssentials@gmail.com). You are also welcome to visit Eric's blog at <http://ericchappell.blogspot.com>.

# INTRODUCTION

*When I wrote the* first version of this book last year, I had no doubt that Autodesk® InfraWorks® 360 would be bigger, stronger, and more adopted a year later, and that I'd be updating it for a second edition. Well, the fact that you're reading this is proof that I was right! I'm even more excited about this year's version of InfraWorks 360 than last year's. The product has come a long way in a short time and is no longer the “new kid,” but a viable, solid, accepted, adopted solution.

InfraWorks 360 has continued to revolutionize the way design is done, and one of its greatest attributes is that, with its beautiful immersive 3D interface, it is simply fun to use. In addition to that, it gets the job done by framing your preliminary design with sound engineering principles.

As with last year's version of this book, and with the *Essentials* series that I've written for Civil 3D, I've attempted to hold as true as possible to the following criteria:

- ▶ The book should be basic enough to enable anyone to learn InfraWorks.
- ▶ It should be in-depth enough to enable a person to be productive using InfraWorks for basic tasks.
- ▶ It should foster understanding by associating the things you do in InfraWorks with familiar things that you see every day.
- ▶ The examples and exercises should be based on the real world.
- ▶ The book should not simply demonstrate random software features, but should teach the process of project completion using InfraWorks.

While writing every single chapter of this book, I have tried to meet these criteria. The first chapter, although very important, is more general and introductory. After that, you are going to help the town of Bimsville decide whether and how they are going to build a bypass around their town. You will begin by reconstructing the existing conditions such as terrain, buildings, roads, and water features in stunning 3D. Then you will build a “revised” world in which the Bimsville Bypass exists, complete with the road itself, buildings, bridges, parking lots, and other features including a controversial wind farm—again all in stunning 3D. You will make your world look exactly the way you want it and then present it in the form of still images, animations, and cloud-based presentations—all in stunning 3D. And you will provide technical answers to solid engineering and planning questions (it can't all be fun and games)!



You should know that InfraWorks 360 is actually a family of products. InfraWorks 360 contains functions for building a base model, sketching preliminary design features, and presenting your design to others, as well as cloud capabilities that allow you to share your designs and collaborate across the globe. Next in the family are vertical applications such as Roadway Design for InfraWorks 360, Bridge Design for InfraWorks 360, and Drainage Design for InfraWorks 360. These applications extend the capabilities of InfraWorks 360, enabling you to perform more sophisticated, detailed, and engineering-oriented design and analysis. InfraWorks 360 LT is a “light” version of InfraWorks 360. The vertical applications cannot be run within it, and it does not have the collaboration capabilities of InfraWorks 360. This book covers functionality within InfraWorks 360 and InfraWorks 360 LT, but not the vertical applications. Other books are available that will teach you how to use the vertical applications, so be sure to check the Sybex website ([www.sybex.com](http://www.sybex.com)) for *Autodesk® Roadway Design for InfraWorks 360 Essentials*, *Autodesk® Bridge Design for InfraWorks 360 Essentials*, and *Autodesk® Drainage Design for InfraWorks 360 Essentials*.

## Who Should Read This Book

This book should be read by anyone who needs or wants to begin learning InfraWorks 360. It is designed to be used in a formal classroom environment, in your home office learning on your own, and everywhere in between. It is appropriate for ages ranging from high school to retirement, and although it is intended for those who have no experience or skill with InfraWorks 360, it can also serve as a great resource for refreshing one’s knowledge base or for filling in any gaps.

Here are some specific examples of individuals who would benefit from reading this book:

- ▶ Anyone involved in the planning or preliminary design stages of infrastructure or land development projects
- ▶ High school students following a design-related educational track
- ▶ College students learning to be designers, engineers, or GIS professionals
- ▶ Employees who have recently joined a company that utilizes InfraWorks 360
- ▶ Employees who work for companies that have recently implemented InfraWorks 360

- ▶ Experienced InfraWorks users who are self-taught and who want to fill in gaps in their knowledge base
- ▶ Civil 3D users

## What You Will Learn

The goal of this book is to make you productive with InfraWorks 360 in a relatively short time. It begins by giving you a detailed tour of the user interface and the environment in which you will be working. It then covers nearly all of the core product functions (not the vertical applications) using relatively simple but realistic examples. It takes you through the progression of a project (the Bimsville Bypass) so that you can learn the logic of how InfraWorks 360 is applied to make projects more successful.

