

The City of Vancouver, Autodesk, and Pitney Bowes Software: A Match Made in Business and Software

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Graphics Planner

Class Summary

This class provides an overview of how a range of products from Autodesk and Pitney Bowes are being used together at the City of Vancouver. It will outline the history of how the workflows between products from two different vendors evolved, focusing on how to take advantage of existing 2D GIS data and to work through the plan, design, build, and manage lifecycle of infrastructure, and to visualize that same data in 3D. Three case studies demonstrating a range of workflows will be presented:

1. Election districtation
2. Building footprints
3. Population projections
4. Line of sight analysis

Learning Objectives

At the end of this class, you will be able to:

- List the potential benefits of the Autodesk and Pitney-Bowes strategic partnership
- Explain how interoperability can improve workflows from GIS to Building Information Modeling (BIM)
- List ways to take advantage of existing GIS data in a 3D environment
- Outline the steps that are required to manage the lifecycle of infrastructure

City of Vancouver



vancouver 2010





Things Cities Do

- Zoning, subdivision, development review & processing, public consultation, infrastructure management, infrastructure design, beat analysis, paper map production, web mapping, public art database, social housing inventory, orthophotos, LiDAR, shadow analysis, energy analysis, 3D city modelling, massing development, view analysis, urban forest management, sea level rise analysis, earthquake mitigation, crime mapping, way finding, facilities management, election boundary redistricting, homeless inventory, bike routes and sharing, asset management, performance facilities management, parks inventory, emergency management, event management, animations, capacity analysis, population projections...and a whole lot of other stuff

Forces

- BIM
- Open data
- 3D hunger
- Visualization of complex data
- Public's demand for more participation
- Higher cartographic standards
- Web access and interaction with City data
- Blurring of roles

Key Business Drivers

- Major City Initiatives
 - Greenest City 2020
 - Replacement of permit system
 - Move to shared services model
 - Earthquake preparedness
- Substantial budget pressures
- Increased need for more collaboration and public participation (at a lower-cost)



How We're Responding



Autodesk®

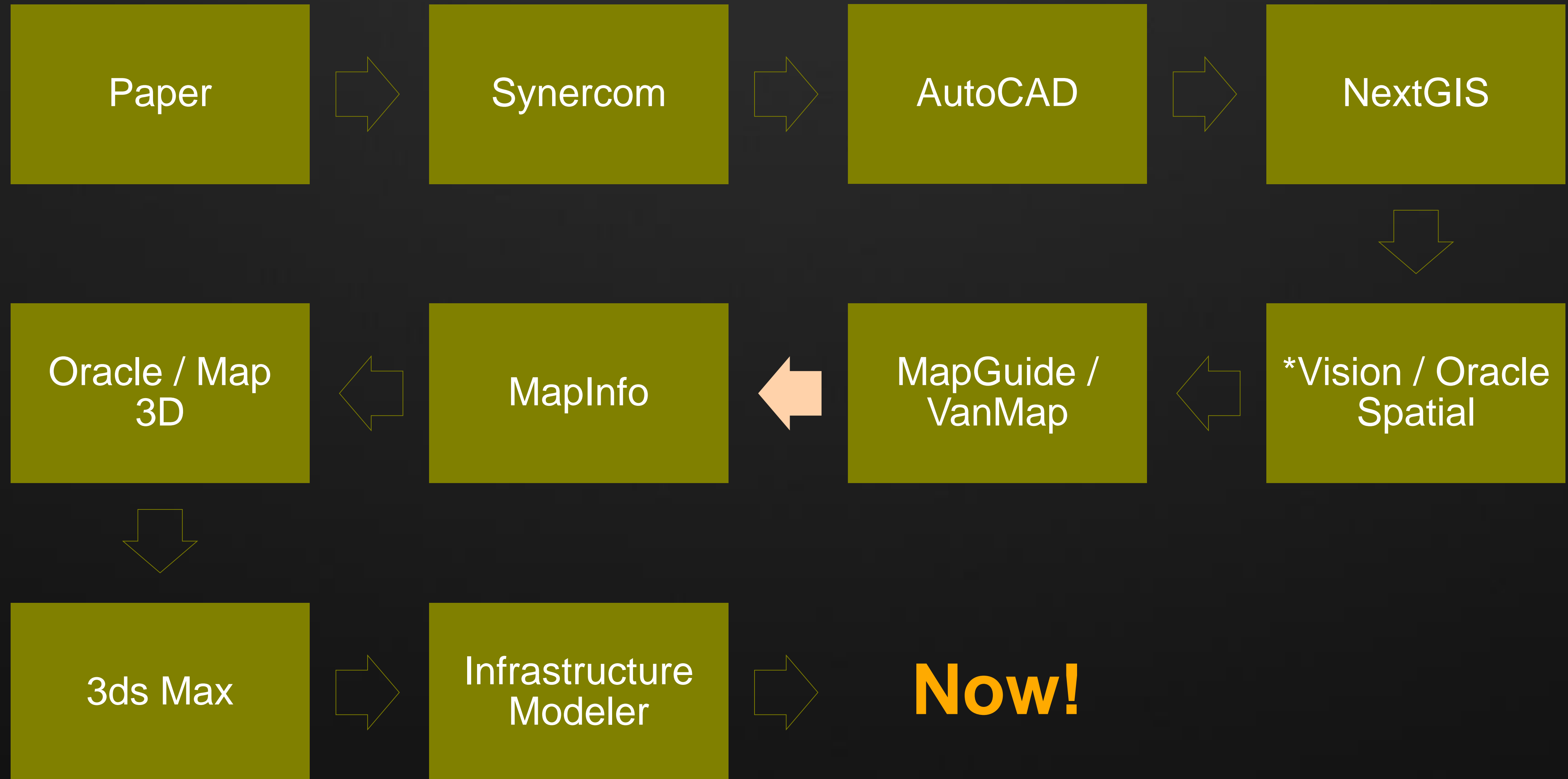
Pitney Bowes & Autodesk

- History & context
- Role
- Four case studies
 - Election redistricting
 - Building footprints
 - Population projections
 - Line of sight analysis

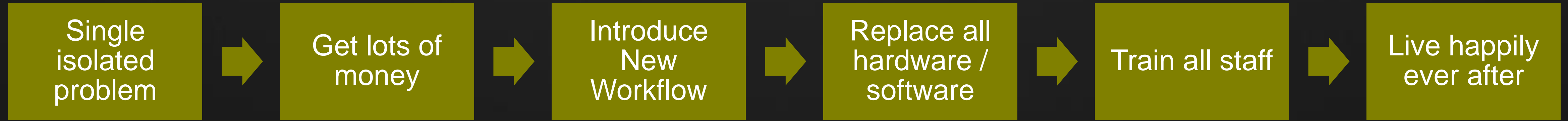
How We Got There – Some History



Key Events – 1980 to...



The Ideal



The Reality



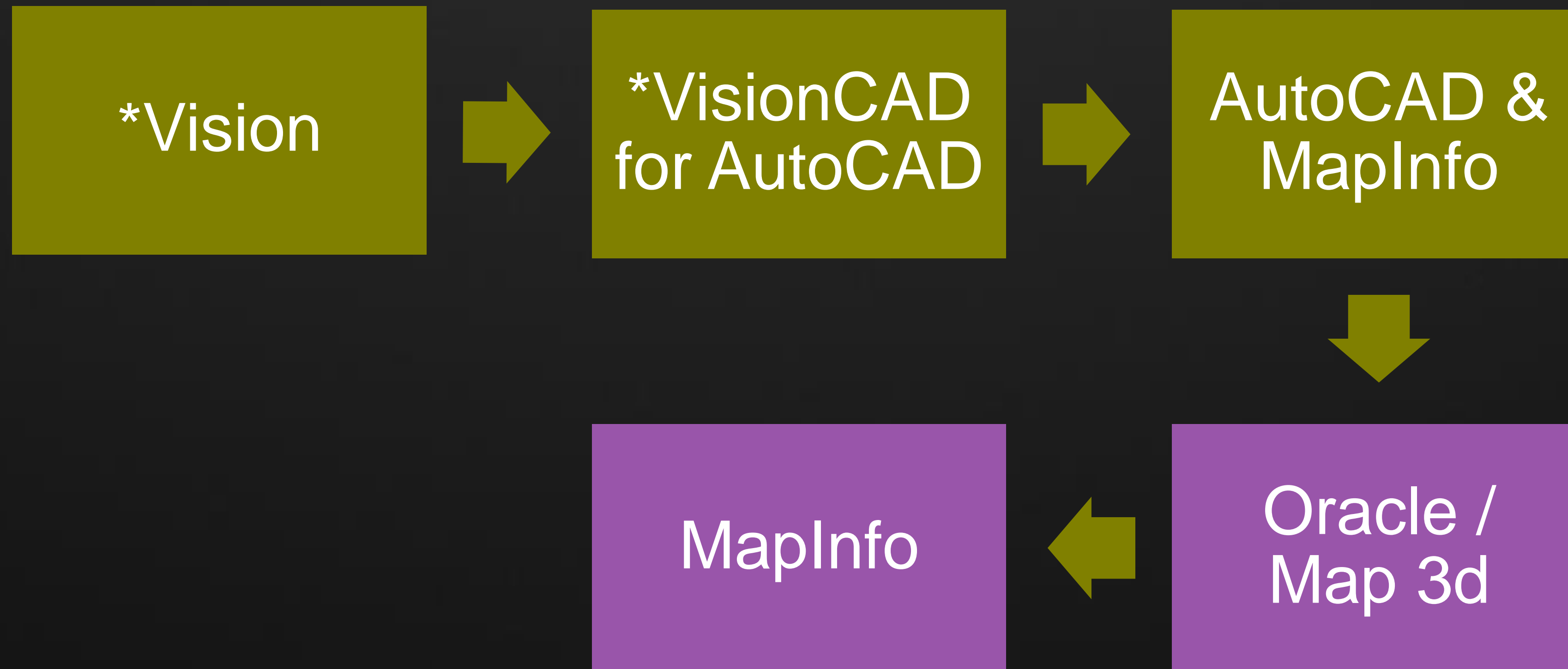
The Solution?



Our Strategic Solution

- The next slide outlines what our strategic solution for integrating Autodesk and Pitney Bowes software was.

The Early Days of Integration



Gated Communities?



Planning

Engineering

Software Silos?

Pit Play Binges

Engineering

What's In the Silos

Community Services

Map 3D	MapInfo
Infrastructure Modeler	3ds Max
SketchUp	Adobe Illustrator
AutoCAD	FME

