



AND **Locate25** | **G**
THE NATIONAL GEOSPATIAL CONFERENCE

Presented at the FIG Working Week 2025,
6-10 April 2025 in Brisbane, Australia



Geospatial
Council of Australia

Collaboration, Innovation and Resilience: Championing a Digital Generation

Brisbane, Australia 6-10 April

Automating Measurement Extraction from Deeds

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Christine Leslie, Esri
Tim Hodson, Esri



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Automating Measurement Extraction from Deeds

- Metes-and-Bounds Deed Descriptions
 - Characteristics & Limitations
- Introducing an ArcGIS Pro Automated Approach
 - COGO Reader





Metes-and-Bounds Deed Descriptions

- Used for parcel boundary delineation in deeds

COMMENCING at the West Right-of-Way line of Reddleshire Lane 50' wide, said point being the most Southerly cutback point of Lot 1, Block 5 as originally platted in Westwick Section 1 as recorded in Volume 258, Page 143 of the Harris County Map Records;

THENCE S 87° 30' 01" W, a distance of 14.60 feet to the POINT OF BEGINNING of the herein described tract;

THENCE, S 03° 25' 14" E, a distance of 3.17 feet to a point for corner;

THENCE, N 86° 35' 46" E, a distance of 4.00 feet to a point for corner;

THENCE, S 03° 25' 14" E, a distance of 6.00 feet to a point for corner;

THENCE, S 86° 34' 46" W, a distance of 4.00 feet to a point for corner;

THENCE, S 03° 25' 14" E, a distance of 18.42 feet to a point for corner;

THENCE, S 86° 34' 46" W, a distance of 57.73 feet to a point for corner;

THENCE, N 01° 21' 30" W, a distance of 27.60 feet to a point for corner;

THENCE, N 86° 34' 46" E, a distance of 56.74 feet to the POINT OF BEGINNING and containing 1602 square feet of land, more or less.



WORKING
WEEK 2025

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Metes-and-Bounds Deed Descriptions

- **Characteristics**

- Scanned in digital formats, TIFF, PDF, etcetera
- United States centric
 - direction units: Quadrant Bearing, degrees minutes seconds: *N45-59'50" E*
- No map no graphical elements, text only
- Large amount of text, many pages for relatively few parcels
- Key words, COMMENCING, POINT OF BEGINNING, THENCE, POB, etcetera.
- Multiple parcels (tracts) in a single document is possible

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CHCNAV



Metes-and-Bounds Deed Descriptions

- **Limitations of creating parcels from deeds**
 - No digital submission of original CAD
 - Manual entry by typing into a Traverse tool
- **Mistakes are common**
 - Transposed numbers
 - Missed /skipped courses
 - Wrong Quadrant
- **High misclosure? Difficult to find mistake(s)**



Modify Features ? ▾ □ ×

← Traverse

Lines Closure ≡

Layer Tax : Tax_Lines ▾

+ Set Start
+ Set Closing
Trace Lines

	Direction ▾	Distance	Radius	Arc Length ▾
1	S1°32'57"E	50		
2	S88°27'30"W	105		
3	N1°32'57"W	50		
4	N88°27'00"E	105 ftUS ▾		
5				

Misclose Distance: 0.02 ftUS
 Misclose Ratio: 1 : 20,299
 Calculated Area: 5,250.01 sqFt
 Closure Method: Compass (default)

New

[Learn more about entering traverse dimensions](#)



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Introducing an ArcGIS Pro Automated approach

