



GIS & CAD INTEROPERABILITY

SOLUTIONS FOR SHARING YOUR DATA



COURTNEY ROE, GISP

CIVIL CAD DESIGNER (*SINCE 2013*)

PAPE-DAWSON ENGINEERS IN AUSTIN, TX

RESIDENTIAL LAND DEVELOPMENT (*SINCE 2016*)

CERTIFIED CIVIL 3D PROFESSIONAL (*SINCE 2016*)

GISP (*SINCE 2017*)

FAA SMALL UAS REMOTE PILOT (*PART 107 CERTIFIED*)

5 ASSOCIATES FROM ACC & BAAS FROM TX STATE UNIVERSITY

SWIGGIS, URISA TX, ATX & TXGIS DAY, CAD UG, AUSTIN WIT, ETC.

LIVE IN KYLE, TX WITH JEREMY AND MINI DACHSHUNDS BONNIE & CLYDE

RSVP



Mappy Hour

Thursday, March 10th

5-7 pm



AUSTIN, TX

10420 Metric Blvd
Ste 150, Austin, TX

RSVP: urisatexas.org/event-4698640



1st Round Sponsored by:



ALLTERRATM

Head over after the TNRIS TX GIS Forum
Food truck and hand-crafted brews on site

Spacious indoor & outdoor seating | Great parking
GEO Swag & 1st Round are 1st come 1st serve



Brought to you by: SWIGGIS & URISA Texas



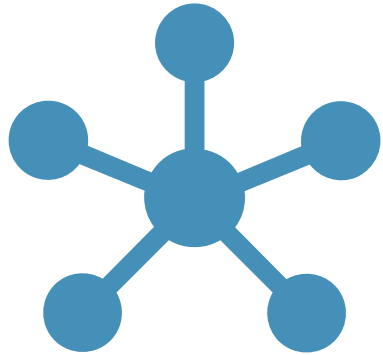
URISATEXAS.ORG/EVENT-4698640

GIS & CAD INTEROPERABILITY

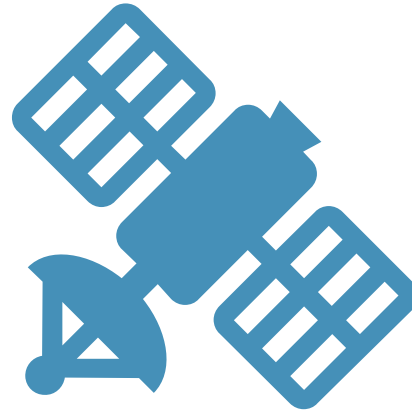
Sharing datasets between CAD & GIS software can be easier! Let's look at how they are imported and exported and discuss methods to effectively communicate workflows and data preparation to work more seamlessly.

Why can't it be easier to share data? The basis of the conversation is understanding the user's needs and the software they use. How can we improve communication between GIS and CAD users to work more seamlessly and provide each other with valuable, usable datasets? Using examples of Autodesk Civil 3D and Esri ArcMap, how can workflows be applied when not using the most up-to-date software? What is on the horizon for newer versions of the software and what will we need to look out for to prepare for a shift in interoperability or lack thereof?

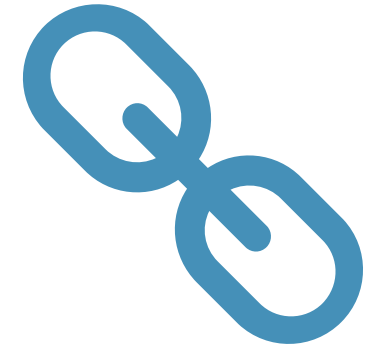
SOLUTIONS FOR SHARING YOUR DATA



WHO



QUALITY



WHERE

DATA! DATA!! DATA!!!

FEDERAL

USGS [National Map Viewer] (NHD)
USFW (NWI)
USDA [GeoSpatial Data Gateway]
FEMA [Map Service Center]