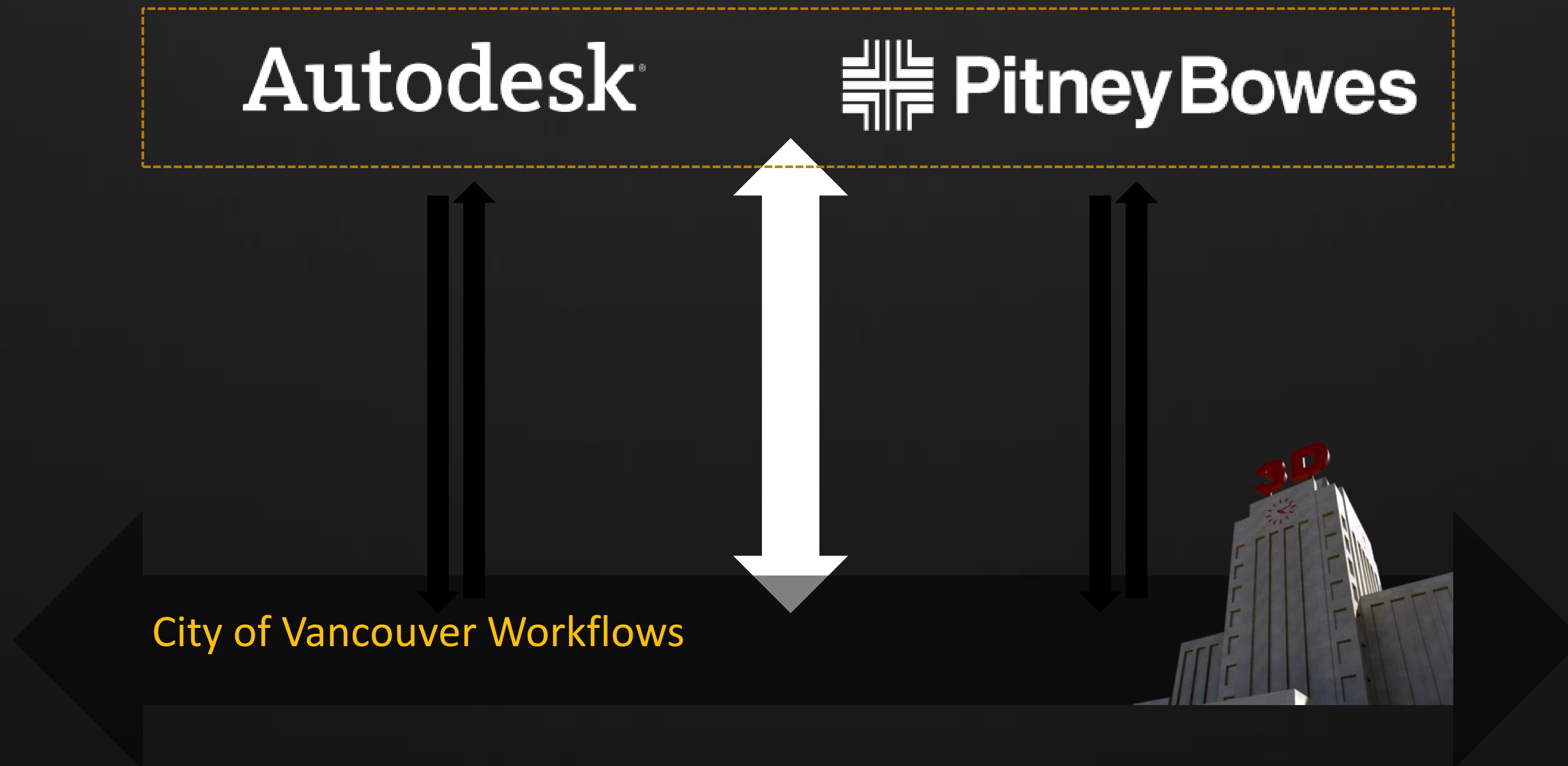
Engineering Services

Map 3D	Topobase
Oracle Spatial	Infrastructure Map Server
AutoCAD	

Other

Emergeo	HAZUS
MapInfo	Map 3D

Our Focus



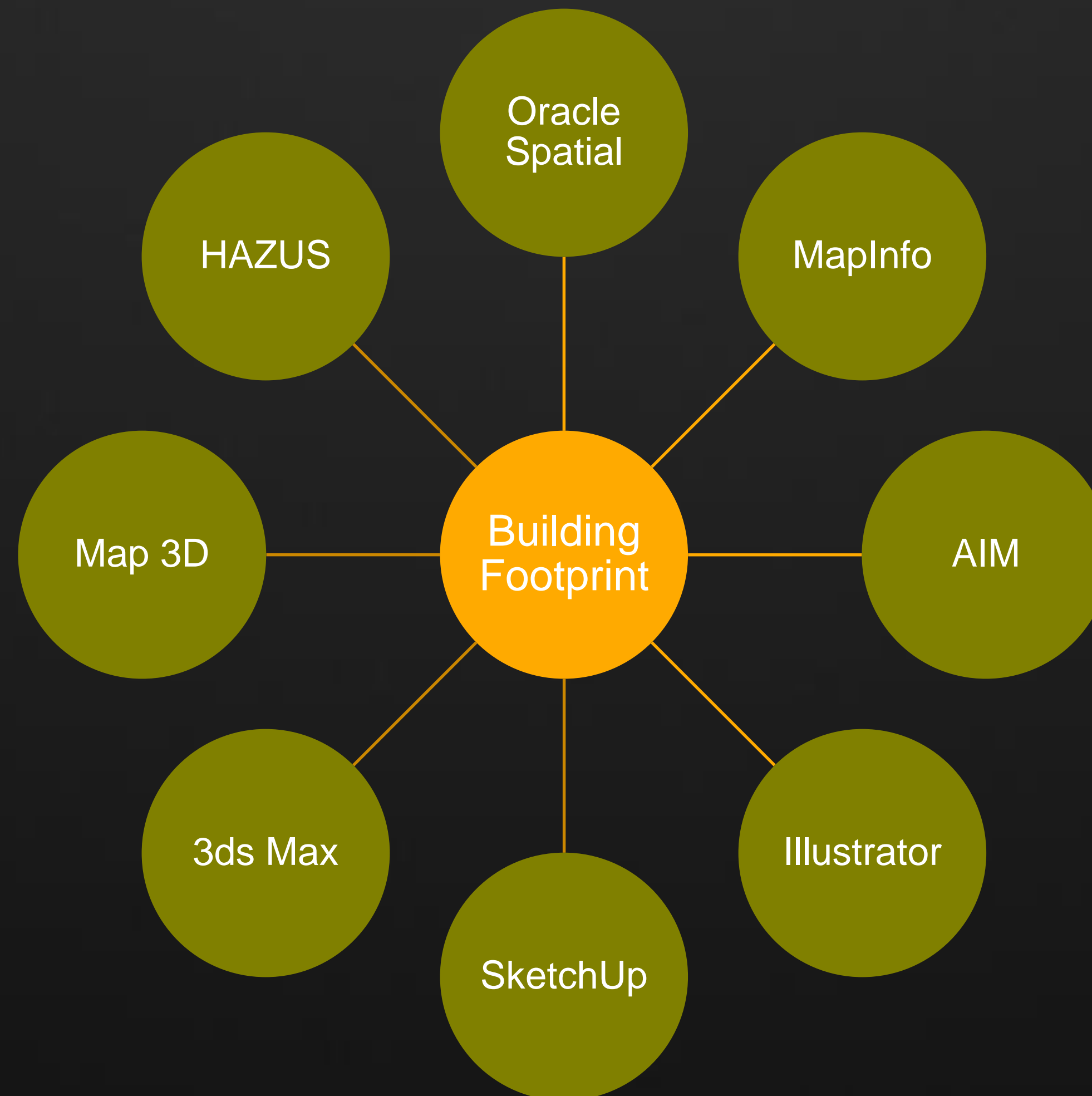
City's GIS-ish Environment



Wasteful Data



The Many Lives of a Single Piece of Data



The Many Lives of a Single Piece of Data 2



The Formalization of the Relationship

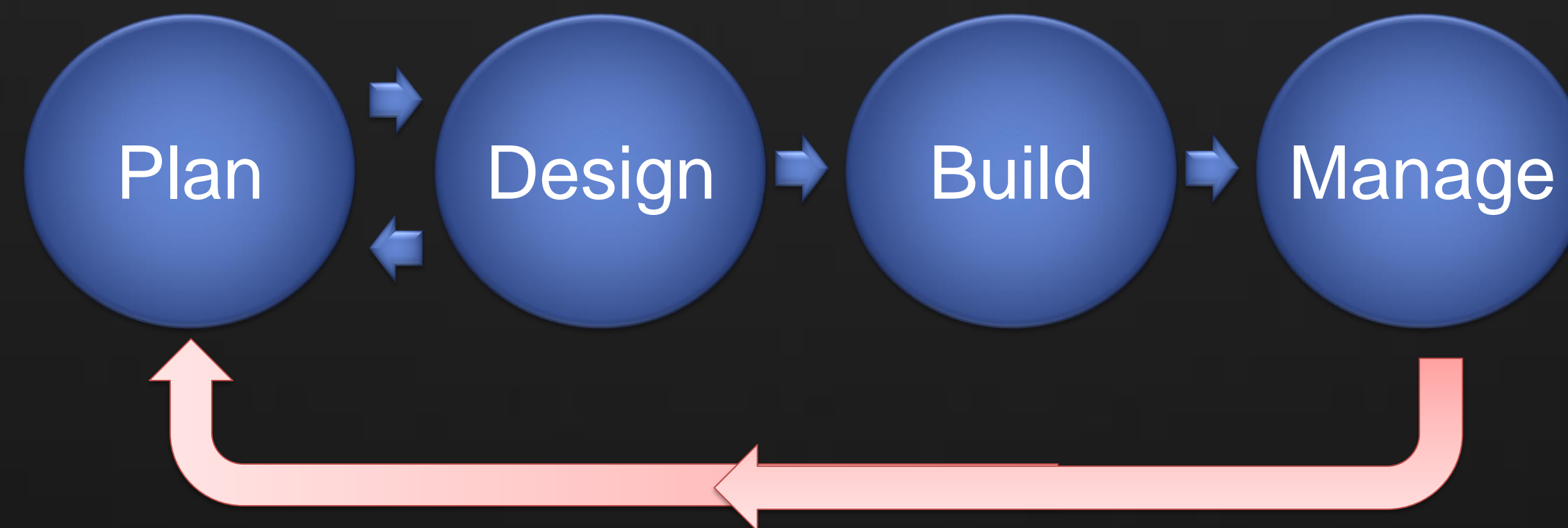


VALIDATION!

