LANMAR SERVICES

3D LASER SCANS TO READY TO USE BIM

Know What You Want: How to Start a Successful Scan-to-BIM Project

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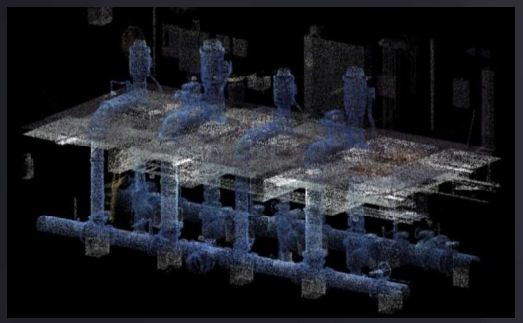
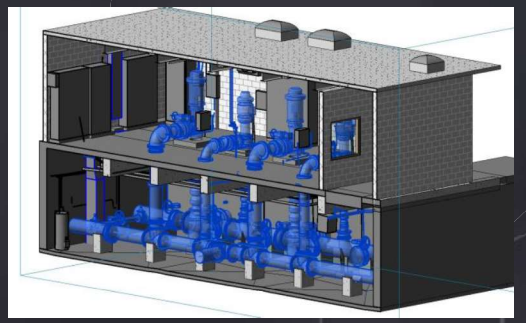
Scan-to-BIM

Scan the Building → Get a Point Cloud → Generate Building Information Model





Scan-to-BIM

Why convert a point cloud into BIM?

1. Most Architecture, Engineering, Construction (AEC) clients ultimately need **CONSTRUCTION DOCUMENTS**
2. BIM have **INTELLIGENCE** that is not inherent in a point cloud
3. BIM are **SMALLER IN SIZE** and more easily transferable

Point Cloud Specs for a Scan-to-BIM Project

- Break down the project into manageable pieces
  - **Naming** convention
  - **Scan maps**
- Have a local **origin** (20 mile rule)
- Will have to convert to **RCP** (Recap) for any Autodesk product
  - **PTX** preferable
  - **50 GB / 50 scan** rule

Expectation vs. Reality

- Scan-to-BIM typically useful for: Architects, Engineer, Facilities Managers
- What do they **think they WANT**?
  - 100% coverage
  - 100% accurate
  - 100% automated
  - Scanning is instant
  - Scanning is omniscient

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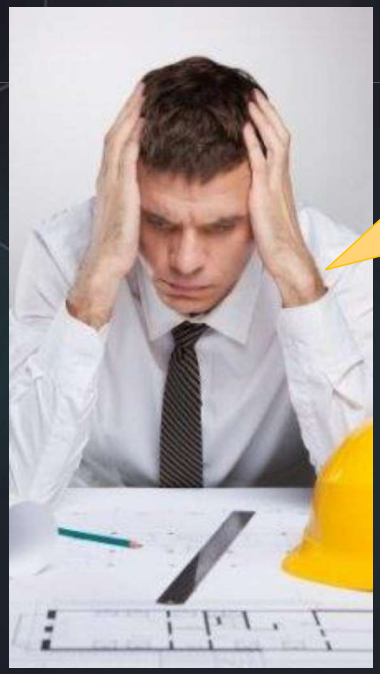
- What do they actually **NEED**?
- Unreasonable expectations = unreasonable price