COGO Reader – ArcGIS Pro 3.5

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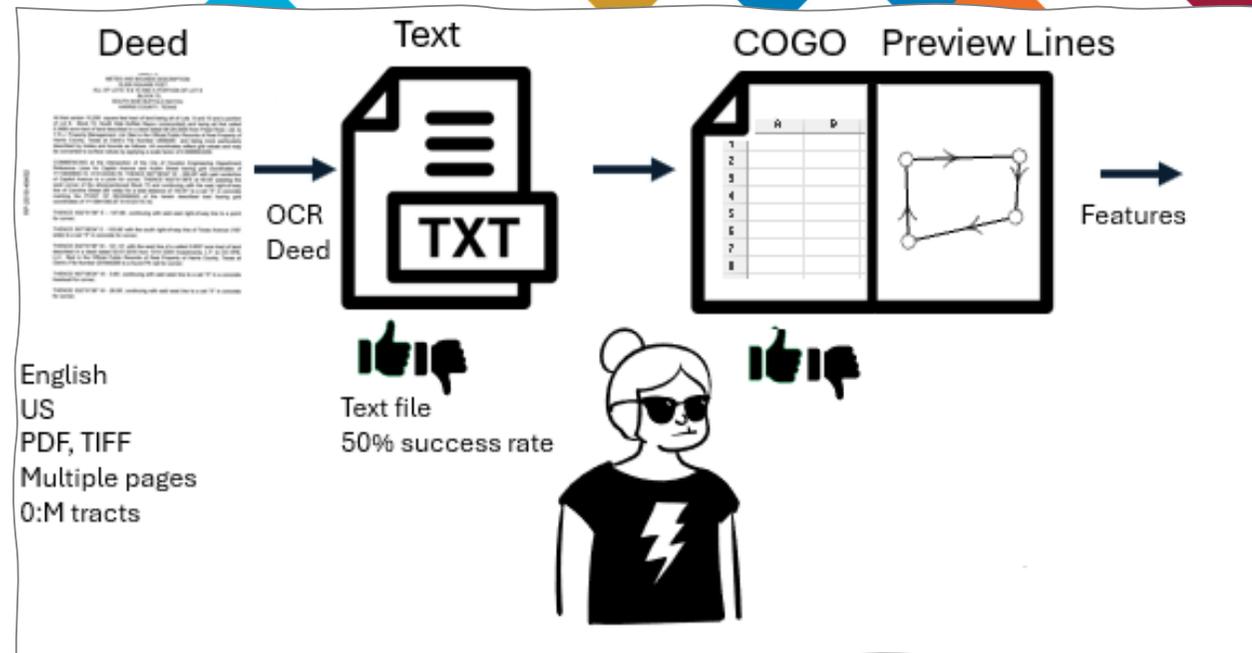


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COGO Reader in ArcGIS Pro

- **Optical character recognition (OCR)**
 - Converts PDF and scanned image to text
- **Extracts COGO measurements from text**
- **Human-in-the-loop: Review and fix extracted measurements**



RP-2018-45452

0.0400 acre tract of land described in a deed
 Y.R.J. Property Management, Ltd. filed in t
 Harris County, Texas at Clerk's File Num
 described by metes and bounds as follows
 be converted to surface values by applying

COMMENCING at the intersection of the
 Reference Lines for Capitol Avenue and
 Y=13840805.72, X=3123335.76; THENCE
 of Capitol Avenue to a point for corner; T
 west corner of the aforementioned Block
 line of Caroline Street (80' wide) for a tota
 marking the POINT OF BEGINNING c
 coordinates of Y=13841083.87 X=3123170

THENCE N32°51'36" E - 147.69', continu
 for corner;

THENCE S57°08'24" E - 103.60' with the s
 wide) to a set "X" in concrete for corner;

THENCE S32°51'36" W - 121.10', with the
 described in a deed dated 02-01-2016 fro
 LLC filed in the Official Public Records c
 Clerk's File Number 201645285 to a found

THENCE N57°08'24" W - 3.60', continuing
 headwall for corner;

THENCE S32°51'36" W - 26.59', continui
 for corner;

Y.R.J. Property Management, Ltd. filed in the Official Public Records of Real Property of
 Harris County, Texas at Clerk's File Number U608290 and being more particularly
 described by metes and bounds as follows. All coordinates reflect grid values and may
 be converted to surface values by applying a scale factor of 0.9998923259.