Autodesk®

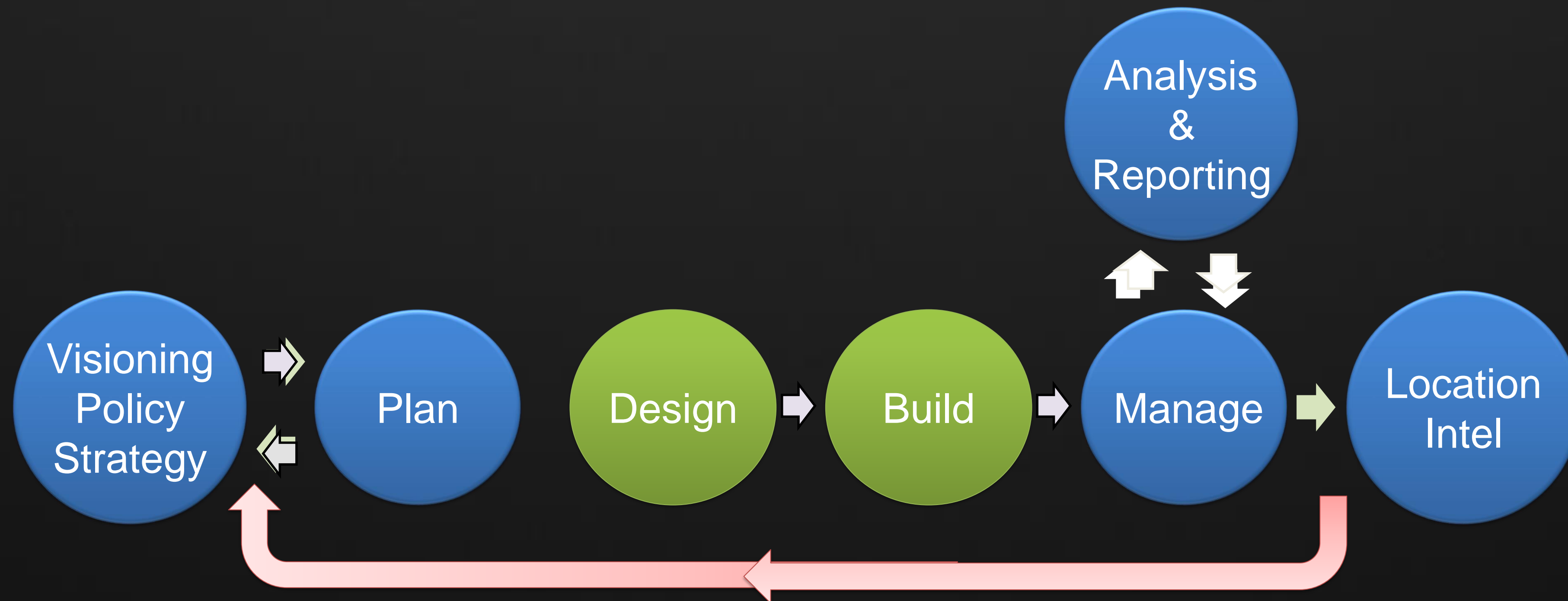
Autodesk

- BIM for infrastructure solutions



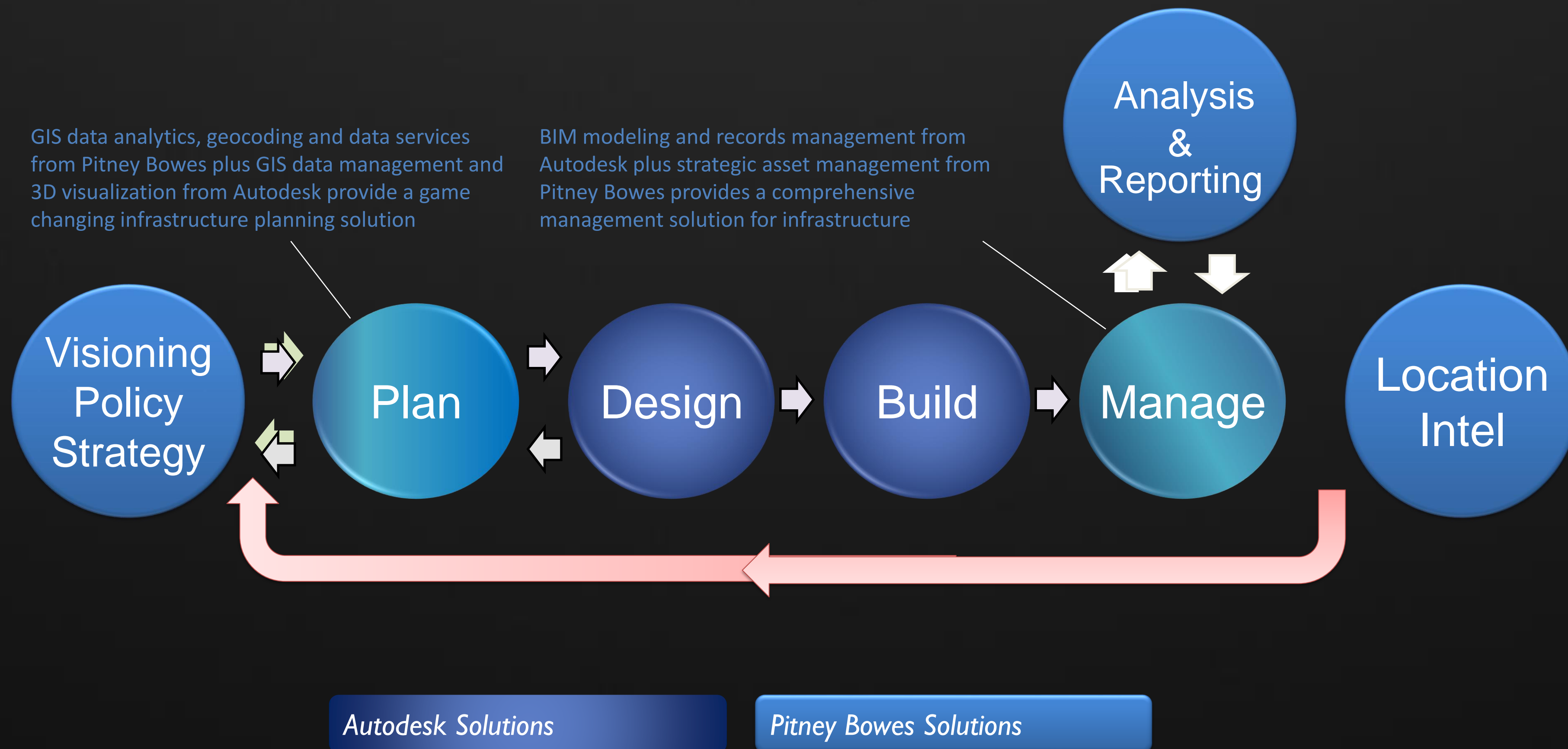
Pitney Bowes Business Insight

- Location intelligence and analytics solutions



Autodesk/Pitney Bowes Alliance

- Comprehensive end-to-end infrastructure solution



Our Own Strategic Initiative

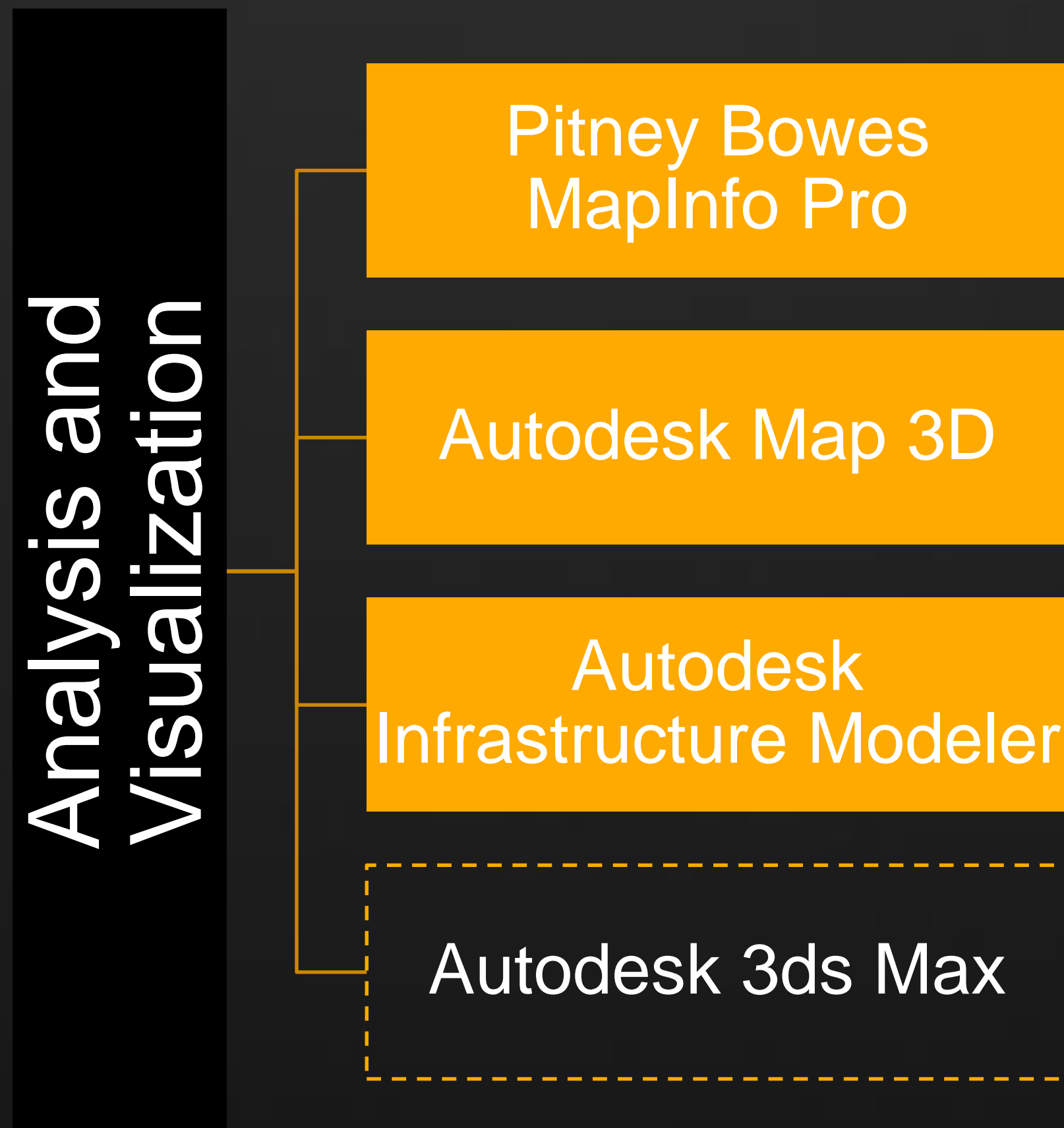
GIS Shared Services GIS

Engineering GIS

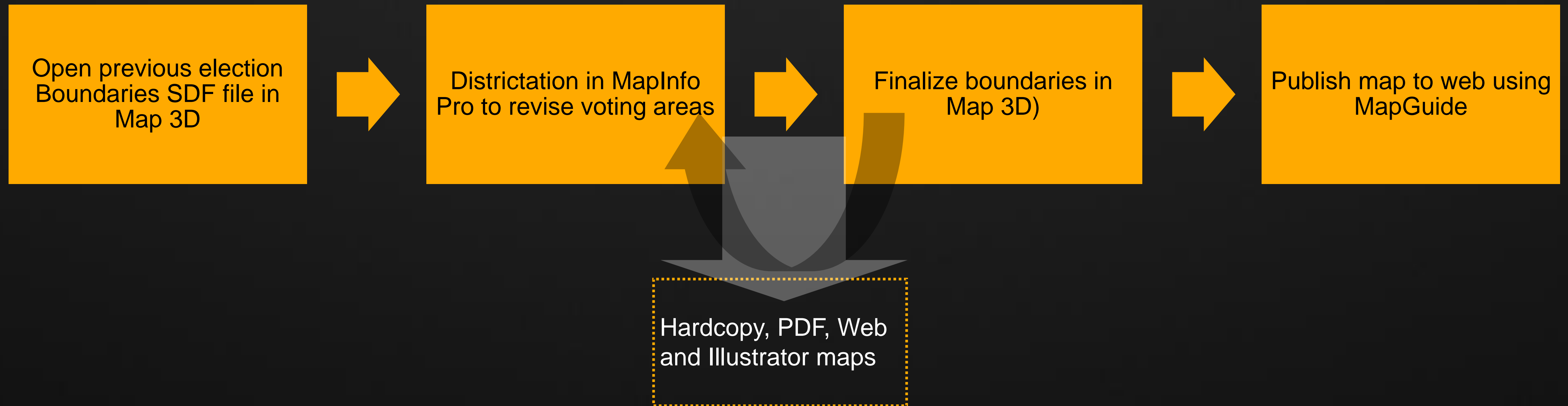
CSG GIS

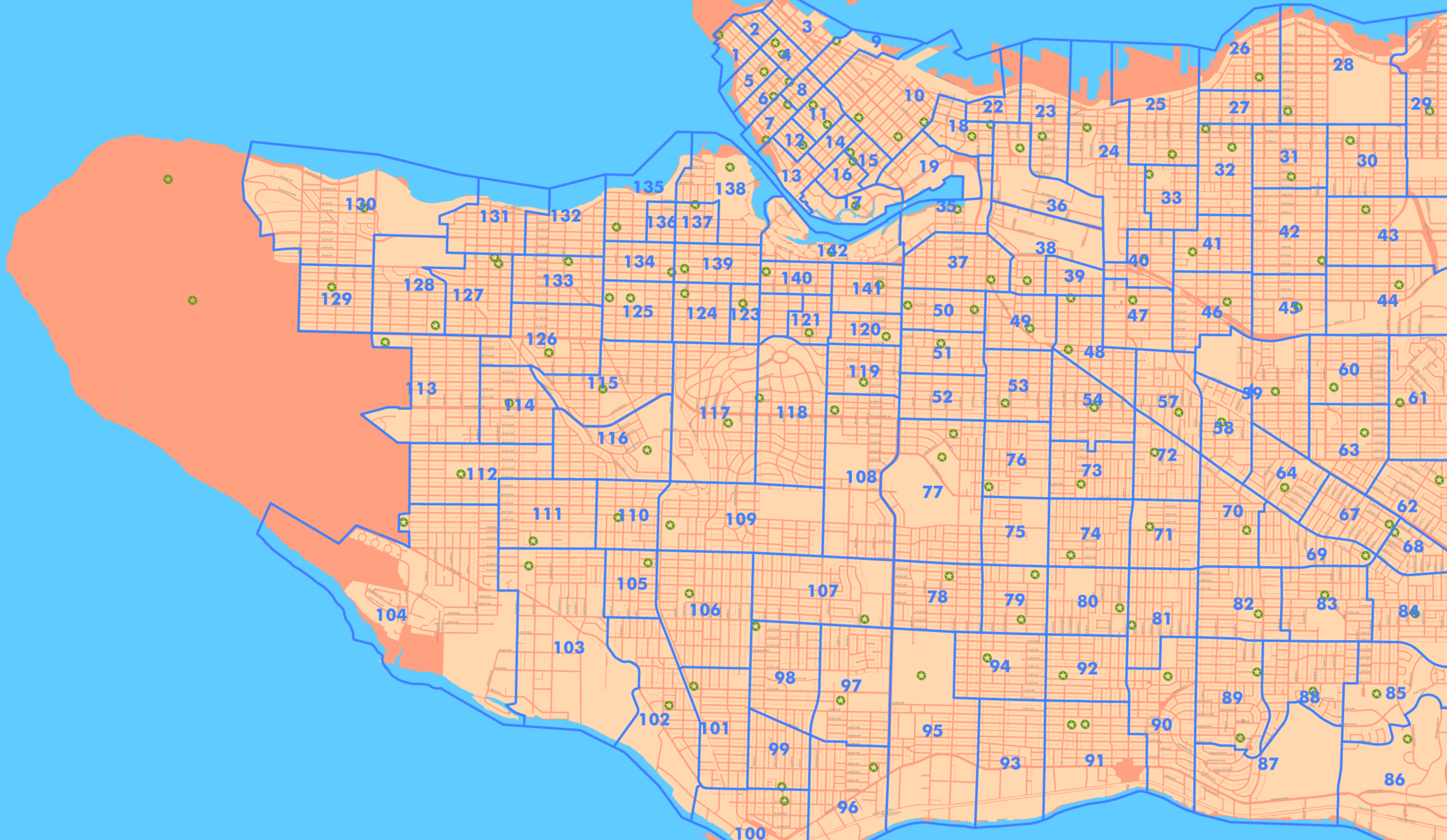
IT GIS

A First World Problem

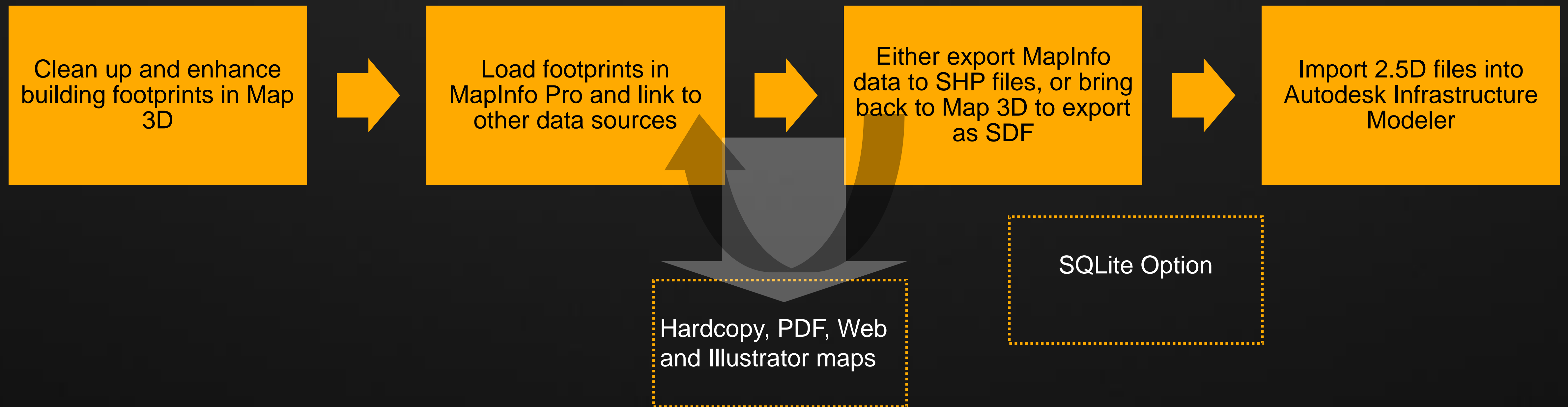


Election Boundary Districtation





Building Footprints



2D to 3D Workflow



An aerial photograph of a large city, likely Seattle, showing a dense urban grid, a large body of water (Puget Sound) to the north, and a river (Duwamish River) flowing through the city. The city's extent is vast, covering a significant portion of the visible landscape.

How Big Is A City?

REALLY BIG!

Strategy?

- We weren't trying to introduce integrated GIS / 3D workflows using competitor's products.
- We were just trying to find an easy way to get a 3D model

An aerial photograph of a city, likely New York City, showing a dense urban grid. A semi-transparent 3D model of the city is overlaid on the photograph, showing building footprints and heights. The text "3D = (4D + 5D(\$)) or 2.5D" is superimposed in the top left corner.