STATE

TNRIS [Data Hub]
TCEQ
GLO
TxDOT

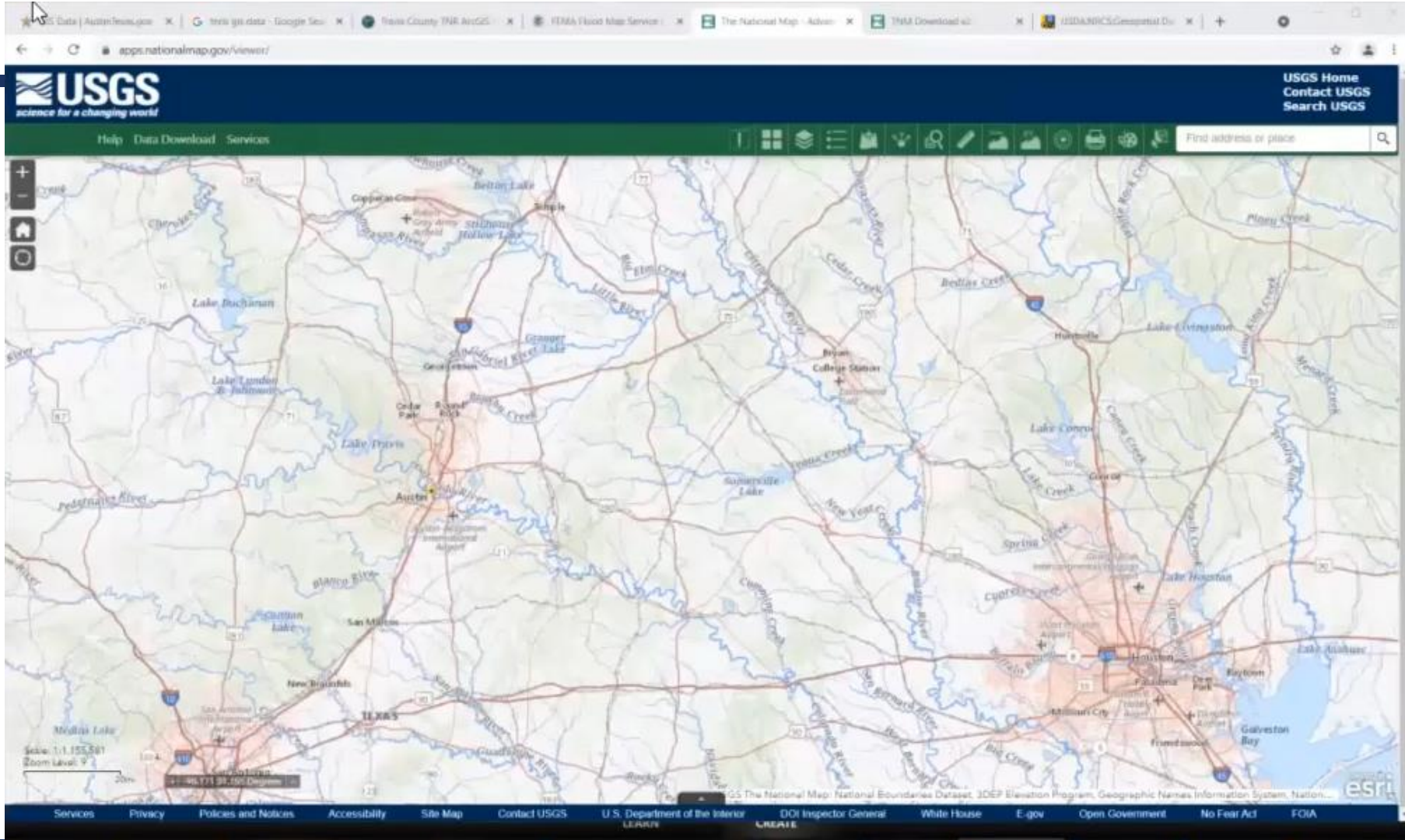
COUNTY

COGs & Appraisal District (Parcels)

CITY

Important Local Data

a few DATA SOURCES



DATA DOWNLOAD

The screenshot displays the 'Property Profile' web application, a development services tool for the City of Austin. The interface is organized into several sections:

- Header:** Features the City of Austin logo and the title 'Property Profile A DEVELOPMENT SERVICES TOOL'.
- Navigation Tabs:** Includes 'Getting Around', 'Search & Identify Data', 'Drawing & Measurement', 'Printing & Reporting', and 'Help'. A 'Tool Labels' checkbox is visible on the right.
- Tool Bar:** Contains icons for 'Address Search', 'Find Review Case', 'Permits By Address', 'Parcel Search', 'Find ROW Permits', 'Change visible map layers', 'Historic Layers', 'Point', 'Query', and 'Filter'.
- Left Panel (Home):**
 - Welcome:** A message stating 'Welcome to the City of Austin Property Profile web map application.' with a link to 'Google Chrome Web browser'.
 - Getting Started:** Instructions to use a mouse to pan and zoom the map.
 - Search for information:** A list of search tools: 'Address Search' (search by address or parcel identifier), 'Parcel Search' (requires an Appraisal District ID), 'Find Review Cases' (search for cases in review or approved), and 'Permits By Address' (search for building & trade permits).
 - Getting Around:** A paragraph explaining navigation tools like pan, zoom, bookmarks, and coordinates.
 - Search & Identify Data:** A paragraph describing search capabilities, including layer catalogs and data attribute retrieval.
 - Drawing & Measurement:** A brief mention of drawing tools.
- Main Map:** A large map area showing a street grid, water bodies, and various colored overlays. A scale bar and 'GreyScale' option are visible at the bottom left of the map.
- Bottom Panel:** Shows a file explorer with three files: 'Waterway Setbacks.zip', 'stratmap17-50cm...zip', and '40453C_20210711.zip'. A 'Show all' button is on the right.