After completing this book, you will be able to use InfraWorks 360 to work on the planning and preliminary design of any land development or infrastructure project. You will be able to work on a team that uses InfraWorks 360, and you will be able to create, modify, and share InfraWorks models with them. You will have built a strong foundation to learn the more advanced applications of InfraWorks 360 and to move on to learning any or all of the modules.

## What You Need

The following are the key elements that you will need to successfully complete the entire book.

### InfraWorks Software

To work through the exercises in this book, you will need to have InfraWorks 360 installed on your computer. You should refer to the Autodesk website ([www.autodesk.com](http://www.autodesk.com)) and make sure your computer's specifications are equal or better than the recommended system requirements for the current release of InfraWorks 360. Some of the topics and exercises refer to functionality that does not exist in InfraWorks 360 LT. Those topics are identified with a No LT icon like the one shown in the margin to the right.



### An InfraWorks 360 Account

For Chapter 8, “Sharing Your Design,” you are required to publish InfraWorks 360 data using an InfraWorks 360 account. You will need to have administrative access to an InfraWorks 360 account so that you are able to create groups and

publish data. If you work for a company or organization, check with a software manager within your organization about getting set up with an InfraWorks 360 account. Or, if you do not have such a person in your organization, contact your Autodesk reseller to see about setting up your account. You can also visit <http://infraworks360.autodesk.com> and follow the instructions to set up your account from there.

## Exercise Files

To complete the exercises, you will need to download the necessary files from [www.sybex.com/go/infraworksessentials](http://www.sybex.com/go/infraworksessentials). There you will find a list of ZIP files, one for each chapter, which you should unzip to the local C: drive of your computer. This will create a folder named InfraWorks Essentials with the chapter folder inside of it. As you unzip additional chapter files, simply merge the new InfraWorks Essentials folder into the old one.

Alternately, you can also request access to the InfraWorks 360 versions of the datasets by emailing [InfraWorksEssentials@gmail.com](mailto:InfraWorksEssentials@gmail.com) with “InfraWorks Essentials Dataset Request” as the subject. Within the body of your e-mail, be sure to provide the email address that is associated with your Autodesk account. You will then be invited to an InfraWorks 360 group and receive instructions as to how to download and utilize the data via that group. Ability to access the data in this manner is subject to availability and, in some cases, you may need to use the zip files mentioned previously.

## How to Use Units

Once you download the files, you'll need to configure your units and understand how units are used in this book.

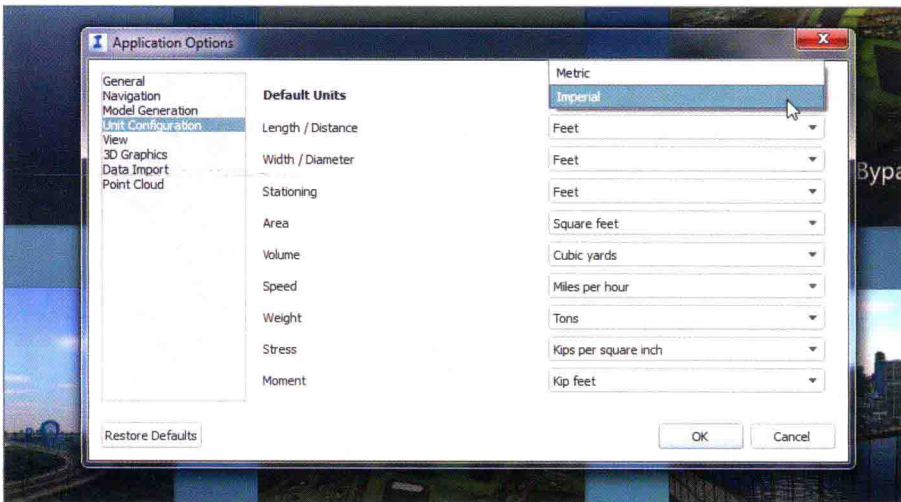
### Configure Your Units

When you begin using InfraWorks 360, you will need to configure it for either imperial or metric units. Here are the steps:

1. Launch InfraWorks 360 and log in with your Autodesk account credentials if you are prompted to do so.
2. On InfraWorks 360 Home, click the sign-in icon, and then click Application Options.