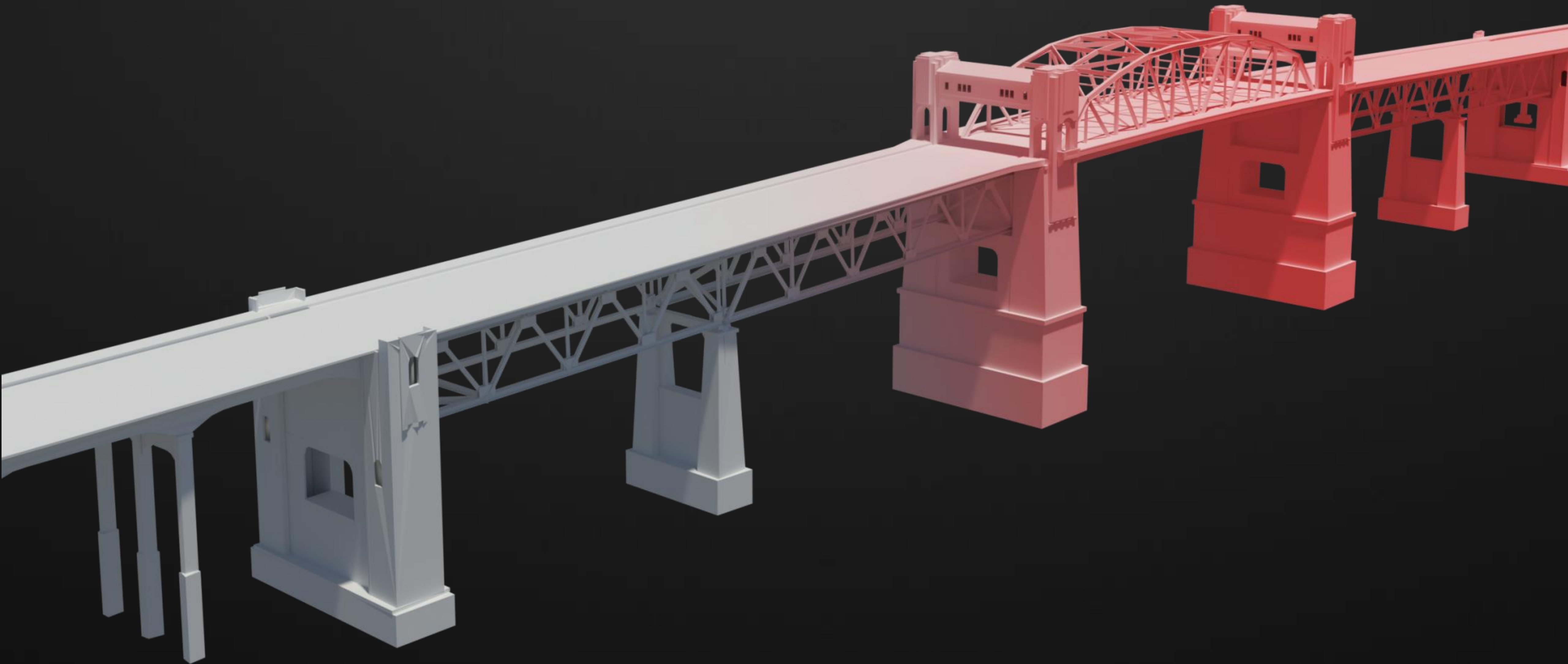
3D = (4D + 5D(\$)) or 2.5D

6 Million Dollar Man?

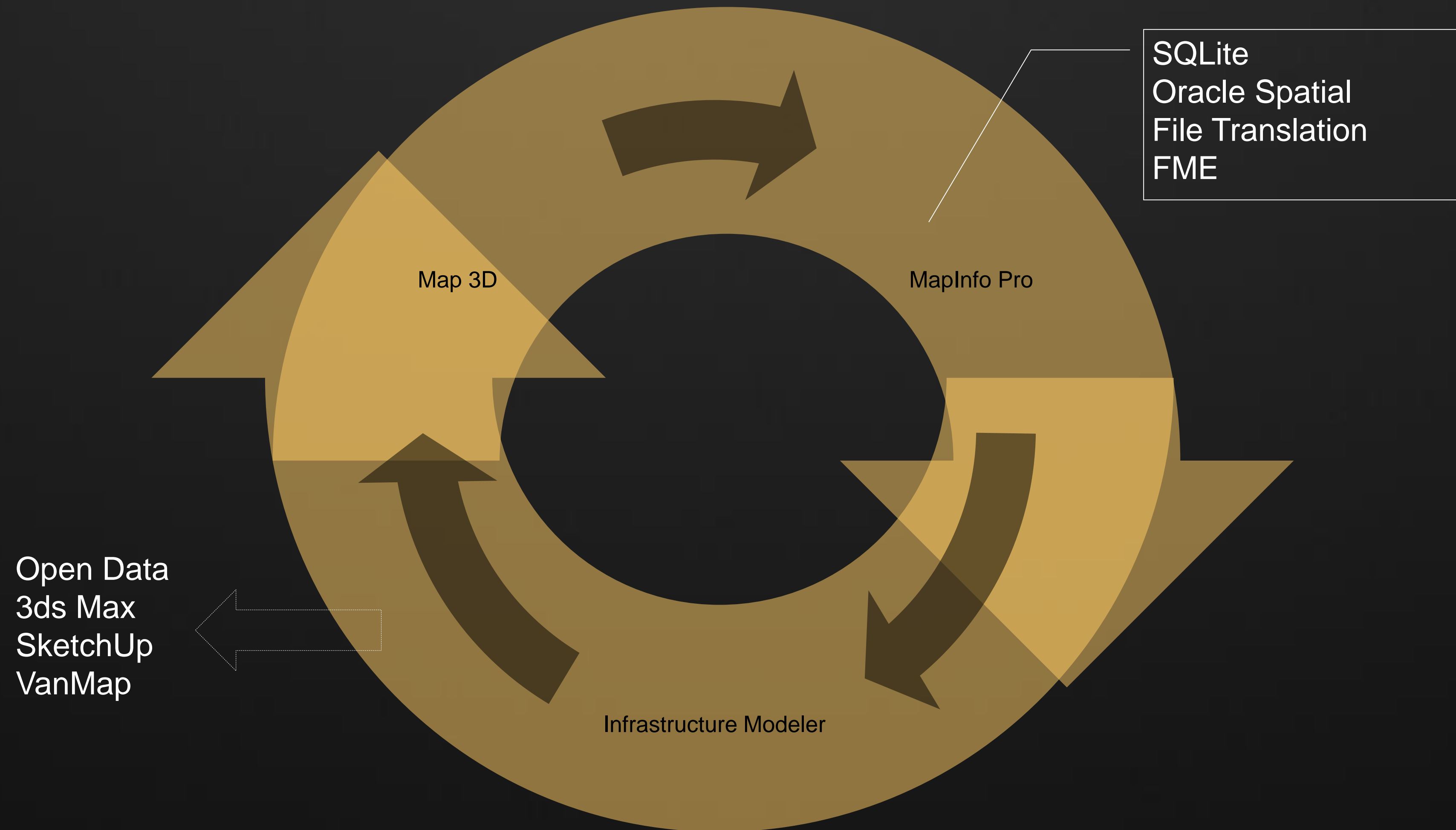
2,500,000.00



Sustainability



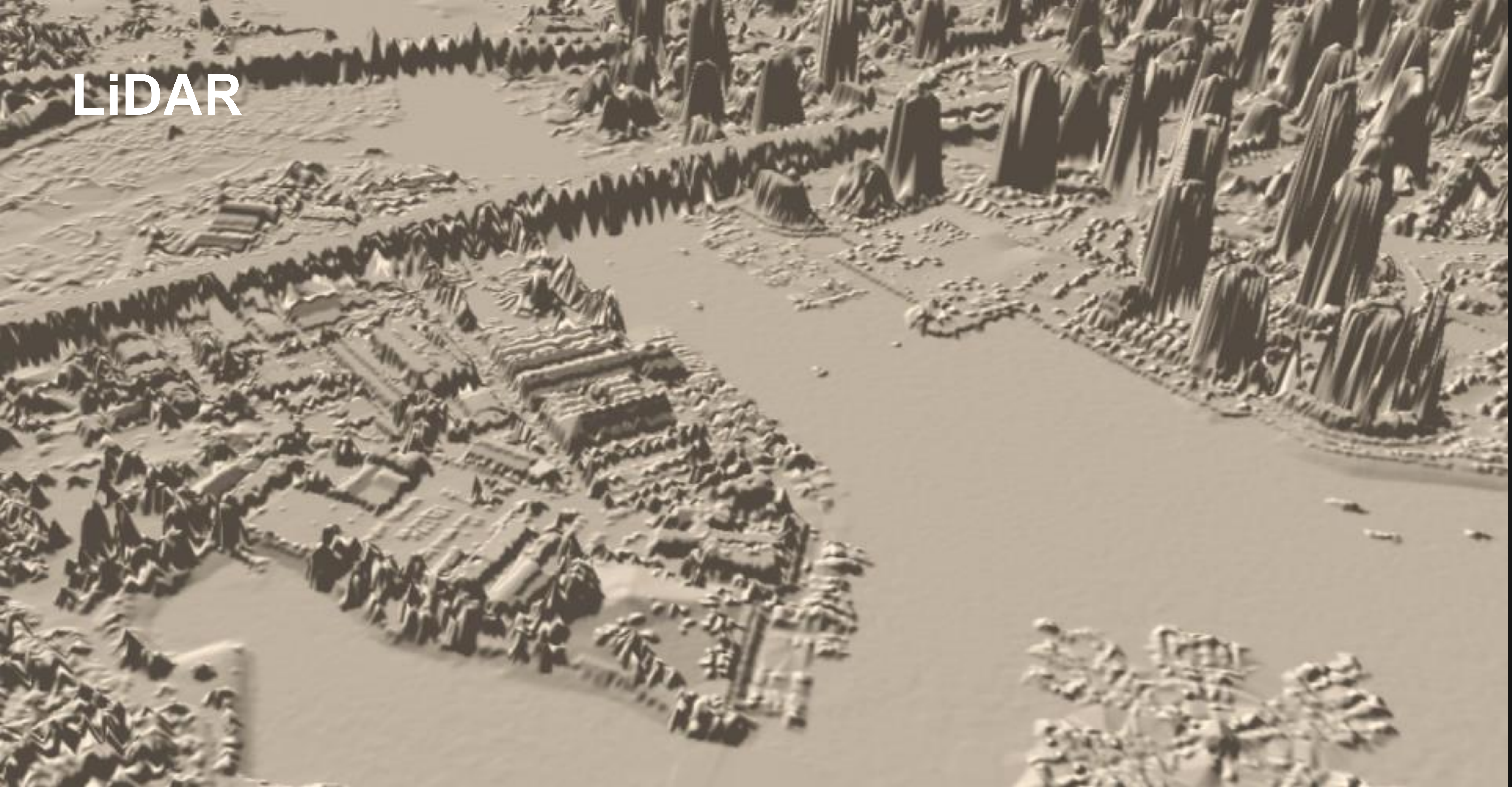
Building Footprints 2D > 3D



Detailed Steps for 2D to 3D



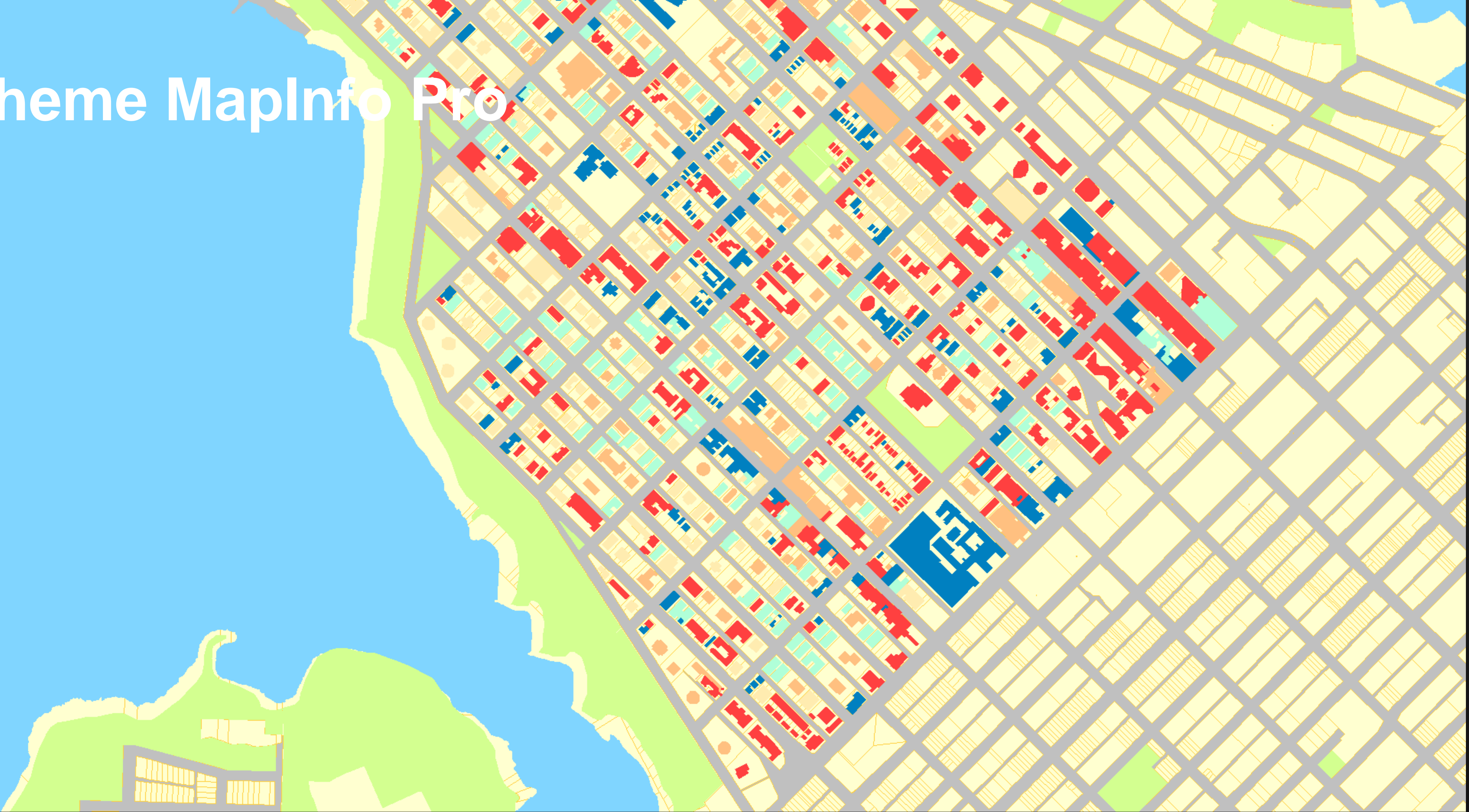
LiDAR



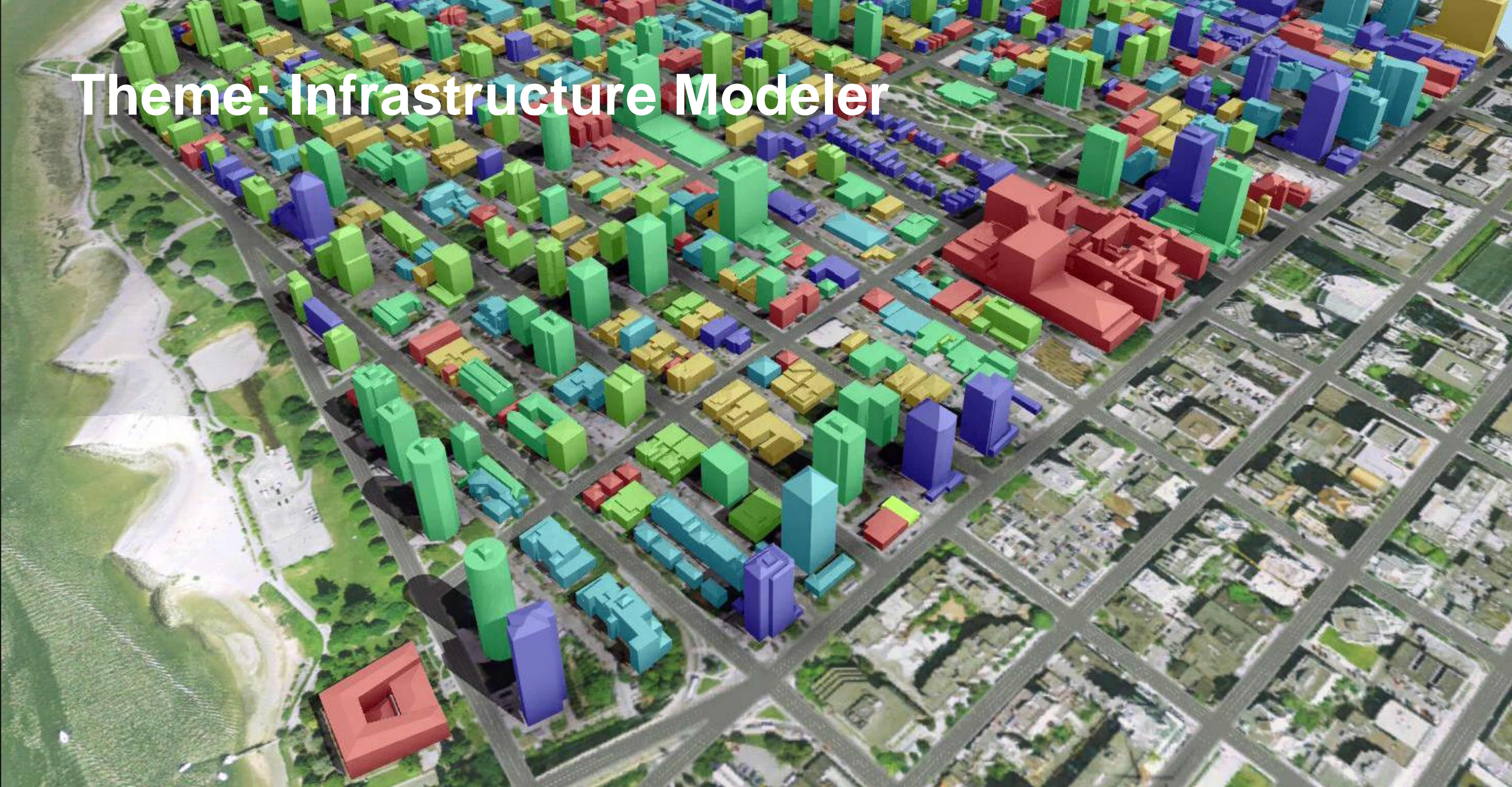
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104,075	-43.1001	140,593	42	33.28	32	23.50	9.78	Pitched	195.154	8.76	2.78	11.13
104,077	-43.5	139,852	42	28.11	25	24.64	3.48	Pitched	70.304	3.58	2.40	6.43
104,745	-43	153,175	999	43.80	19	17.50	26.30	Complex	305.228	23.81	1.48	31.17
104,746	-43.0999	153,144	41	22.92	7	18.63	4.29	Flat	142.996	3.16	1.77	4.16
104,747	-43.6	153,140	41	45.11	5	18.11	27.00	Flat	327.608	24.04	0.00	31.15
104,748	-43.6	153,132	41	27.59	2	17.00	10.59	Flat	529.903	8.47	0.52	11.70
104,749	-43.3	153,103	41	29.49	2	17.65	11.84	Flat	578.659	9.93	0.00	15.83
104,750	-44	153,072	41	30.23	3	18.24	11.99	Flat	506.808	10.99	0.00	13.88
104,751	-43.8999	153,073	41	30.94	3	18.66	12.29	Flat	621.332	10.85	0.00	13.13
104,752	-43.9001	153,059	41	26.54	2	17.63	8.91	Flat	578.428	7.97	0.00	10.99
104,753	-42.9	153,060	41	28.72	2	16.83	11.89	Flat	688.789	10.30	-0.01	12.18