DATA MANAGEMENT

GIS > DATA > SourceData >

Austin_Water

CAPCOG

CEF_Buffers

COA_Boundaries

COA_Creek_Buffers

COA_Creek_Lines

FEMA

FloodplainModel_DryEastWatershed

TPWD

TCAD_Parcels2016



Creek_Lines.dbf

Creek_Lines.prj

Creek_Lines.shp

Creek_Lines.shx

Creek_Lines_161012.zip

ReadMe_20161012.txt

GIS > DATA > WorkingData > COA > Streams

COA_Creek_Buffers_CWQZ_IndvStream.cpg

COA_Creek_Buffers_CWQZ_IndvStream.dbf

COA_Creek_Buffers_CWQZ_IndvStream.prj

COA_Creek_Buffers_CWQZ_IndvStream.sbn

COA_Creek_Buffers_CWQZ_IndvStream.sbx

COA_Creek_Buffers_CWQZ_IndvStream.shp

COA_Creek_Buffers_CWQZ_IndvStream.shp.xml

COA_Creek_Buffers_CWQZ_IndvStream.shx

COA_Creek_Lines.cpg

COA_Creek_Lines.dbf

COA_Creek_Lines.idx

COA_Creek_Lines.prj

COA_Creek_Lines.sbn

COA_Creek_Lines.sbx

COA_Creek_Lines.shp

COA_Creek_Lines.shp.xml

COA_Creek_Lines.shx

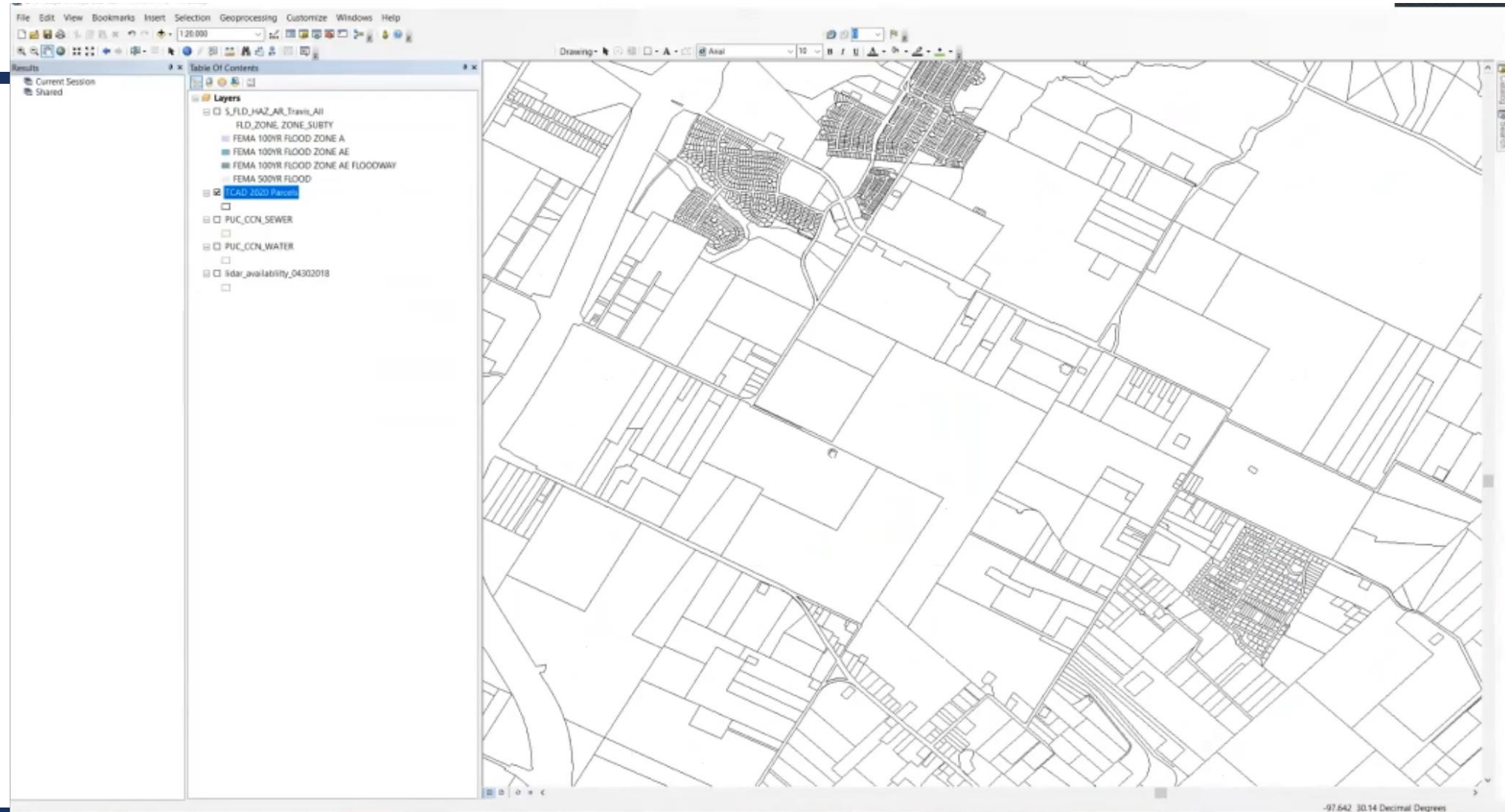
DATA ASSIMILATION

GIS > DATA > SourceData > CityOfAustin > COA_WaterwaySetbacks

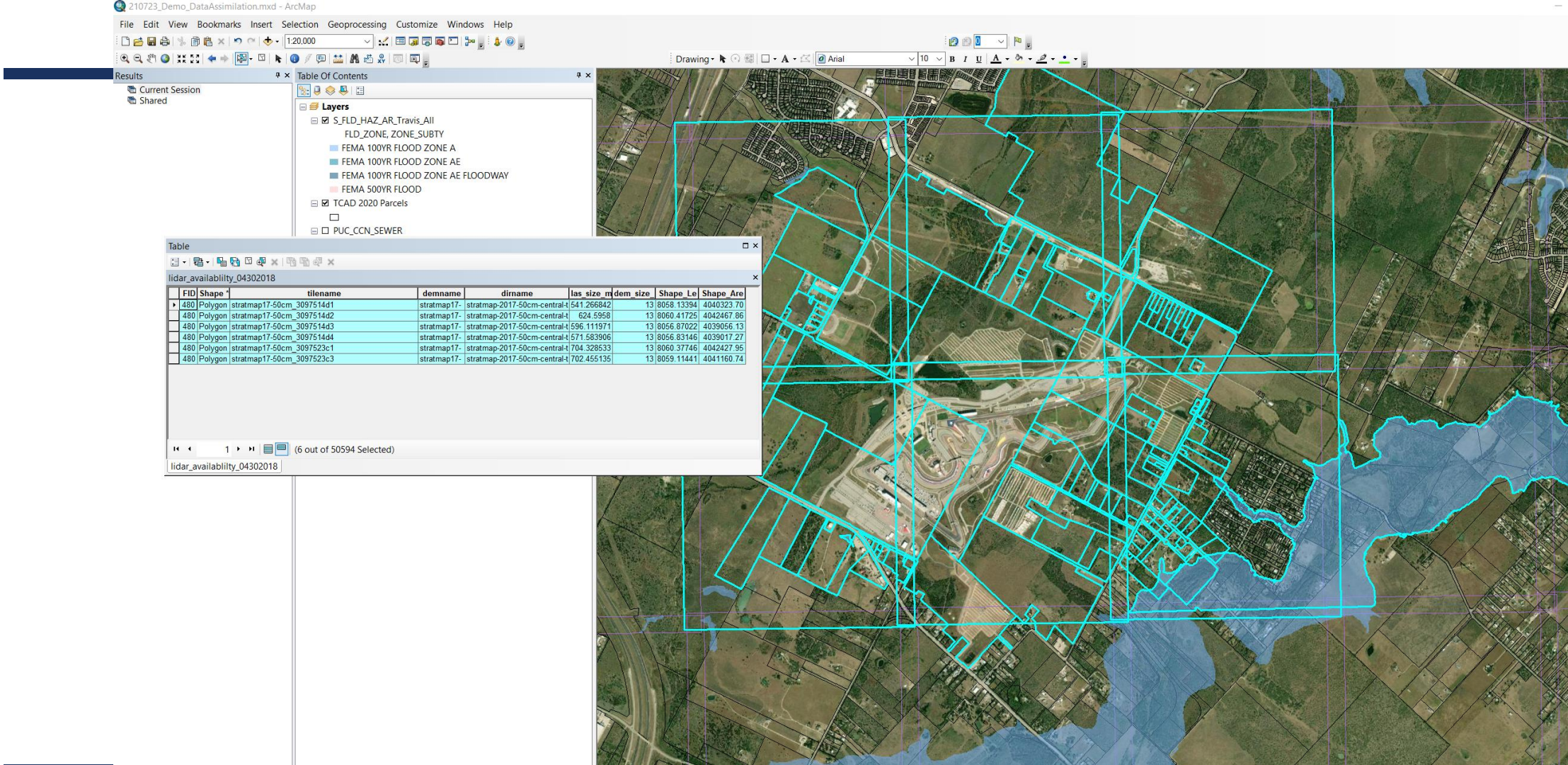
Search COA_WaterwaySetba...