COMMENCING at the intersection of the City of Houston Engineering Department
 Reference Lines for Capitol Avenue and Austin Street having grid coordinates of
 tA Y=13840805.72, X=3123335.76; THENCE N57°08'24" W - 290.00' with said centerline
 Tt of Capitol Avenue to a point for corner; THENCE N32°51'36"E at 40.00' passing the
 2 west corner of the aforementioned Block 72 and continuing with the east right-of-way
 © line of Caroline Street (80' wide) for a total distance of 143.81' to a set "X" in concrete
 S marking the POINT OF BEGINNING of the herein described tract having grid
 Cl coordinates of Y=13841083.87 X=3123170.19;

oO
 Y THENCE N32°51'36" E - 147.69', continuing with said east right-of-way line to a point
 for corner;

_ THENCE S57°08'24" E - 103.60' with the south right-of-way line of Texas Avenue (100'
 wide) to a set "X" in concrete for corner;

THENCE S32°51'36" W - 121.10', with the west line of a called 0.8557 acre tract of land
 described in a deed dated 02-01-2016 from 1314 GSW Investments, L.P. to CS HPB,
 LLC filed in the Official Public Records of Real Property of Harris County, Texas at
 Clerk's File Number 201645285 to a found PK nail for corner;

THENCE N57°08'24" W - 3.60', continuing with said west line to a set "X" in a concrete
 headwall for corner;

THENCE S32°51'36" W - 26.59', continuing with said west line to a set "X" in concrete
 for corner;

490009,0007 WEST 209609923 v1 6

THENCE N57°08'24" W - 100.00'. with the north line of a called 5,000 square feet tract

Parcel 1

Set Start 3,123,335.76E 13,840,805.72N ftUS

Connection lines

Template << Lines

Direction	Distance	Radius	Arc Length
1 N57°08'24"W	290		
2 N32°51'36"E	143.81		

Parcel courses

Template >> ParcelLines

Direction	Distance	Radius	Arc Length
1 N32°51'36"E	147.69		
2 S57°08'24"E	103.6		
3 S32°51'36"W	121.1		
4 N57°08'24"W	3.6		
5 S32°51'36"W	26.59		
6 N57°08'24"W	100		

Misclose Distance: 0
 Misclose Ratio: Exceeds 1:100,000

Add to Map

Learn more about using COGO Reader

Project Map Insert Analysis View Edit Imagery Share Help Add-In Graphics Parcel Record Workflows Quality Versioning Linear Referencing

Save Discard Transparency 100% Show Only Active Create Record Parcel Lineage Create Modify Delete Select Parcel Features Attributes Transfer Parcel COGO Reader Move Rotate Scale Annotation Transform Align Edge Copy Lines To Create Seeds Build Align Parcels