The Hard Truth of Existing Conditions

EXPECTATION

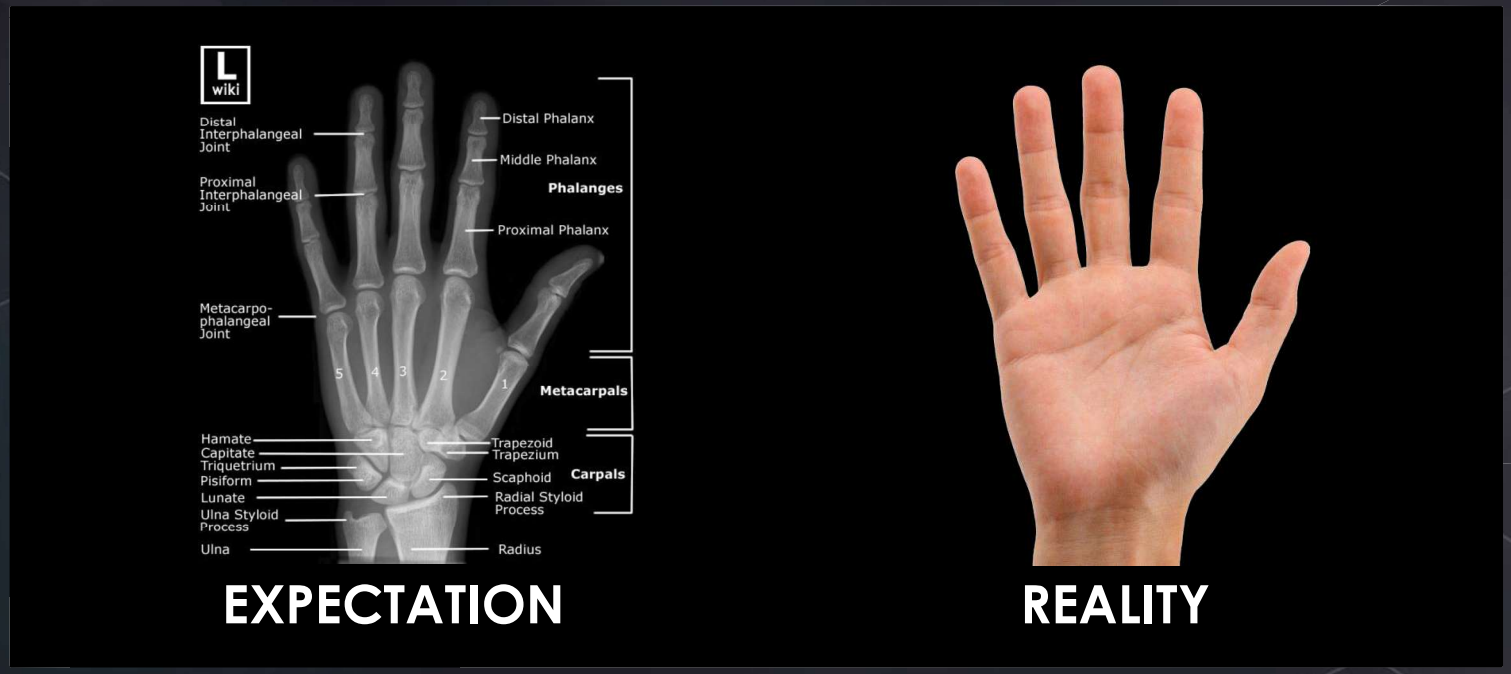
REALITY

The Hard Truth of Existing Conditions



"Why is nothing straight?"

Scanners Can’t See Through Things



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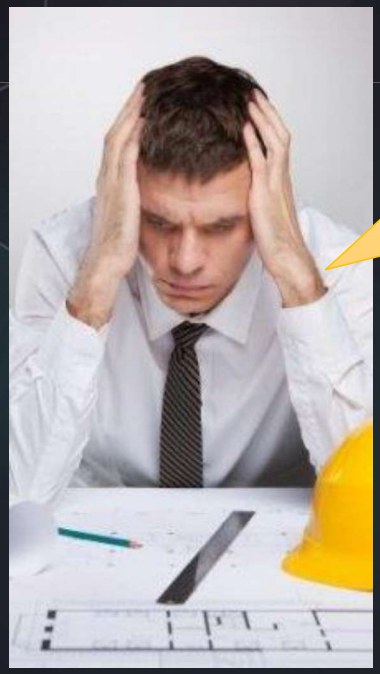


“What’s inside this wall?”

“LOD” Is Misused in Scan-to-BIM

L.O.D. = **Level of Development** * AIA definition

L.O.D. ≠ **Level of Detail**

- The acronym L.O.D. is widely misused
- L.O.D. takes into account both the **graphical accuracy** of an element and **information** about its manufacturer, model or make
- Point clouds alone will rarely give you the information required for high LOD

Additional information needed

400: Construction details and shop drawings

300: Wall assemblies are known

Point clouds will get you here

100: There is a wall (schematic design)

200: Wall quantities, sizes, shapes, locations and orientations are known

Change the Vocabulary: "Modeling Protocols"