Name	Date modified	Type	Size
210723_ReadMe.txt	7/23/2021	210723_ReadMe.txt - Notepad	
COA_WaterwaySetbacks.dbf	7/23/2021	File Edit Format View Help	
COA_WaterwaySetbacks.prj	7/23/2021	Waterway Setbacks	
COA_WaterwaySetbacks.shp	7/23/2021	Based on Waterway Setbacks	
COA_WaterwaySetbacks.shx	7/23/2021	This layer depicts creeks with buffers for water quality and creek protection.	
Waterway Setbacks.zip	7/22/2021	Downloaded on 07/23/2021 by Courtney Roe, GISP (croe@pape-dawson.com) from: https://data.austintexas.gov/Locations-and-Maps/Waterway-Setbacks/eg2m-3frp https://data.austintexas.gov/d/eg2m-3frp?category=Locations-and-Maps&view_name=Waterway-Setbacks	

DATA ASSIMILATION



DATA PREPARATION IN ARCMAP



DATA PREPARATION IN ARCMAP

MAPIMPORT

Statically Imports GIS Data w/ Attributes & CAN edit in CAD

_AeccImportGISData

Creates Pipe Network from GIS Data

MAPEXPORT

Statically Exports CAD Data to GIS w/ Attributes

_AeccCreateSurfaceFromGISData

Creates Surface from GIS Data. **CAUTION** code uses Int. feet

MAPTRIM

Trim vector data in CAD & Retain Attributes

MAPWSPACE

Under the Planning & Analysis Workspace (MAP3D). Use to connect to GIS Data (in GRID)

MAPIINSERT

Inserts an Image (RASTER) Utilizing world files

EXPORTKML

Must be scaled to GRID first & Drape Objects on Ground

a few MAP3D CAD COMMANDS

HOW TO BRING GIS DATA INTO CIVIL3D STATICALLY

- SET COORDINATE SYSTEM
- MAPIMPORT & SCALE (MAPTRIM)
- MAPEXPORT to .SHP

GIS > DATA > SourceData > CityOfAustin > COA_Planimetrics2015

210723_ReadMe.txt
COA_Planimetrics2015.dbf
COA_Planimetrics2015.idx
COA_Planimetrics2015.prj
COA_Planimetrics2015.shp
COA_Planimetrics2015.shx
Planimetrics 2015.zip

Right click:
**OPEN
WITH
NOTEPAD**

COA_Planimetrics2015.prj - Notepad

File Edit Format View Help

GEOGCS["WGS84(DD)", DATUM["WGS84", SPHEROID["WGS84", 6378137.0, 298.257223563]], PRIMEM["Greenwich", 0.0], UNIT["degree", 0.00000111566146]

**SCALE
FACTOR**

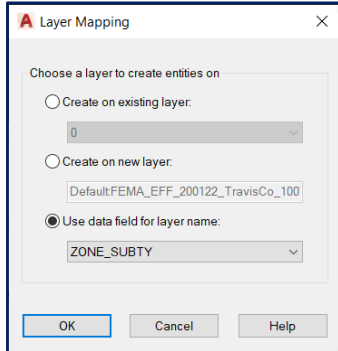
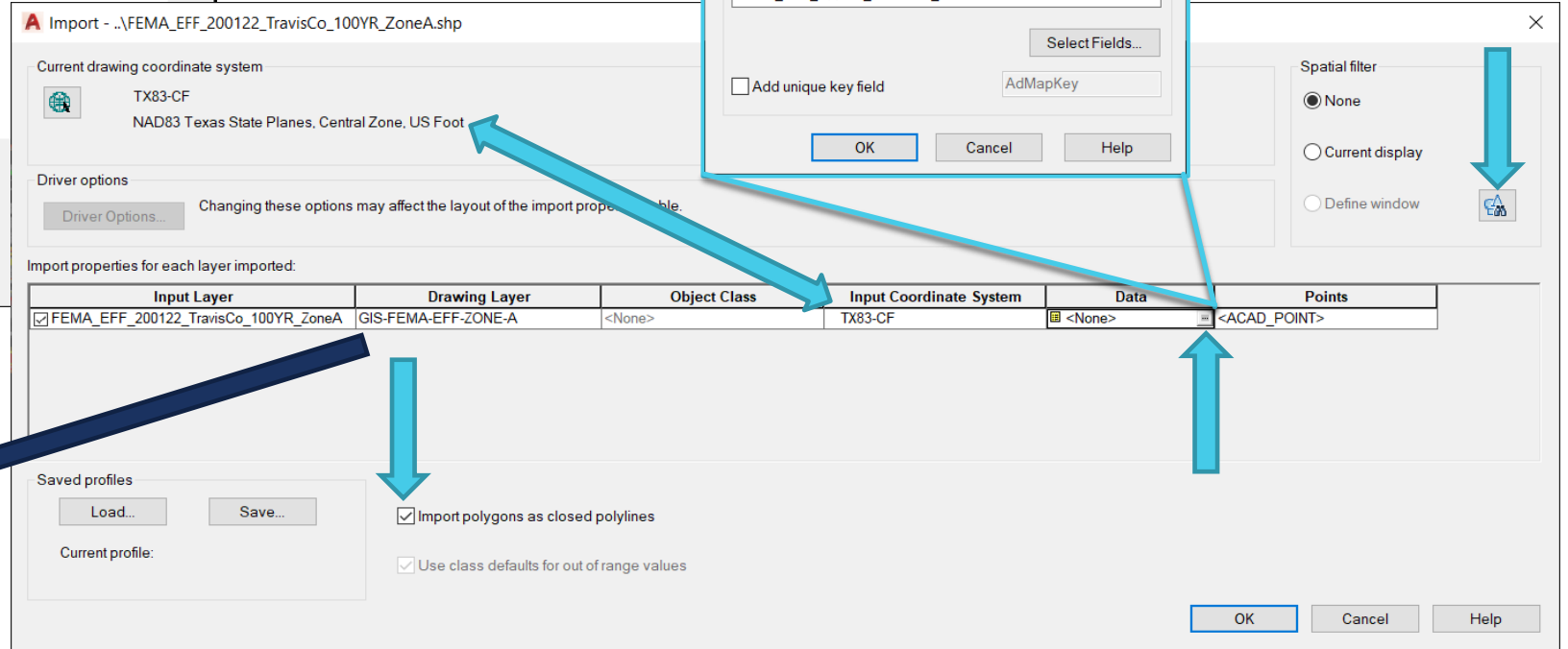
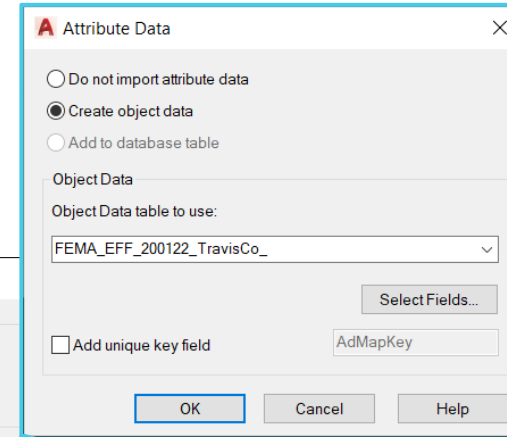
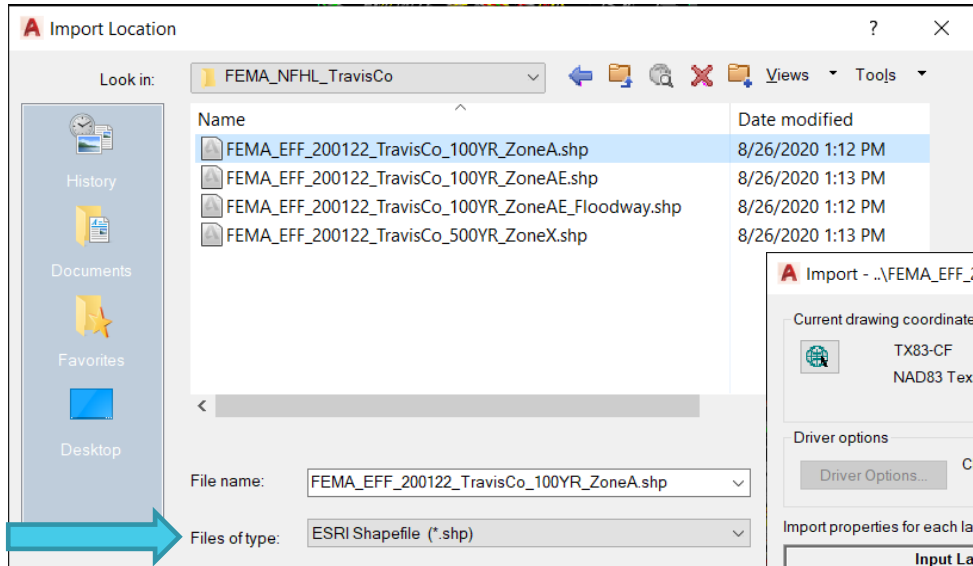
- #1 Comes from Surveyor of the Project; know the origin!
- #2 Often used in Civil Design.
- #3 **WATCH OUT** for Coordinate Creep!