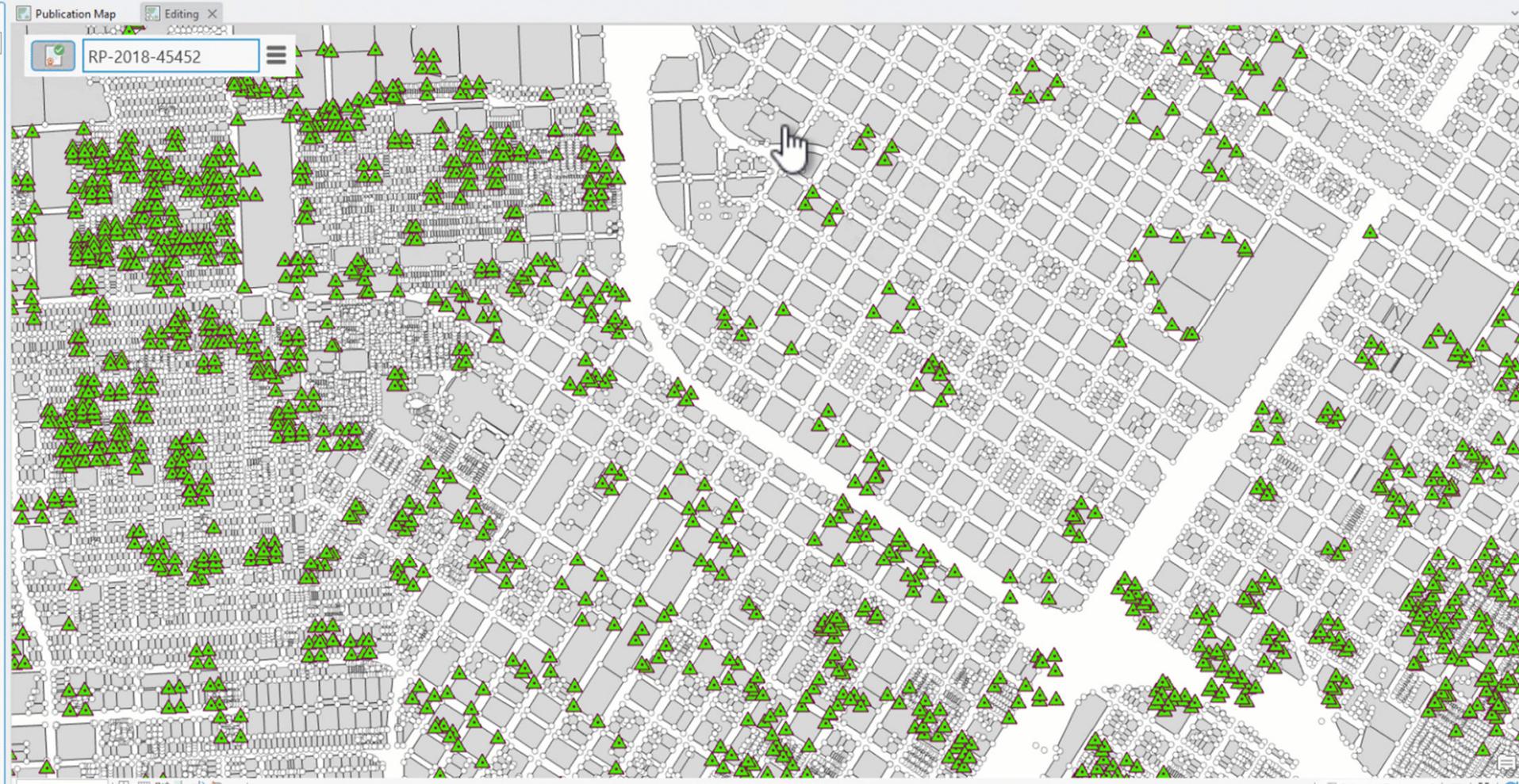
Manage Edits Records Features Selection Tools Construct Alignment

Contents

Search

Drawing Order

- Editing
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- HCAD Error Layers
- Graphics Layer
- L0HCAD_ParcelFabric
- L2HCAD_ParcelFabric_Topology
- Anchor Points
- Points
- Links
- Connection Lines
- Tax
- Simultaneous_Conveyance
- Conveyance_Division
- Encumbrance
- World Topographic Map
- World Hillshade



Catalog History Attributes Create Features Modify Features

COGO Reader - 01015170.pdf

Job No. 107005

Exhibit "A"

DESCRIPTION of a 222,247 square foot (5.1020 Acres) tract of land being Lot 29 of Crosby Meadows, an unrecorded subdivision of 349.226 Acres in the Absolom Reeves Survey, Abstract No. 60 and the W. R. Baker Survey, Abstract No. 144, Harris County, Texas and being more particularly described by metes and bounds as follows,

COMMENCING at the Northeast corner of said 349.226 Acre tract and being the intersection of the South Right of Way of Reid Road and the West Right of Way of Miller-Wilson Road,

THENCE, S 89° 48' 13" W, along the South Right of Way of Reid Road, a distance of 734.68 feet to a point for corner,

THENCE, S 00° 21' 18" E, a distance of 1826.17 feet to a point in the centerline of Sundown Meadow (60' R/W) for the Northeast corner of the tract herein described and the POINT OF BEGINNING,