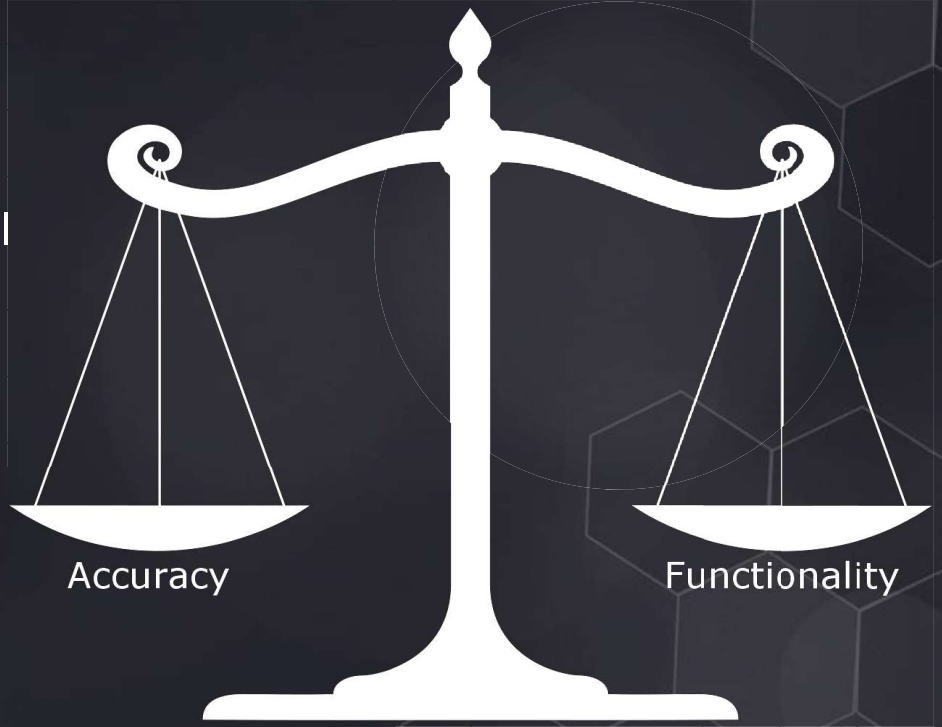
- Projects will typically have focus areas with different needs for accuracy/detail/information
- Go through floor plans and establish Modeling Protocol A, B, C, etc.
- Sample:

Protocol A: Office Space to be Demolished
Generic door panels, materials not called out

Protocol B: Egress and Restrooms to Remain
Custom door panels, materials called out, trim

Accuracy vs. Functionality

- Existing buildings are less straight than many people expect
- It is impossible and undesirable to model every wall that is not plumb or every ceiling that has sagged over time
- What is the best **balance between accuracy and functionality**?




The Answer is Different for Every Project!
But Here's Where to Start the Discussion.