For example: Published Scale Factor is 1.00012

In Civil3D when scaling (SC)>Basepoint (often is 0,0,0)>Scale Factor

(Enter in the proper fraction to go from GRID to GROUND 100012/100000)

.PRJ FILES & SCALE FACTORS



MAPIMPORT INTO CIVIL3D

Export - I:\...\210723_COA_WW_Modified.shp

Selection | Data | Options

Object type
 Point
 Line
 Polygon
 Text

Select objects to export
 Select all
 Select manually

Filter selection
 Layers: GIS-COA-UTIL-SSWR-PIPE

Object Classes: *

Select polygon topology to export
 Name: <None>

Group complex polygons

Saved profiles
 Load... Save... Current profile:

Automatic selection

Select Attributes

Expression:

- Properties
 - ANGLE
 - AREA
 - BLOCKNAME
 - BULGE
 - CENTER
 - CENTROID
 - CLASSNAME
 - COLOR
 - DWGNAME**
 - EANGLE
 - EHANDLE
 - ELEVATION
 - EWIDTH
 - HEIGHT
 - IMAGENAME
 - LABELPT
 - LAYER
 - LENGTH
 - LINETYPE
 - LINEWEIGHT
 - LOCKSTAT
 - PLOTSTYLE

OK Cancel Help

Export - I:\...\210723_COA_WW_Modified.shp

Selection | Data | Options

Data

Select Attributes... Choose attribute fields to build table for export

Source Field	Output Field
DWGNAME@WWMain	DWGNAME
ELEVATION@WWMain	ELEVATION
LAYER@WWMain	LAYER
FeatId@WWMain	FeatId
ENABLED@WWMain	ENABLED
COMPTYPE@WWMain	COMPTYPE
SUBPROJECT@WWMain	SUBPROJECT
GRIDID@WWMain	GRIDID
MAPSCO@WWMain	MAPSCO
WWW_ID@WWMain	WWW_ID
ADDBY@WWMain	ADDBY
DATEADDED@WWMain	DATEADDED

Create unique key field: AdMapKey

Saved profiles
 Load... Save... Current profile:

Automatic selection

Select Attributes

Expression:

- Properties
- Object Data
 - COA_CEF_Buffers2_prj4203
 - COA_CEF_Wetlands1_prj4203
 - COA_CEF_Wetlands2_prj4203
 - COA_Creek_Buffers_Diss_prj4203
 - COA_Creek_Buffers_prj4203
 - COA_Creeks_prj4203
 - COA_EHZ_Diss_prj4203
 - COA_EHZ_prj4203
 - COA_Jursd_Bndy_prj4203
 - COA_Planimetrics2015
 - COA_Zoning_Overlay_Pipeli
 - FEMA_EFF190503_TravisCo_Z
 - Main
 - Parcel_poly
 - WWMain**
 - FeatId
 - ENABLED
 - COMPTYPE
 - SUBPROJECT
 - GRIDID
 - MAPSCO

OK Cancel Help

Export - I:\...\210723_COA_WW_Modified.shp

Selection | Data | Options

Coordinate conversion
 TX83-CF
 NAD83 Texas State Planes, Central Zone, US Foot

Convert coordinates to:

Other
 Treat closed polylines as polygons

ESRI Shapefile

2 Dimension shape files.
 3 Dimension shape files.

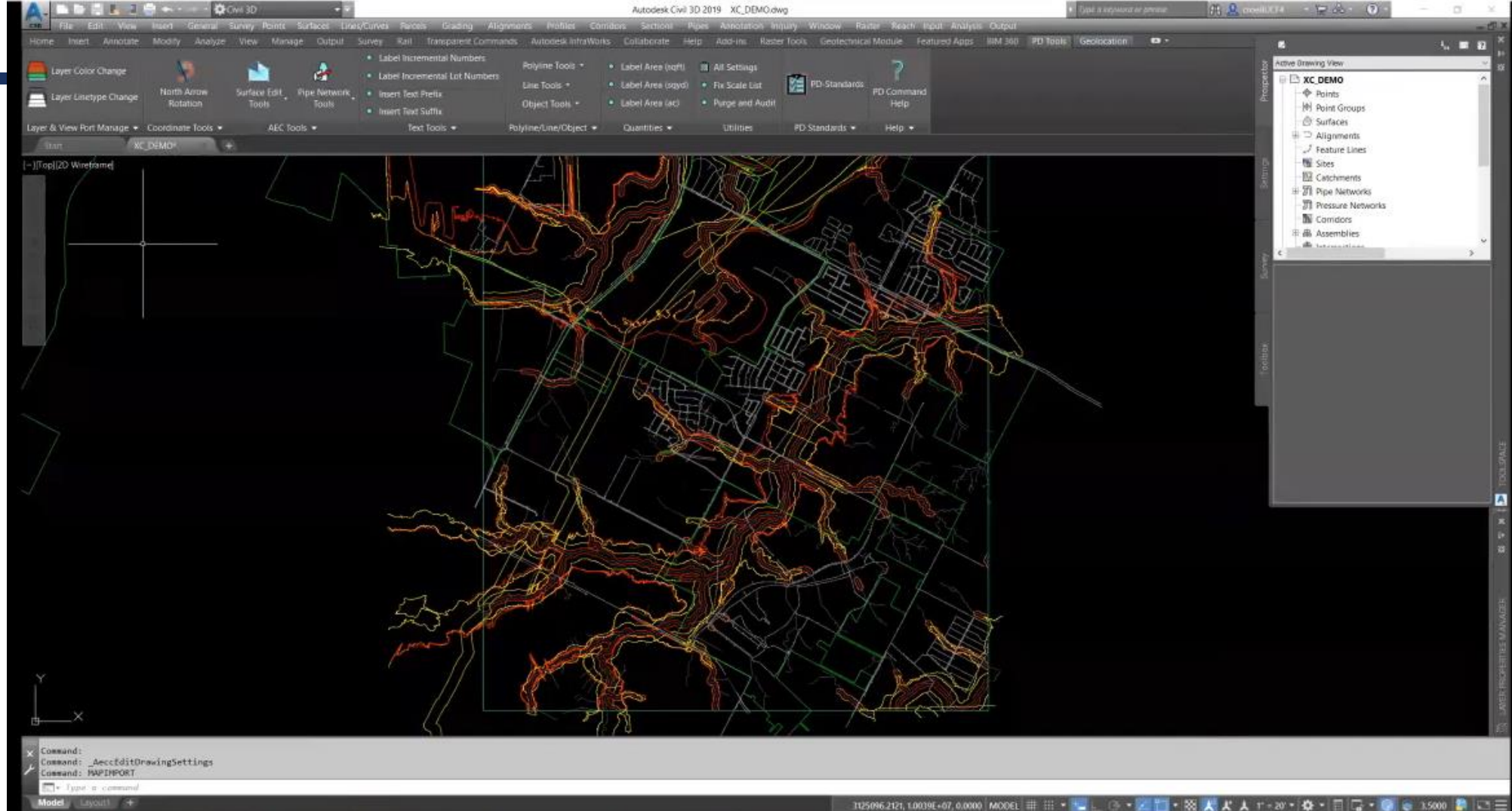
OK Cancel

Driver Options...

Saved profiles
 Load... Save... Current profile:

Automatic selection

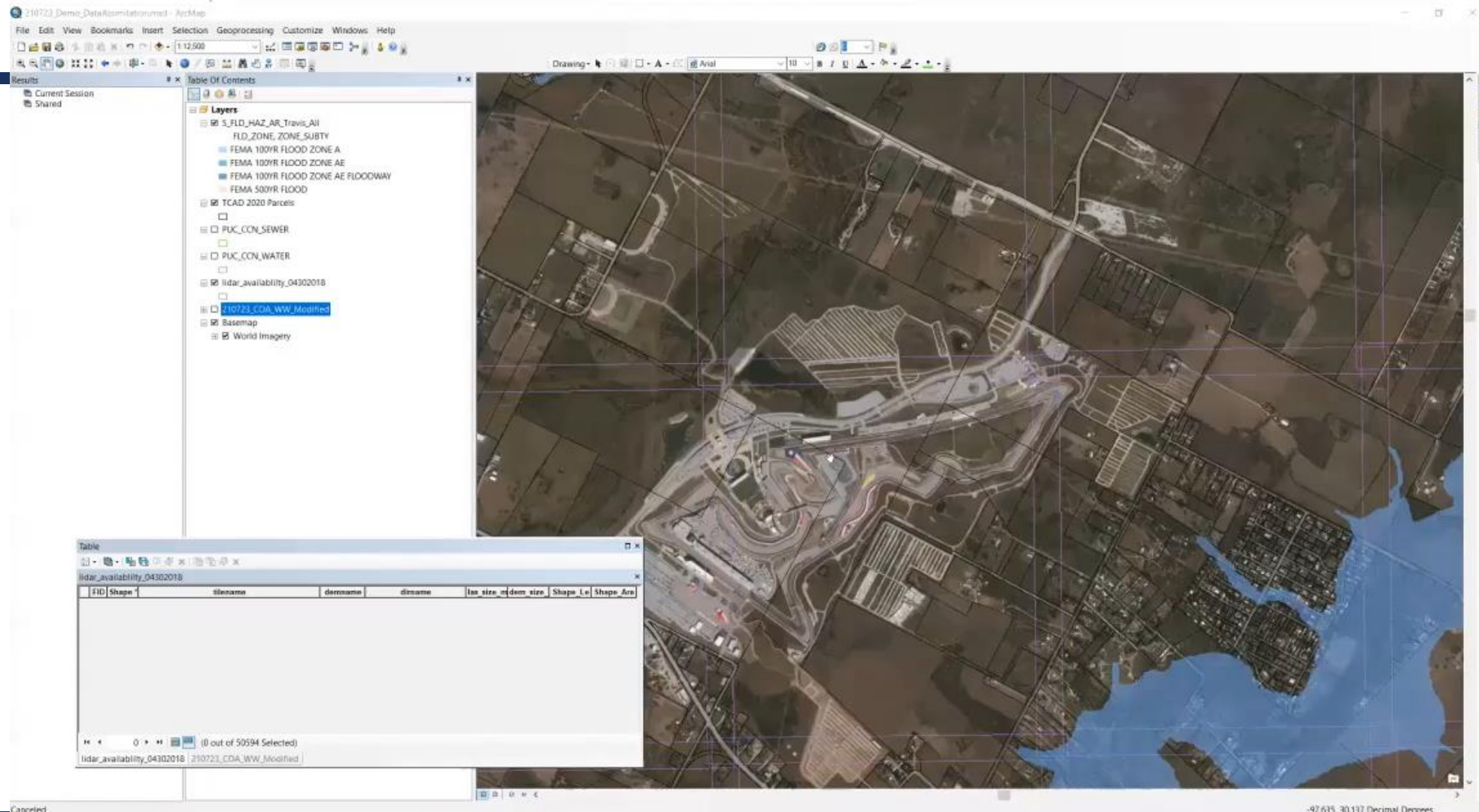
MAPEXPORT MEANINGFUL .SHP



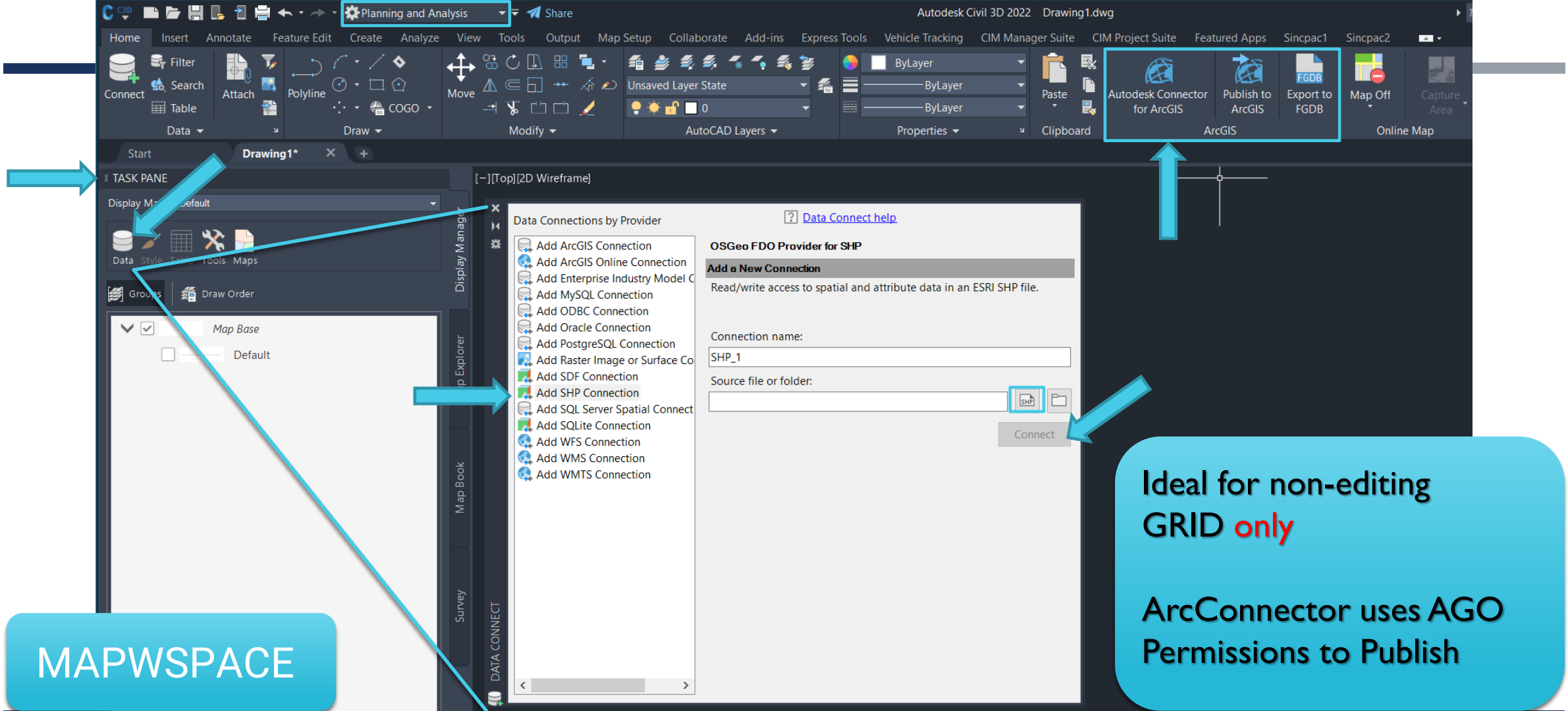
MAPIMPORT INTO CIVIL3D & EXPORT

CREATING A SURFACE FROM GIS CONTOURS

- MAPIMPORT & SCALE (MAPTRIM)
- ATTACH & EXECUTE QUERY
- CREATE SURFACE, SWAP EDGES, & CROP



CREATE A SCALED SURFACE

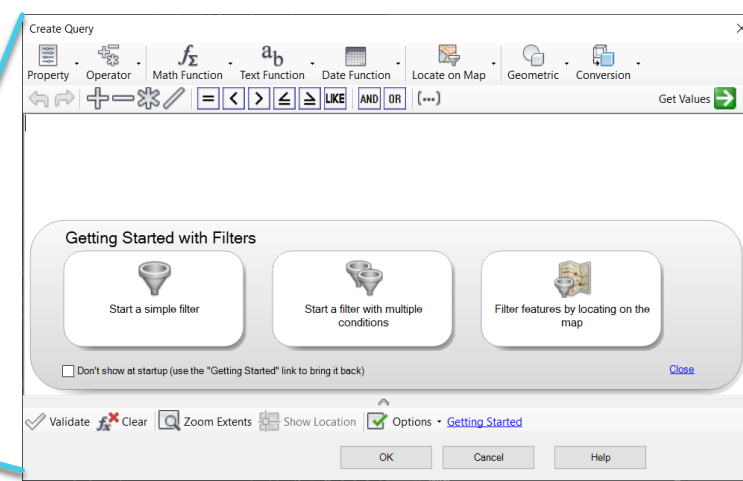
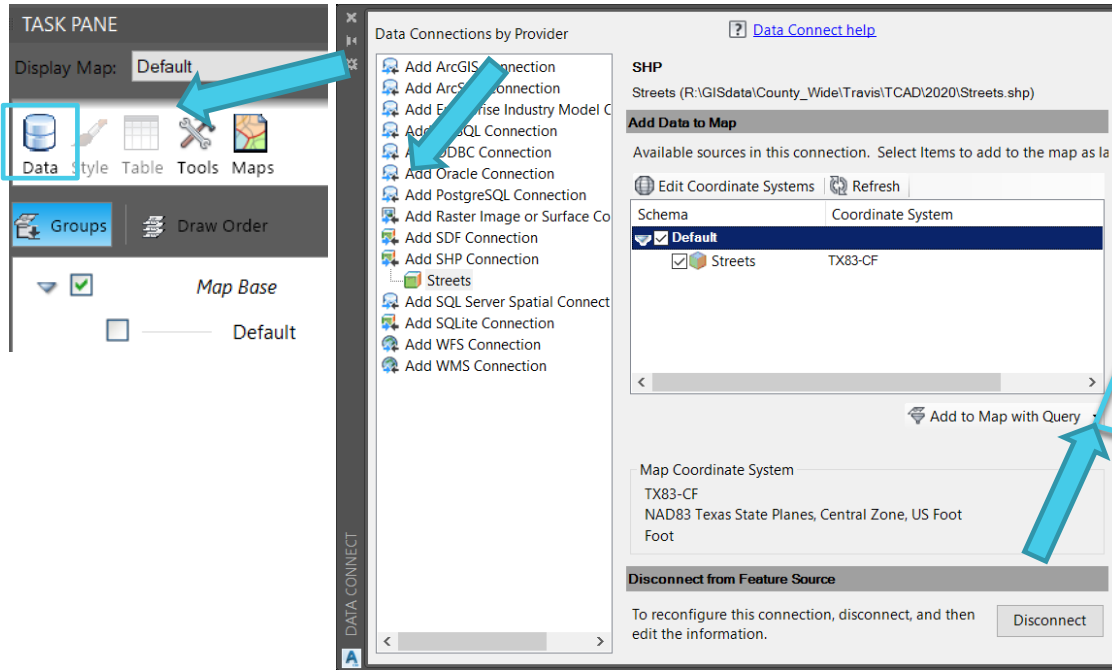