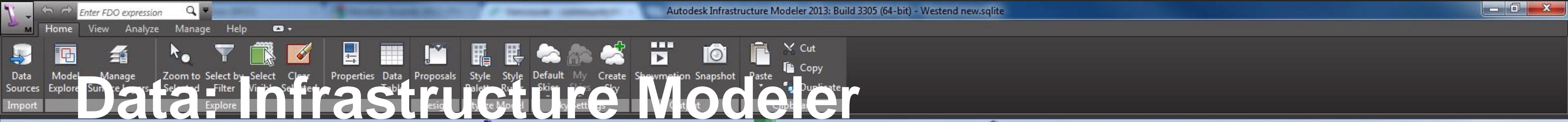
COORD	NAME	FROMNUMB	TONUMBI	DIR	STREET	ADDRESS	ARCHITECT
67015194	Windermere Retirement Lodge	900		W	12th Av	900 W 12TH AV	
60711840	Mole Hill - Private	1150			Comox	1150 COMOX ST	
69009195		2005		W	16th Av	2005 W 16TH AV	
09568883		3135			Maple St	3135 MAPLE ST	Ramsay Worden Architects
59421253		851			Keefer	851 KEEFER ST	
70314636		1188			Balfour	1188 BALFOUR AV	John Hollifield Architect Inc
14870273		3699			Osler	3699 OSLER ST	John Hollifield Architect Inc
74203705		3793		W	38th	3793 W 38TH AV	Matthew Cheng Architect Inc
74203711		3787		W	38th	3787 W 38TH AV	Matthew Cheng Architect Inc
79005095	Magee House	6475			Balclava	6475 BALACLAVA ST	Stuart Howard Architects
59819853		653			Union	653 UNION ST	
25082309	Jasper Care Home??	7887			Jasper	7887 JASPER CRESCENT	

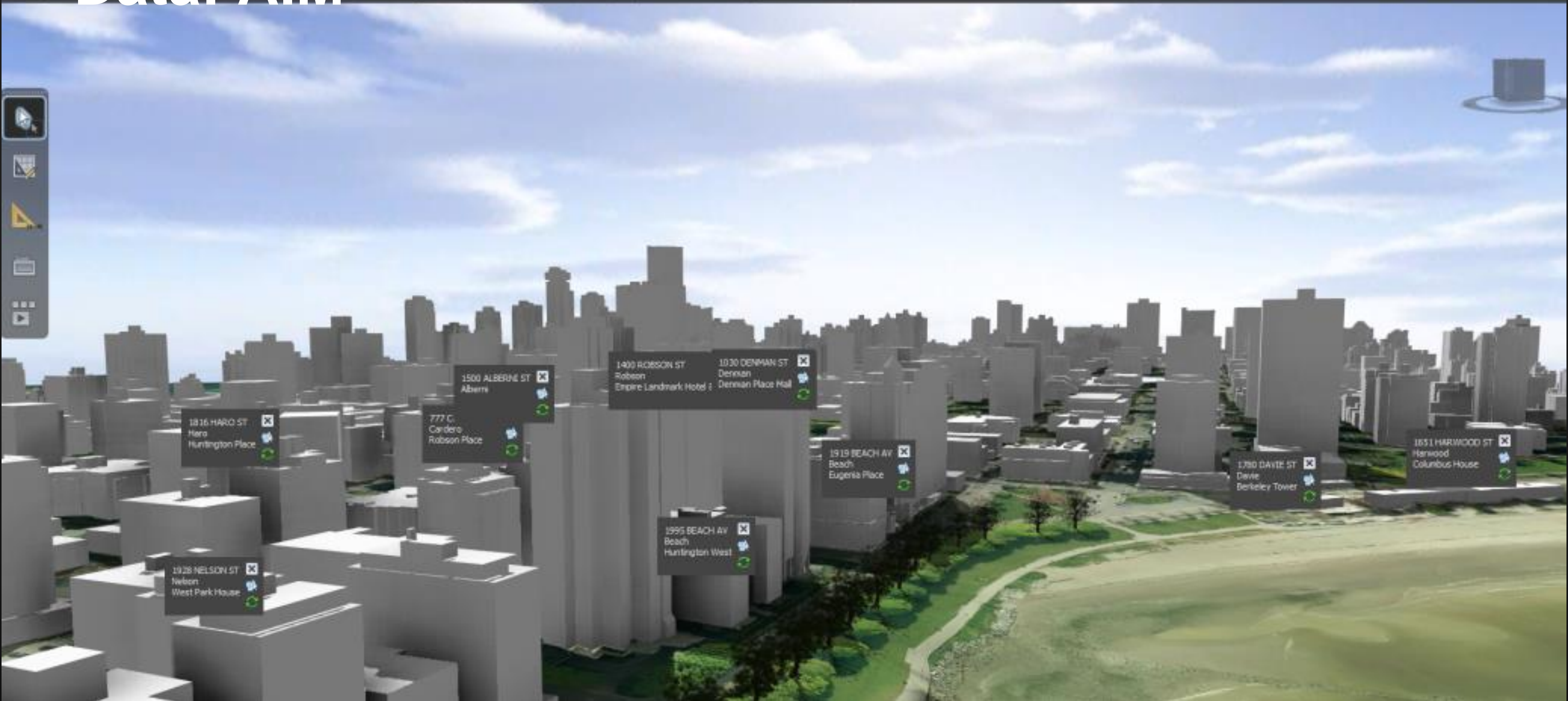
Theme MapInfo Pro



Theme: Infrastructure Modeler

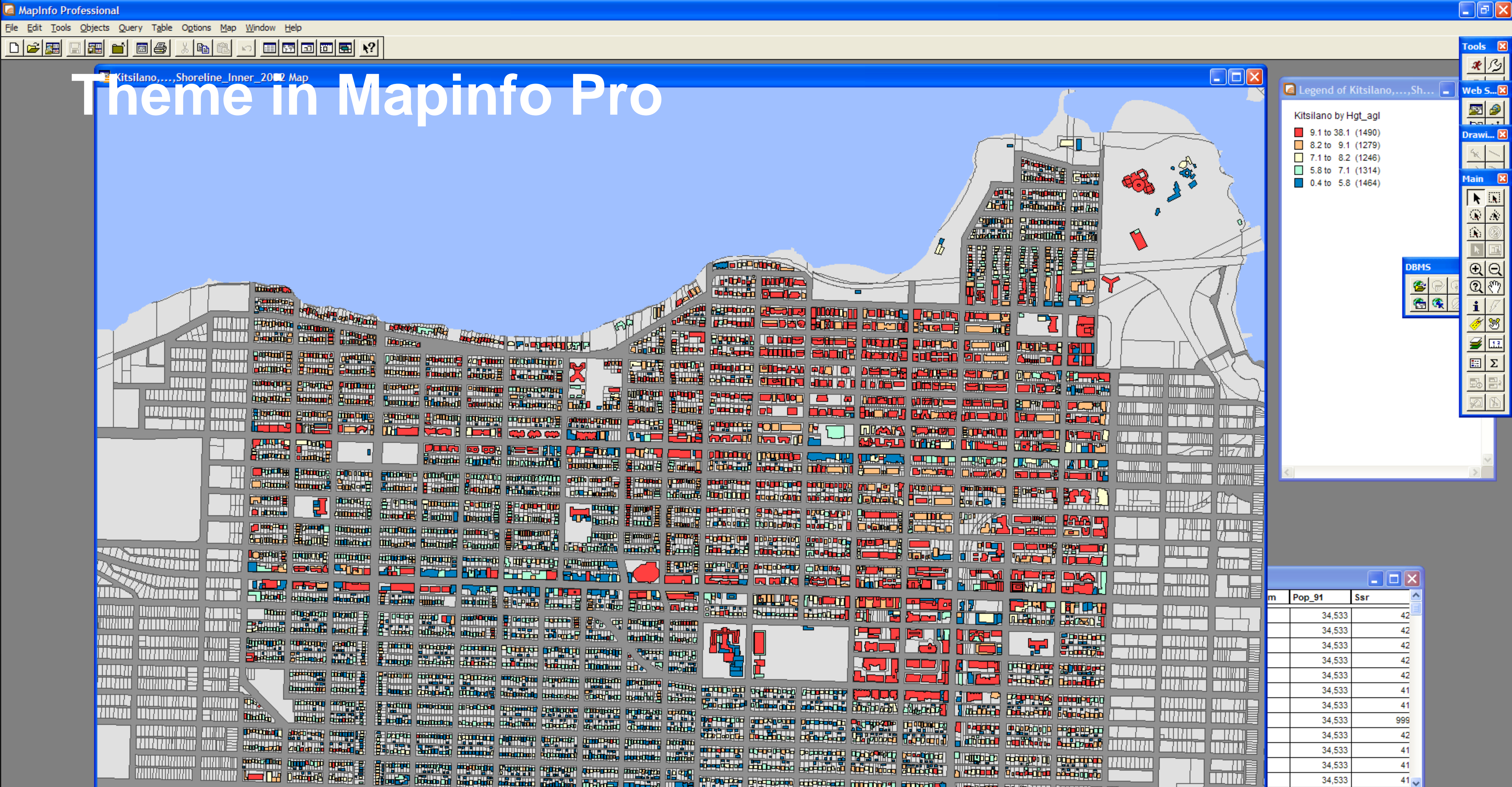






Visualization: AIM





Theme in AIM



AutoCAD Map 3D 2012 Drawing2.dwg

Planning and Analysis... Home Insert Annotate Feature Edit Create Analyze View Tools Output Map Setup Help Online Express Tools Vector Layer Style

3D

Previous View
Named Views

World
Show UCS Icon at Origin
UCS Icon Properties

Viewport Configurations List
Rectangular
Named

New
Clip
Join

Map Task Pane
Data Table
Tool Palettes
Properties

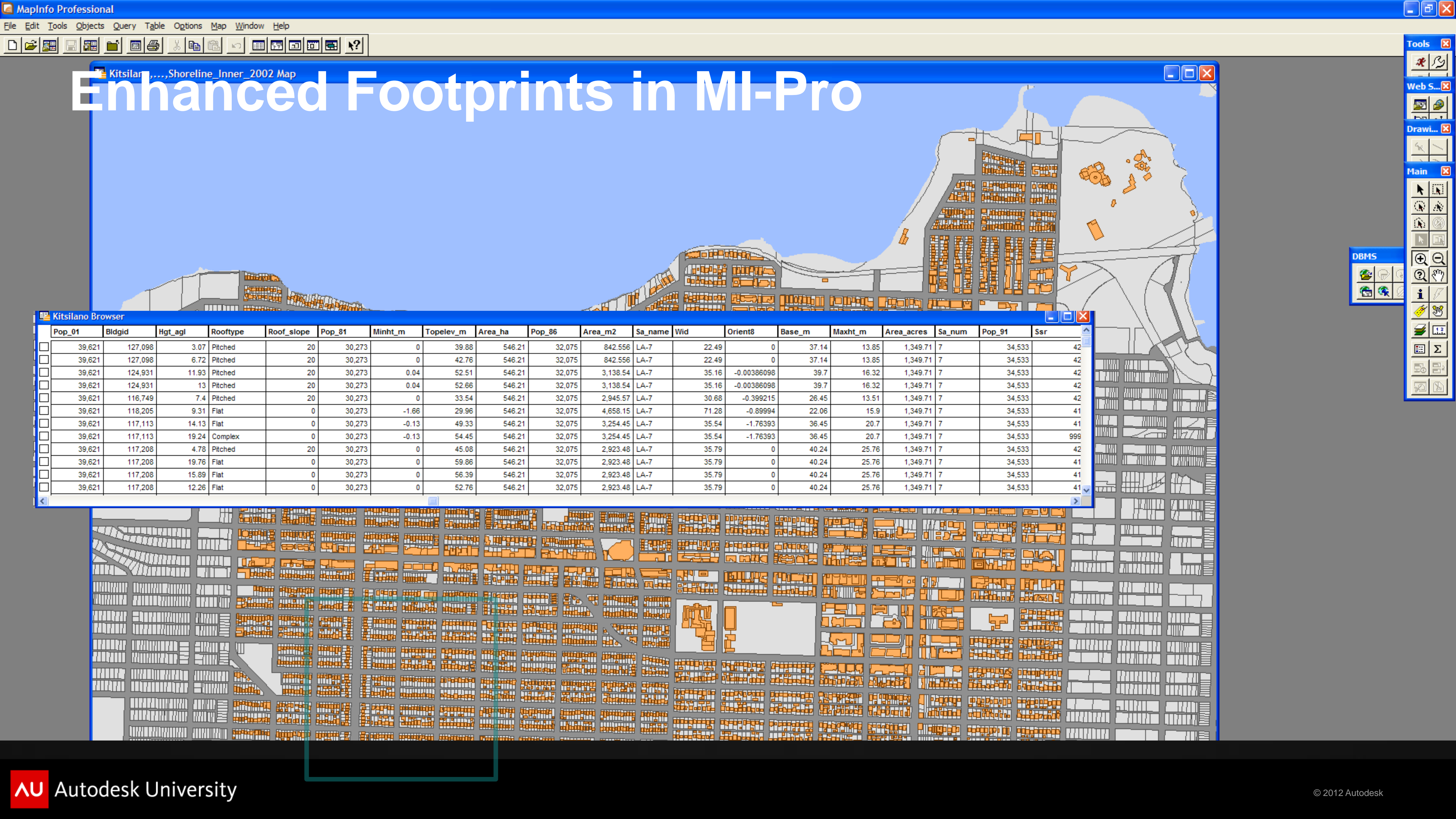
Tile Horizontally
Tile Vertically
Cascade

