

City of Killeen
Fire Department Map Book Project



Start to Finish

The Presentation

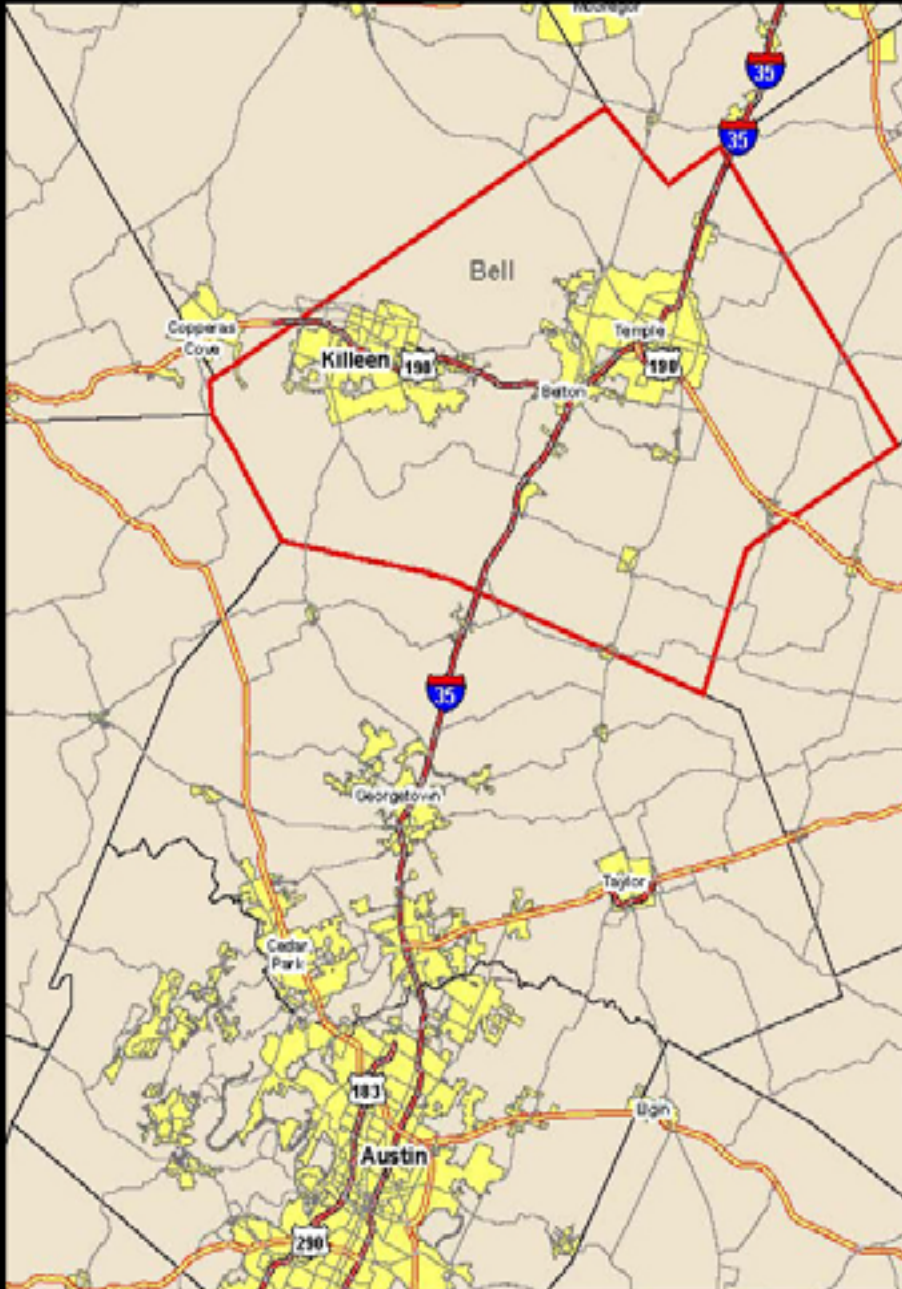
What We Hope to Achieve

- Share KFD Map Book History and the importance of an informative, effective, and user friendly emergency location support source.
- Communicate How and Why we Created the New Map Books.
- Lessons Learned

Where Is Killeen?

- Killeen is in Bell County, Texas
- The region is commonly referred to as “The Heart of Texas”