THENCE, S 00° 21' 18" E, along the common line of those tracts described in Clerk's File No. U-578466 and U-661964, passing at 30.00 feet a found 1" iron pipe in the South Right of Way of Sundown Meadow, and continuing a total distance of 600.03 feet to a found 1" iron pipe for the Southeast corner of the tract herein described,

THENCE, S 89° 57' 15" W, along the common line of that tract described in Clerk's File No. P-8945583, passing at 337.56 feet a found 1" iron pipe in the East Right of Way of Sunnyview Way (60' R/W) and continuing a total distance of 367.56 feet to a point in the centerline of said Sunnyview Way for the Southwest corner of the tract herein described,

THENCE, N 00° 53' 53" W, along the centerline of Sunnyview Way, a distance of 600.07 feet to the Northwest corner of the tract herein described,

THENCE, N 89° 57' 05" E, along the centerline of Sundown Meadow, a distance of 373.25 feet to the POINT OF BEGINNING and containing 5.1020 Acres.

F. G. Huffman, RPLS No. 1682

8302 CHESWICK * HOUSTON, TEXAS 77037

JUL 20 2001

County Clerk
HARRIS COUNTY, TEXAS

THENCE, S5 00° 21' 18" E, along the common line of those tracts described in Clerk's File No. U-578466 and U-661964, passing at 30.00 feet a found 1" iron pipe in the South Right of Way of Sundown Meadow, and continuing a total distance of 600.03 feet to a found 1" iron pipe for the Southeast corner of the tract herein described,

THENCE, S 89° 57' 15" W, along the common line of that tract described in Clerk's File No. P-8945583, passing at 337.56 feet a found 1" iron pipe in the East Right of Way of Sunnyview Way (60' R/W) and continuing a total distance of 367.56 feet to a point in the centerline of said Sunnyview Way for the Southwest corner of the tract herein described,

THENCE, N 00° 53' 53" W, along the centerline of Sunnyview Way, a distance of 600.07 feet to the Northwest corner of the tract herein described,

THENCE, N 89° 57' 05" E, along the centerline of Sundown Meadow, a distance of 373.25 feet to the POINT OF BEGINNING and containing 5.1020 Acres.

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LASS 4,8 \\
F. G. Huffman, RP . 1682 AM G\atEptuy
Huffman S No. 168 Bye \\\ Se \\
Ye 7
5302 CHESWICK * HOUSTON, TEXAS 77037 Sc
ANY PROWISHOH HEREWIH WHICH RESTRICTS THE SALE, RENTAL, OR USE OF THE DESCRIBED REAL PROPERTY BECAUSE OF COLOR OR RACE IS VALID AKD UEMFORCEARLE UNDER FEDERAL LAW,

Set the commencement point.

Parcel 1

Set Start XY not set

Connection lines

Template << Lines

Direction	Distance	Radius	Arc Length
1 S89°48'13"W	734.68		
2 S0°21'18"E	1,826.17		

Parcel courses

Template >> ParcelLines

Direction	Distance	Radius	Arc Length
1 N0°53'53"W	600.07		

Misclose Distance: 600.07
Misclose Ratio: 1 : 1

Add to Map

Learn more about using COGO Reader

Why not use AI?

- **Experiments with Chat bots**
 - Not reliable – occasional nonsensical result (“hallucination”)
- **Current models have weaknesses and need further enhancement to interpret:**
 - specialized language & keywords with contextual meaning (example circular arcs (tangency))
 - variety of ways to record the same description, regional differences, age of document, etc.
- **FUTURE:**
 - Outputs generated over time by COGO Reader can be used to develop training models
 - Using AI to remove watermarks and enhance image before OCR

Summary

- **Optical Character Recognition (OCR)**
 - Converts PDF and scanned image to text
- **Extracts COGO measurements from text**
- **Hours of manual entry reduced to a few minutes**
- **Even with a non-perfect OCR result**
 - User intervention to review & correct is faster than manual entry (human-in-the-loop)