3. In the Application Options dialog, click Unit Configuration.
4. For Default Units, select either Imperial or Metric based on the units you prefer to work in. Click OK.



## Know Which Units to Use

As you work through the book, you will see dimensions provided twice: once in imperial units and then again as metric units in parentheses. Please note that the metric value is not a direct conversion of the imperial value, but is usually a similar value that has been rounded to be more practical. This is an example step from an exercise:

1. Click the height gizmo and enter a value of **150 (45)** in the tooltip. Press Enter. Press Esc to clear the selection of the building.

In this example, you would enter **150** if you are working in imperial units and **45** if you are working in metric units. Note that 45 meters is not the exact metric equivalent of 150 feet, but is a practical approximation.



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The Autodesk Education Community is an online resource with more than 5 million members that enables educators and students to download—for free (see the website for terms and conditions)—the same software used by professionals worldwide. You can also access additional tools and materials to help you design, visualize, and simulate ideas. Connect with other learners to stay current with the latest industry trends and get the most out of your designs. Get started today at [www.autodesk.com/joinedu](http://www.autodesk.com/joinedu).

## What Is Covered in This Book

*Autodesk® InfraWorks® 360* and *Autodesk® InfraWorks® 360 LT Essentials, Second Edition* is organized to provide you with the knowledge needed to master the basics of InfraWorks 360.

**Chapter 1: Exploring the InfraWorks 360 Environment** Familiarizes you with the InfraWorks environment so that you can navigate more easily within the software.

**Chapter 2: Building a Base Model** Demonstrates how to build a 3D model of the existing conditions of your project area using either Model Builder, or geospatial data to which you have access. You will learn about coordinate systems and about importing and configuring data from various sources.

**Chapter 3: Creating New Design** Demonstrates how to develop the InfraWorks model by adding proposed features. You will study the main design features of roads, coverages, and buildings.

**Chapter 4: Adding Detail to Your Design** Demonstrates how to add detail and realism to your model by including more elements. You will study points of interest, trees, water features, barriers, pipelines, and city furniture.

**Chapter 5: Working with Styles** Demonstrates how to leverage styles to make model elements appear the way you want them to appear. You will study material styles, material groups, coverage styles, road styles, facade styles, and style rules.

**Chapter 6: Presenting Your Design** Demonstrates the use of InfraWorks tools to present your design ideas to others. You will study visualization settings, snapshots, rendering scenes, and building storyboards.



**Chapter 7: Analyzing Your Design** Demonstrates the use of InfraWorks tools to answer questions about your design. You will study measurement tools, visual analysis techniques, terrain analysis, feature analysis, and light and shadow analysis.

**Chapter 8: Sharing Your Design** Demonstrates how to use InfraWorks 360 to set up a sharing environment and publish information to be shared. You will practice setting up InfraWorks 360 groups, publishing models, and sharing scenarios. You will also learn about exchanging data between InfraWorks and Civil 3D.

## The Essentials Series

The *Essentials* series from Sybex provides outstanding instruction for readers who are just beginning to develop their professional skills. Every *Essentials* book includes these features:

- ▶ Skill-based instruction with chapters organized around projects rather than abstract concepts or subjects
- ▶ Downloadable tutorial files showing the start and end states of each exercise
- ▶ Digital extras so you can work through the project tutorials yourself. Please check the book's web page at [www.sybex.com/go/infracore-essentials](http://www.sybex.com/go/infracore-essentials) for these companion downloads

## How to Contact the Author

I welcome feedback from you about this book or about books you'd like to see from me in the future. You can reach me by writing to [InfraWorksEssentials@gmail.com](mailto:InfraWorksEssentials@gmail.com). For more information about my work, please visit my blog at [erichappell.blogspot.com](http://erichappell.blogspot.com).

Sybex strives to keep you supplied with the latest tools and information you need for your work. Please check its website at [www.sybex.com](http://www.sybex.com), where we'll post additional content and updates that supplement this book if the need arises.

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