Text Window

Switch Windows

Palettes
Windows

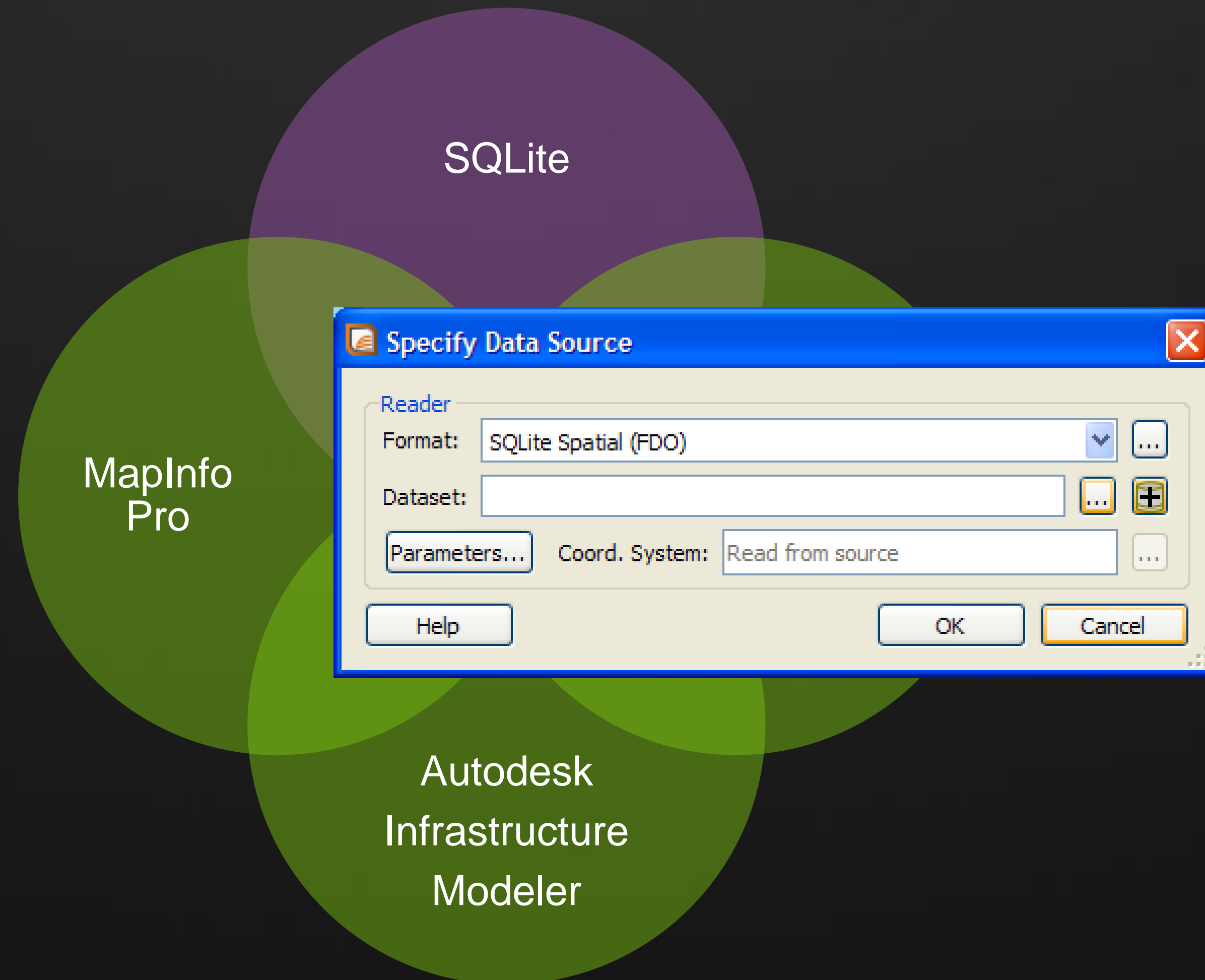




Enhanced Footprints in MI-Pro

	Pop_01	Bldgid	Hgt_agl	Rooftype	Roof_slope	Pop_81	Minht_m	Topelev_m	Area_ha	Pop_86	Area_m2	Sa_name	Wid	Orient8	Base_m	Maxht_m	Area_acres	Sa_num	Pop_91	Ssr
<input type="checkbox"/>	39,621	127,098	3.07	Pitched	20	30,273	0	39.88	546.21	32,075	842.556	LA-7	22.49	0	37.14	13.85	1,349.71	7	34,533	42
<input type="checkbox"/>	39,621	127,098	6.72	Pitched	20	30,273	0	42.76	546.21	32,075	842.556	LA-7	22.49	0	37.14	13.85	1,349.71	7	34,533	42
<input type="checkbox"/>	39,621	124,931	11.93	Pitched	20	30,273	0.04	52.51	546.21	32,075	3,138.54	LA-7	35.16	-0.00386098	39.7	16.32	1,349.71	7	34,533	42
<input type="checkbox"/>	39,621	124,931	13	Pitched	20	30,273	0.04	52.66	546.21	32,075	3,138.54	LA-7	35.16	-0.00386098	39.7	16.32	1,349.71	7	34,533	42
<input type="checkbox"/>	39,621	116,749	7.4	Pitched	20	30,273	0	33.54	546.21	32,075	2,945.57	LA-7	30.68	-0.399215	26.45	13.51	1,349.71	7	34,533	42
<input type="checkbox"/>	39,621	118,205	9.31	Flat	0	30,273	-1.66	29.96	546.21	32,075	4,658.15	LA-7	71.28	-0.89994	22.06	15.9	1,349.71	7	34,533	41
<input type="checkbox"/>	39,621	117,113	14.13	Flat	0	30,273	-0.13	49.33	546.21	32,075	3,254.45	LA-7	35.54	-1.76393	36.45	20.7	1,349.71	7	34,533	41
<input type="checkbox"/>	39,621	117,113	19.24	Complex	0	30,273	-0.13	54.45	546.21	32,075	3,254.45	LA-7	35.54	-1.76393	36.45	20.7	1,349.71	7	34,533	999
<input type="checkbox"/>	39,621	117,208	4.78	Pitched	20	30,273	0	45.08	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	42
<input type="checkbox"/>	39,621	117,208	19.76	Flat	0	30,273	0	59.86	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	41
<input type="checkbox"/>	39,621	117,208	15.89	Flat	0	30,273	0	56.39	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	41
<input type="checkbox"/>	39,621	117,208	12.26	Flat	0	30,273	0	52.76	546.21	32,075	2,923.48	LA-7	35.79	0	40.24	25.76	1,349.71	7	34,533	41

The Enabling Role of SQLite



Population Projections



Population Projections

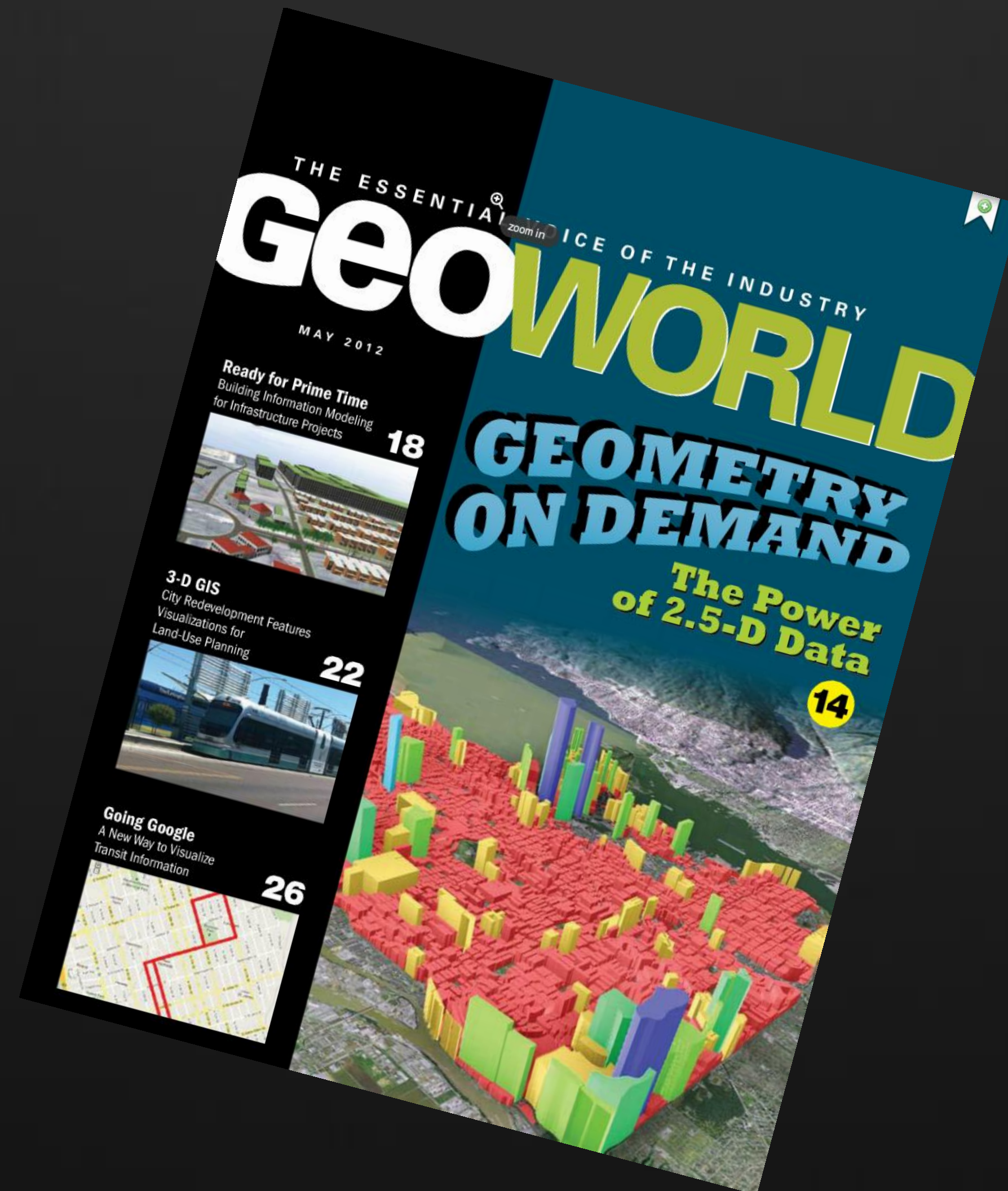
Population Projections



Population Projections



Population Projections



Line of Sight

Footprints in AIM are used to conduct line of sight analysis



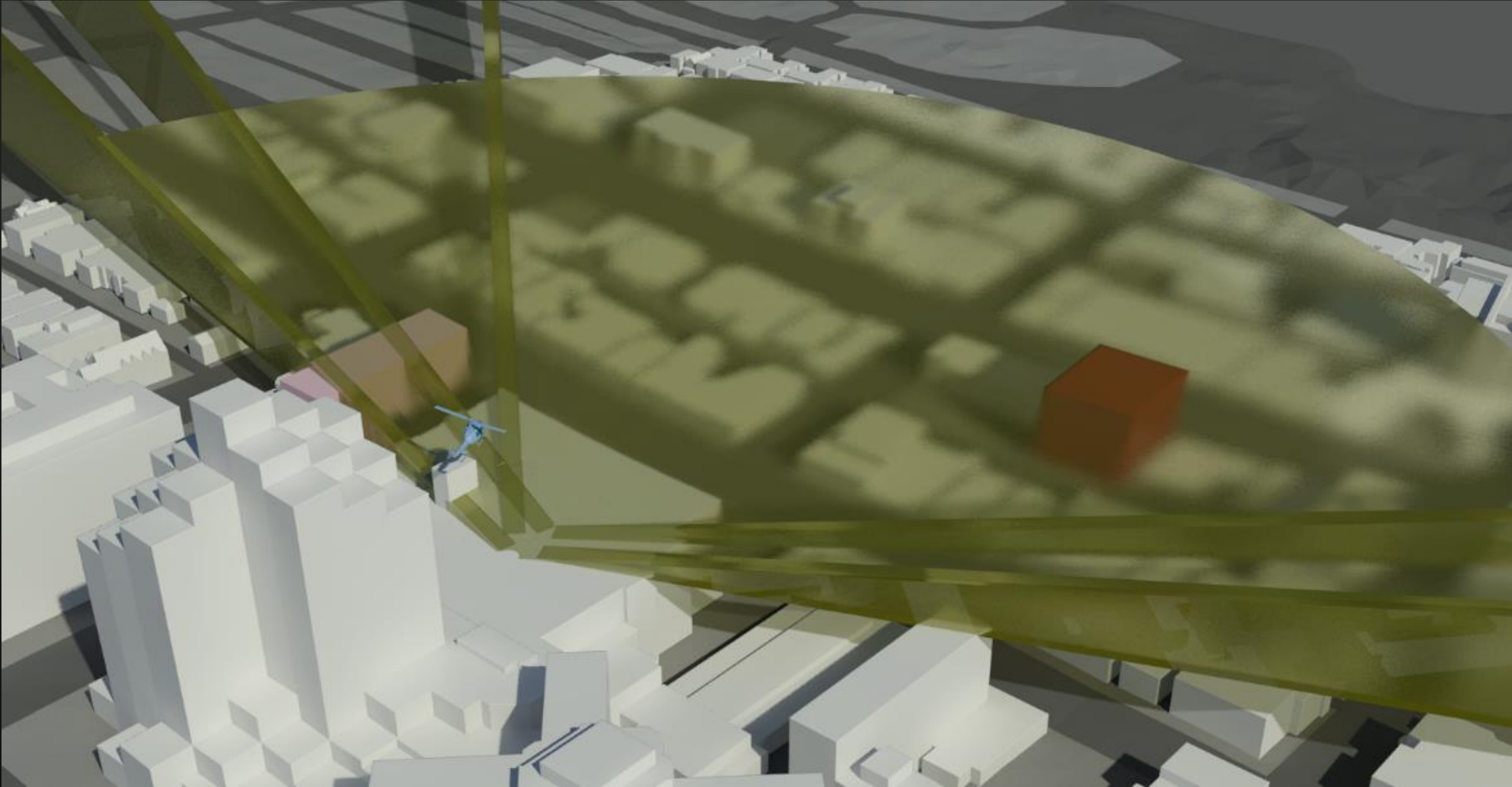
Visible buildings are saved as new data set that is exported to MapInfo Pro