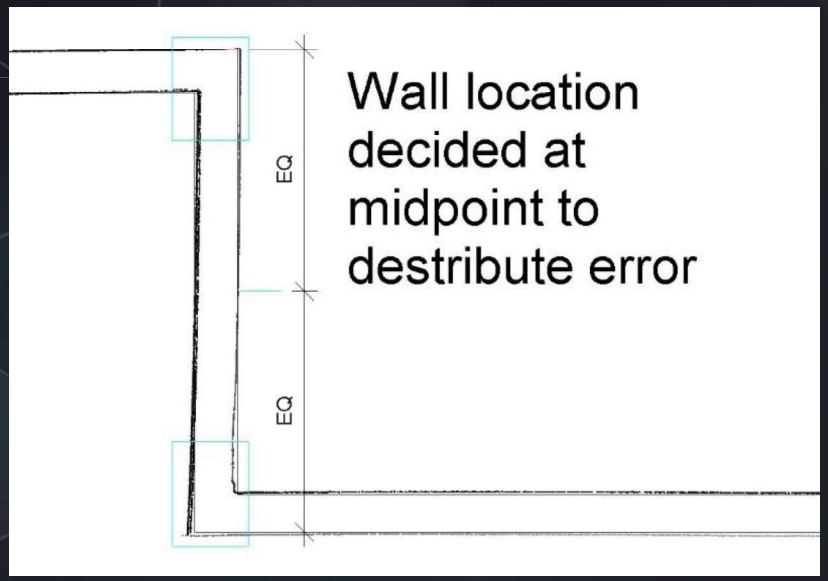
Top 4 Scan-to-BIM Problems & Solutions

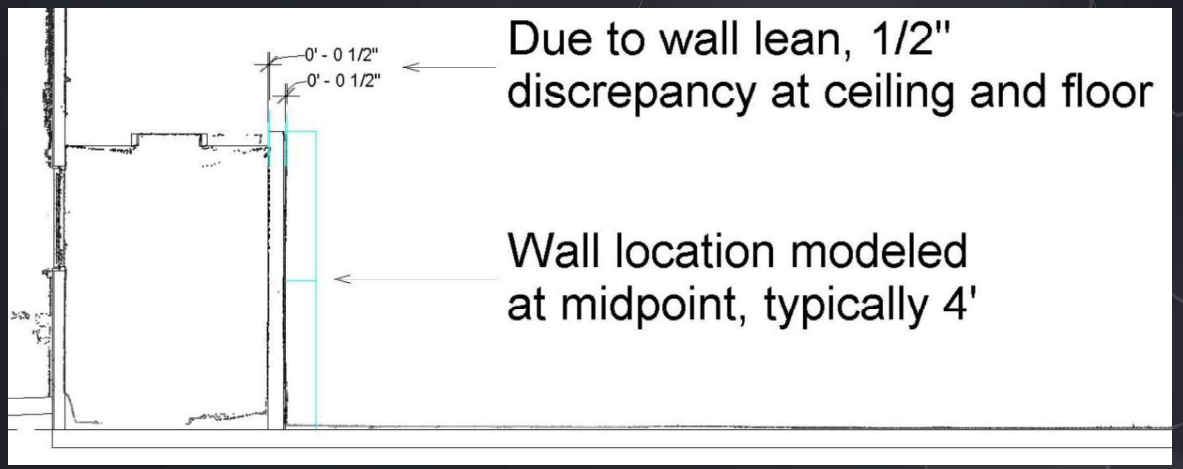
1. Nothing is **STRAIGHT**
2. Everything **SAGS** over time
3. Modeling **DAMAGED AREAS**
4. Establishing **REASONABLE ASSUMPTIONS** about missing information

In reality, most walls are not straight. However if all walls are modeled exactly to the point cloud, most cannot be dimensioned.

Agree on a maximum **“orthogonal correction”** up to which objects will be straightened out.

Nothing is Straight

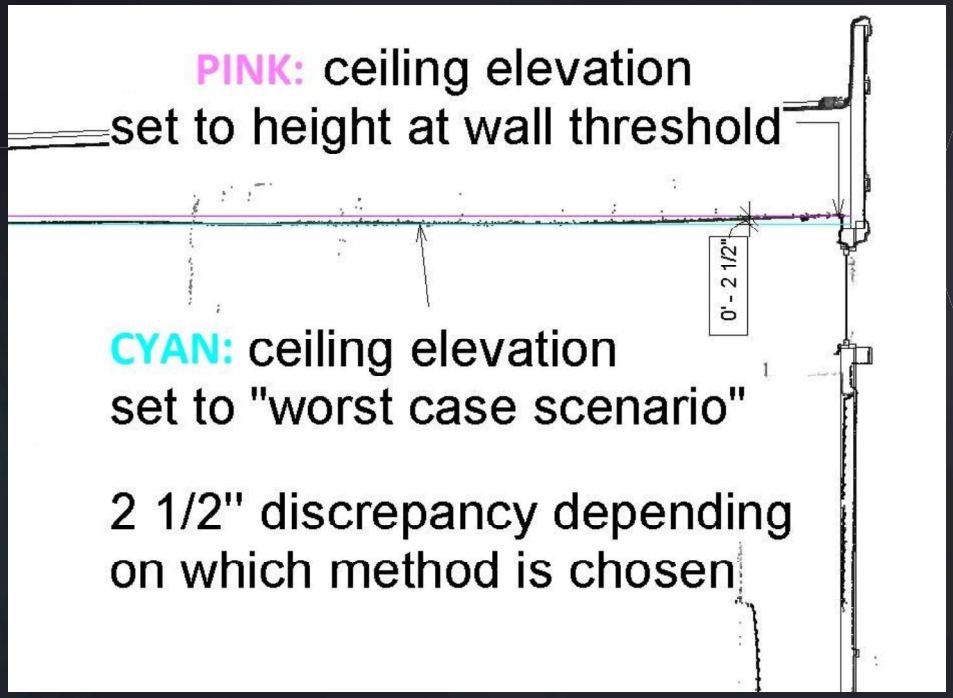




In reality, horizontal elements (ceilings, beams, floors) sag over time. It is impossible/impractical to model sag in most CAD programs.

Agree on whether horizontal elements should be modeled at **design height**, or **lowest point** of sag.

Everything Sags



Modeling every damaged element adds unnecessary graphical data to the project.

Tag damaged items and allow the client to query damaged items.

Modeling Damage

- Usually impractical to create a family for every damaged item
- Consider having a project parameter for damaged items that can be scheduled

Scanning is line of sight. If only areas covered by the point cloud were modeled, the model would look incomplete.

Agree on a set of **"reasonable assumptions."**

Reasonable Assumptions

- Assumed Regularity:
  - Structure: "Structural elements will be assumed to continue to the next building grid line even if they are only visible in one room."
  - Moulding: "Base board will be assumed to continue behind furniture."
- Filling in the model to make it look complete:
  - Talk about how existing plans will be used and how to distinguish this from what is modeled from the point cloud
  - Establish reasonable assumptions about assemblies

WANT

VS.

NEED

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ACCURACY

VS.

FUNCTIONALITY