MAPWSPACE

Ideal for non-editing
GRID **only**

ArcConnector uses AGO
Permissions to Publish

PLANNING & ANALYSIS



Many methods to Query (SQL)

ADEDEFDATA

Creates CAD attribute data fields that can be filled by CAD user

MAPANTEXT

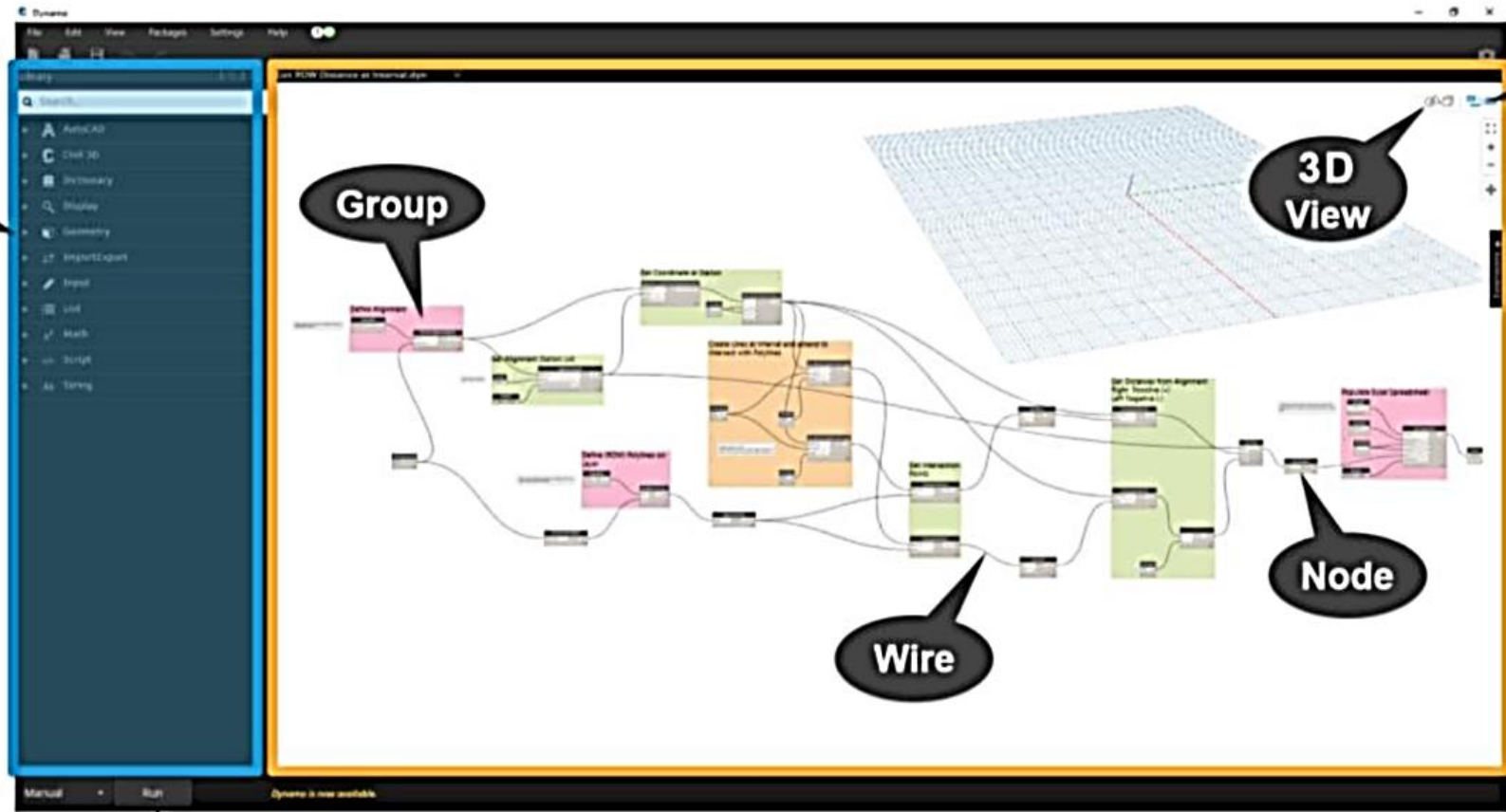
Creates CAD BLOCKS with Annotation based on attribute data

QUERIES & ATTRIBUTES

The image shows the Autodesk Connector for ArcGIS interface. At the top, there are tabs for 'AutoCAD Layers', 'Properties', 'Clipboard', 'ArcGIS', and 'Online Map'. The main window is titled 'Autodesk Connector for ArcGIS' and has a search bar with 'austin' entered. Below the search bar, there are several search results, including '100 and 500 Year Floodplains in Austin, Texas'. A map of Austin, Texas, is displayed on the right, showing the floodplains overlaid on the city's streets and water bodies. The map has a search bar and navigation controls. The 'Layers' panel on the left of the map shows two layers: 'Dissolve_100_Grid' and 'dissolve_Grid_500', both of which are checked. A blue arrow points to the search bar, another blue arrow points to the '100 and 500 Year Floodplains in Austin, Texas' search result, and a third blue arrow points to the map's search bar.

CONNECTOR & ARCGIS ONLINE

Library of libraries



Graph View

3D View

Group

Node

Wire

Execution

DYNAMO IN CIVIL3D

THANK YOU TNRIS & TX GIS FORUM

courtney.f.roe@gmail.com

ANY QUESTIONS?