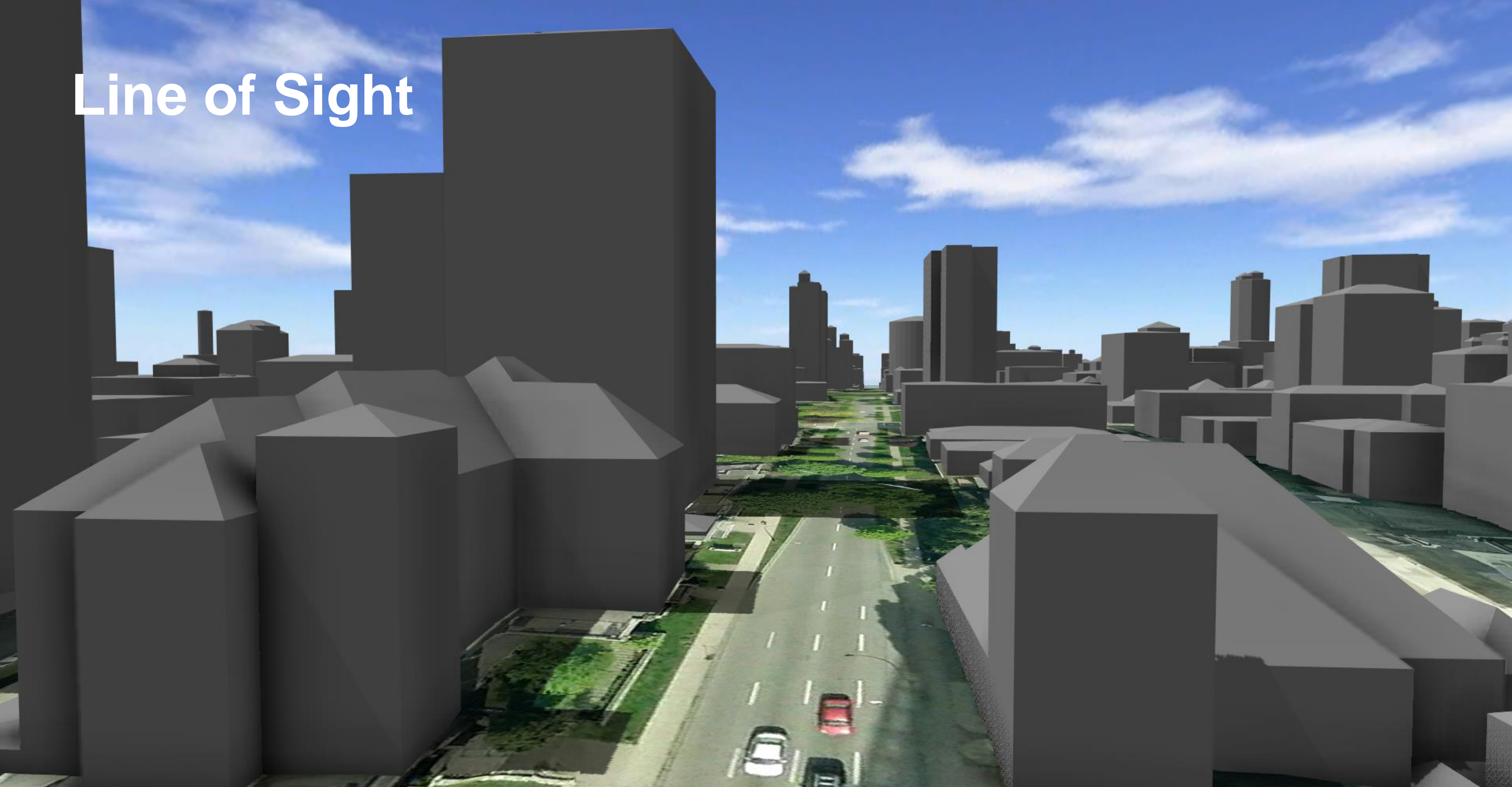
In MapInfo Pro a buffer analysis is run to select buildings within a specific radius of central visible building



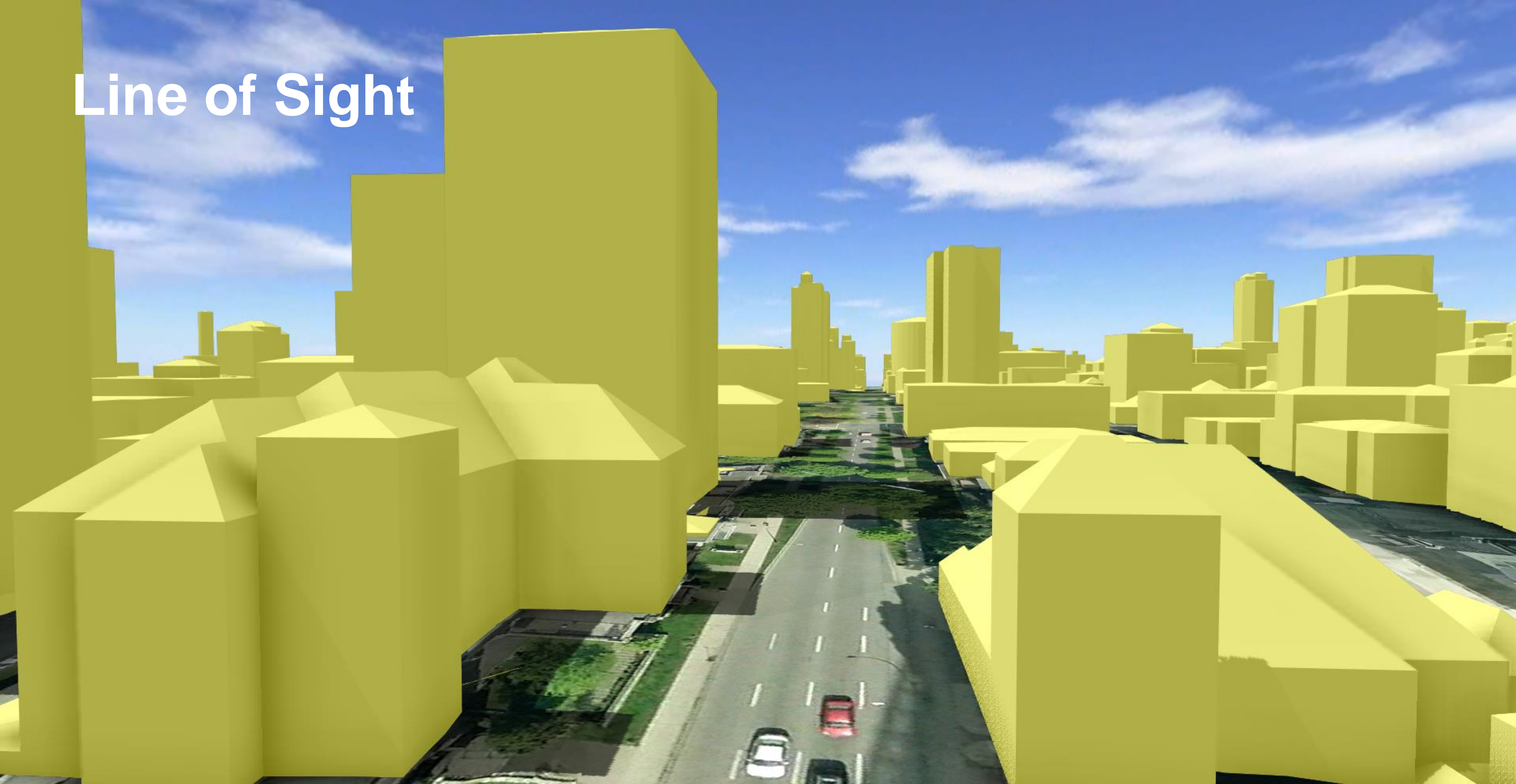
Export the buffer object back into AIM to visualize its impact on building height

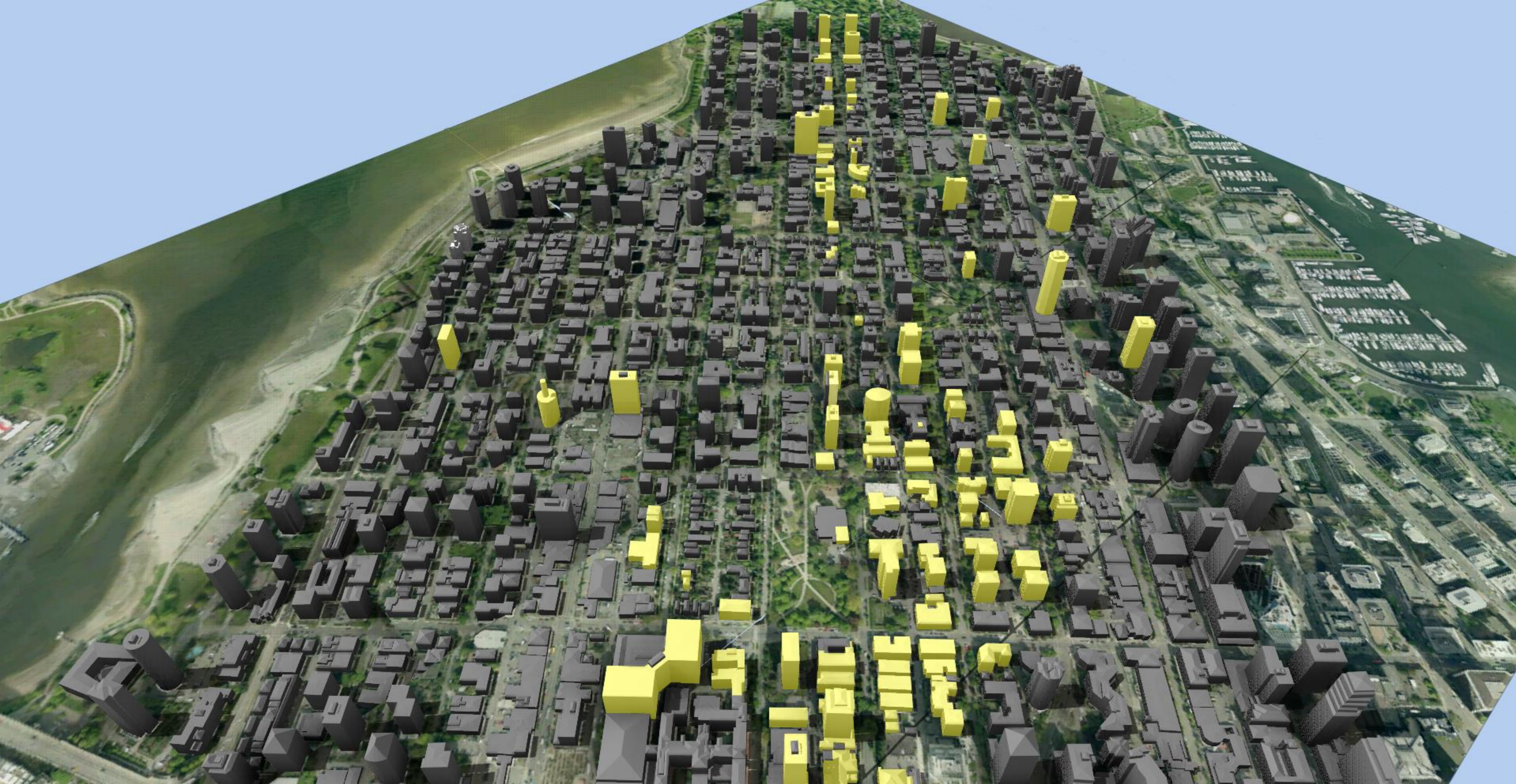


Line of Sight



Line of Sight





Autodesk Infrastructure Modeler 2013: Build 3305 (64-bit) - Westend 3D Buildings.sqlite