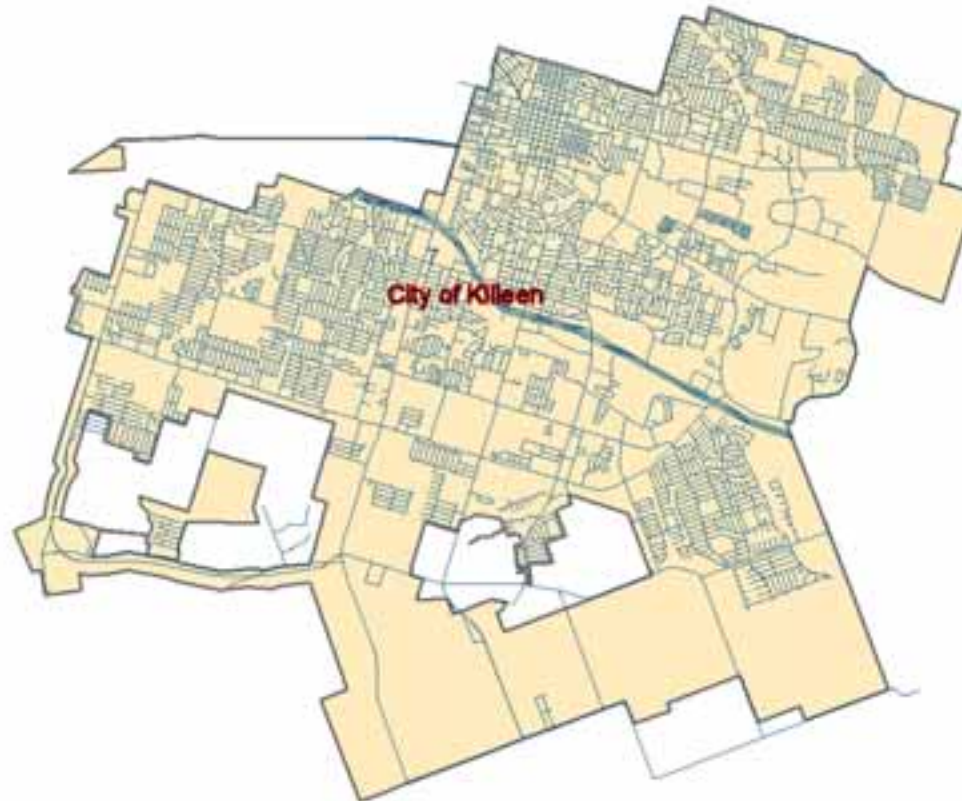


Killeen & Bell County

Killeen is located on the West side of Bell County, approximately 15 miles west of the IH 35 corridor.

What Does Killeen look like?

- Current Population is approximately 113,000
- Area inside Killeen City Limits is 45.35 sq. miles.



Killeen Fire Department Station Locations and Response Areas



- Killeen currently has 7 fire stations, and two new stations on the way
- Response areas includes all of the City Limits, parts of Fort Hood, the Killeen ETJ, and some additional county areas outside the ETJ

Map Book History



Transitioning into technology

Maps for Fire Dept Before 1965



- FD used folded Maps bought from local retailers
- The Killeen population was approximately 31,000 and a city limits area of 21 sq. miles
- Maps contained no FD data
- FD needed something with up to-date street information with additional data to include response areas and hydrant locations

New Map Books in 1965

- Book in every vehicle
- Hard Ring Binder
- Replaceable pages
- Photocopies of Hand Drawn Maps
- All Manually Maintained

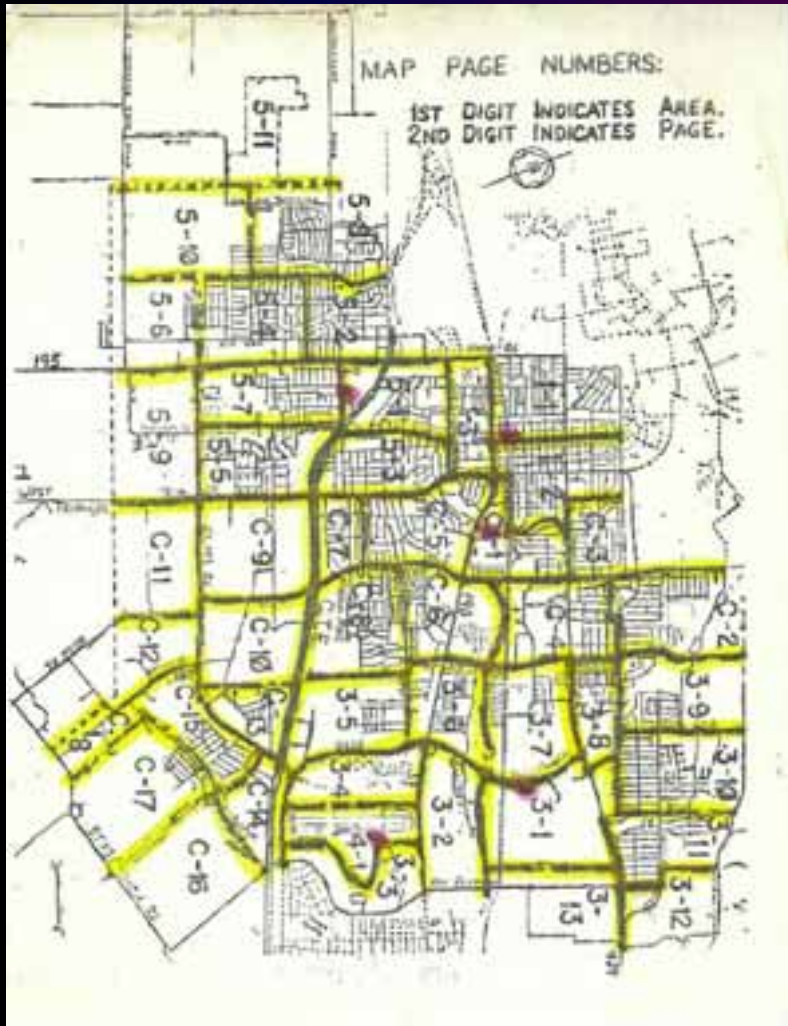


1965-2006



- No substantial changes in design
- Every book is different and individually maintained
- No technology utilized
- All books out of date