Home View Analyze Manage Help

Data Sources Model Explorer Manage Surface Layers Import

Zoom to Selected Select by Filter Select Visible Clear Selected Explore

Properties Data Table

Proposals Design

Style Palette Style Rules Stylize Model

Default Skies My Skies Create Sky Sky Settings

Showmotion Snapshot Output

Paste Copy Duplicate Clipboard

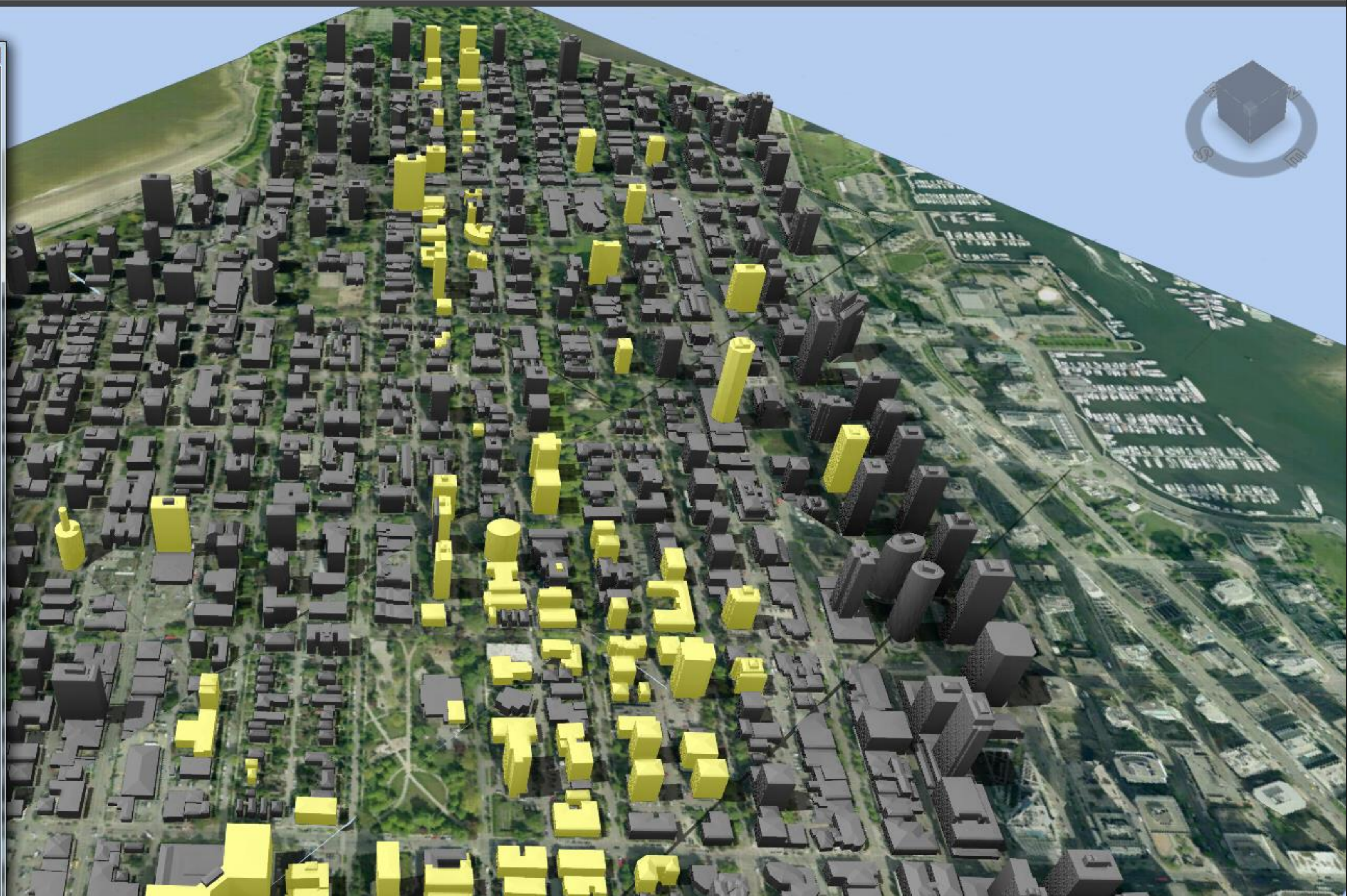
Cut Copy Duplicate

Properties

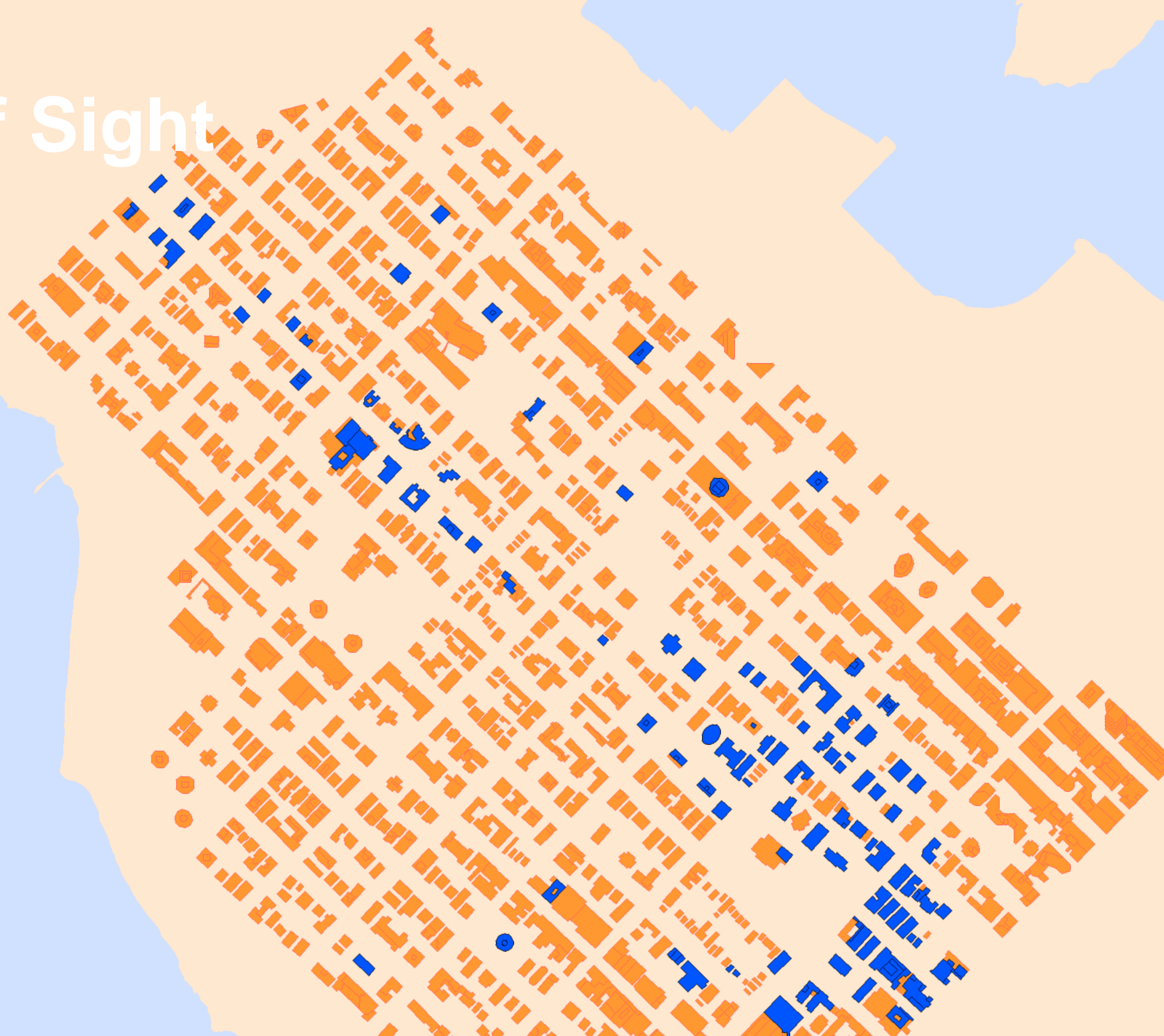
FOOTPRINTS (145)

Unit of Measure: Meters Auto Update Update

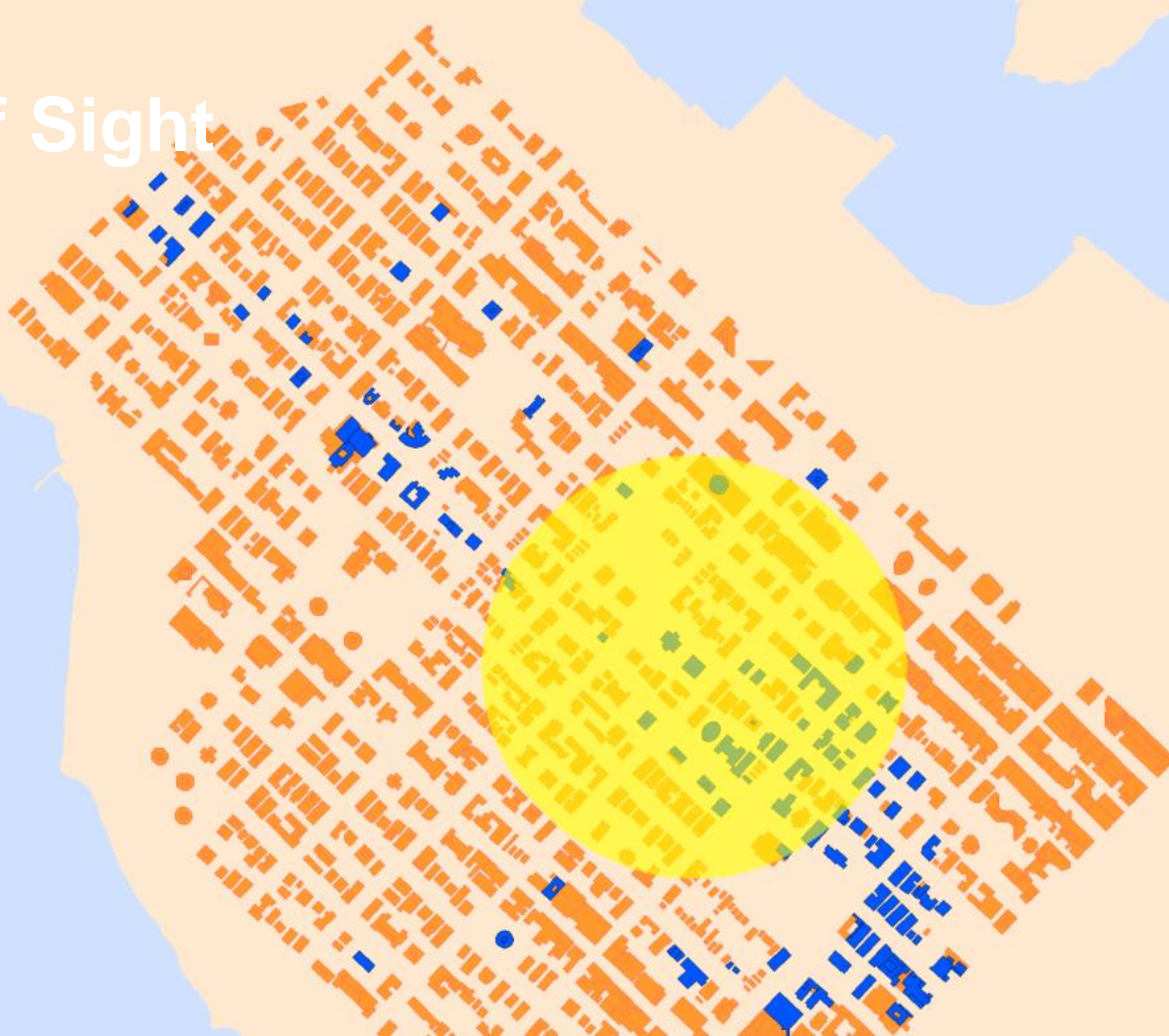
Property	Value
MODEL_TRANSFORM	<various values>
YEARCOMPLETED	<various values>
USE	<various values>
STREETNAME	<various values>
SKETCHUP	
MAX	
MATERIAL	
HERITAGE_STATUS	<various values>
DEVELOPER	<various values>
CIVIC_NO	<various values>
BLDG_NAME	<various values>
AUTOCAD	
ARCHITECT	<various values>
RESUNITSTOTAL	<various values>
FLOORS	<various values>
SPACING_VARIANCE	
SPACING	
FLR_HEIGHT	
AREA_M2	<various values>
Common	
ID	<various values>
Data Source	3cf21e66-a9ab-11e1-8000-70f39502fc7a
Name	<various values>
Description	
External ID	<various values>
Tag	
User Data	visible
Tooltip	
Link	
Stylization	
Manual Style	
Rule Style	
Geometry	
Generalization	
Tessellation	
Elevation	
Elevation Offset	
Building	
Building Complex ID	
Roof Height	<various values>



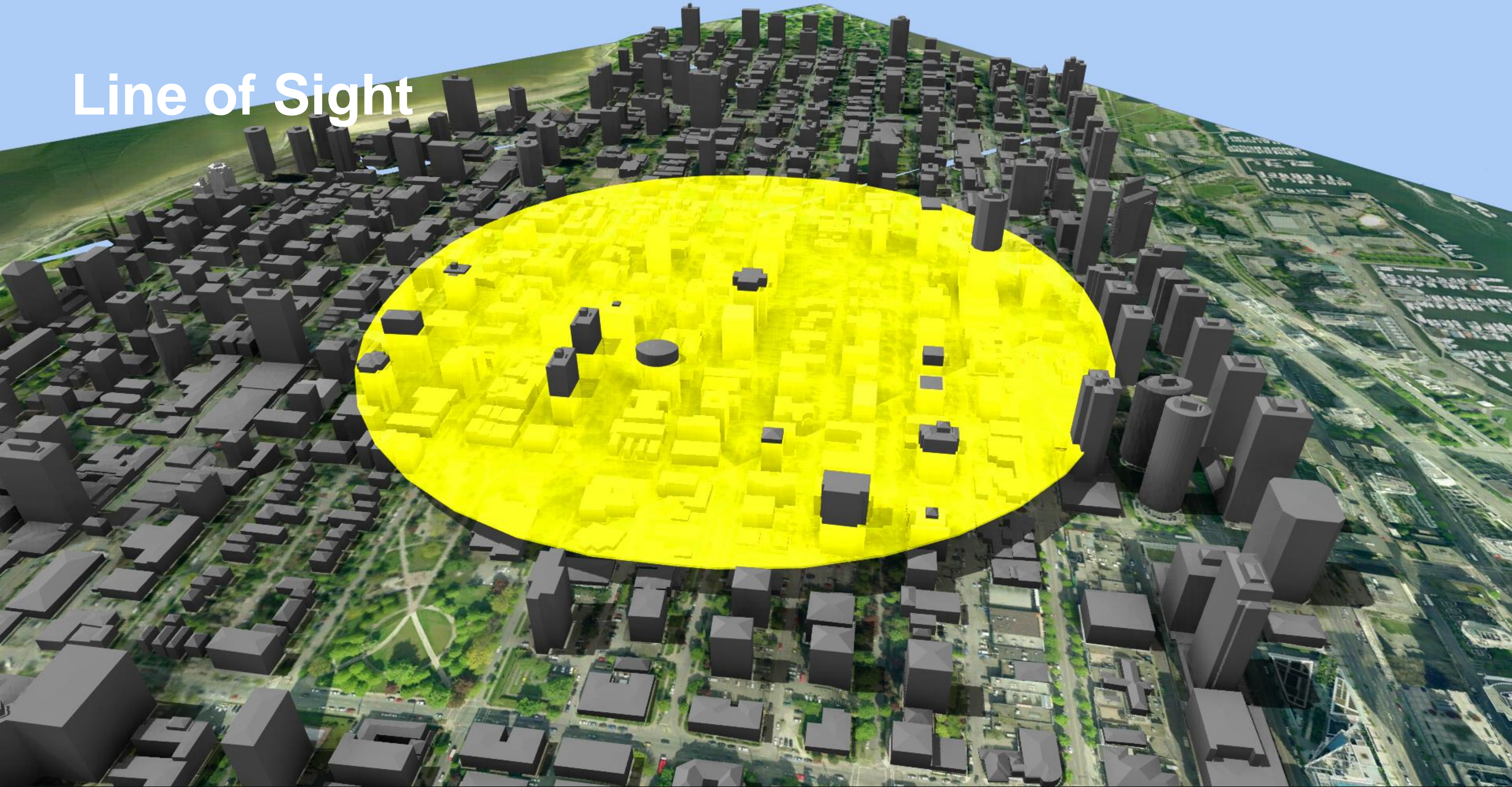
Line of Sight



Line of Sight



Line of Sight



2012 Meridian Award



The Future?

- From Our Customer Viewpoint:
 - Validation of our existing GIS environment
 - Improved interoperability
 - Flexibility in workflow
 - Focus on product strengths
 - Reduced number of data sets

For more information...

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- 604-873-7405