Map Book Page From 2001



- Overall Map with response areas
- Book list 7 Stations but map shows only 5
- Map Books got larger but the basic concept and the maintenance issues remained

What's Wrong With This Picture? (Two Index Sheets from Same Map Book)

Bacon Ranch Rd:	
408-901	6-2
1000-2499	6-1
2500-3301	6-6
3400-on	6-7
Beebee Ln	7-4
Barbara Yn	5-4
Baroness Dr	6-3
Barrington Trail	7-7
Barry Dr	3-9
Basalt Dr	7-3
Bass Cr	4-2
Bassett Dr	3-5
Bastion Cr	6-5
Beaman Dr	8-7
Beach Hall Dr	7-4
Beagle Dr	3-5
Beak Dr	3-2
Becker Rd	C-8
Becky Cr	3-9
Beechwood Ln (Elm Grove MHP)	3-4
Bell Tower Dr	7-8
Bellaire Dr	5-3
Belmont Dr	5-4
Belt Sp	C-2
Beechnack Tr	5-9
Bending Tr	6-13
Bentree Dr	3-11
Beretta Dr	3-8
Bersude Dr:	
1400-1599	5-2 (M)
1600-1799	7-2 (M)
1800-2000	5-4 (M)
2100-2599	7-3 (M)
Beta Cr	3-10
Big Bend Dr	3-4
Bigsleaf Dr	7-3
Birchwood Pl (Elm Grove MHP)	3-4
Birgess Dr	3-11
Bishop Dr	1-3
Black Oak Ln (Elm Grove MHP)	3-4
Blackburn Dr	3-3

Updated 12/13/01

	FINN	FINN
Boys Cr	3-10	(11)
Boys Tr	3-10	(12)
Boys Dr	C-3	(13)
Boys Ave	3-8	(14)
Boys Bldg Ave	3-8	(15)
Boys Church Ave	3-8	(16)
Boys Lake Ave	3-8	(17)
Boys Lake Cr	3-8	(18)
Boys Lake Dr	3-8	(19)
Boys Rd:		
2615-3199	2-2 (M)	(20)
3200-3500	C-4 (M)	(21)
3601-3901	5-9 (M)	(22)
4000-4210	3-4 (M)	(23)
4301-4610	3-10 (M)	(24)
4711-4810	3-1 (M)	(25)
Boys Travis Ave	3-8	(26)
Boysrest Dr	7-1	(27)
Boysridge Dr	7-1	(28)
Boysshore Dr	3-3	(29)
Boysview Cr	3-3	(30)
Boyslight Cr	C-3	(31)
Boys Loop (1/2 mile east of Tiffany Circle)	7-9	(32)
Boysford Dr	3-3	(33)
Boysen Dr	6-8	(34)
Boyspark Dr	7-3	(35)
Boyspark Dr	7-3	(36)
Boys Ln (Boysrest Mile MHP)	6-3	(37)
Boys Dr (Boysrest MHP)	6-3	(38)
Boys Ln	3-3	(39)
Boys Lane	5-4	(40)
1800-1999	7-3	(41)
1900-2410	8-4	(42)
Boysdale St	3-11	(43)
Boys Ridge Dr	5-2	(44)
Boys Ann Cr		
Boys Dr:		
1200-1750	5-4 (M)	(45)
1800-1950	5-2 (M)	(46)
Boysville Dr	6-10	(47)
Boysing Oak Dr	6-11	(48)
Boysington Dr	7-3	(49)
Boysington Dr	5-4	(50)
1800-1900 MHP 4200-4810	7-3	(51)
1900-1940	C-5	(52)
Boys Dr	5-4	(53)
Boysdale Circle	5-2	(54)
Boys Dr	6-4	(55)
Boys Ave	3-8	(56)
Boys Circle	5-1	(57)
Boys Ln	C-4	(58)
Boys St	8-8	(59)
Boys Circle	3-8	(60)
Boys Mill Sp		

Updated 12/1/00

What's wrong with the old Map Books?

- About 55 map books city wide
 - all different, out-of-date, and inadequate
- Maintenance Nightmare
 - all index sheets manually typed and maps were hand drawn.
- Used 4 people and a ton of hours to update
- No established overall maintenance procedures
 - Every station or driver doing their “own thing”
- No GIS technology utilized

Emergency Vehicle Dispatch



Then and Now

Up to 1999 Killeen used a Radio Dispatch System

- Killeen managed its own dispatch system
- Calls came into Central Station
- Dispatcher contacts proper Fire Station with dispatch call using a radio system



1999 To Present Killeen has been part of a County Wide Dispatch System



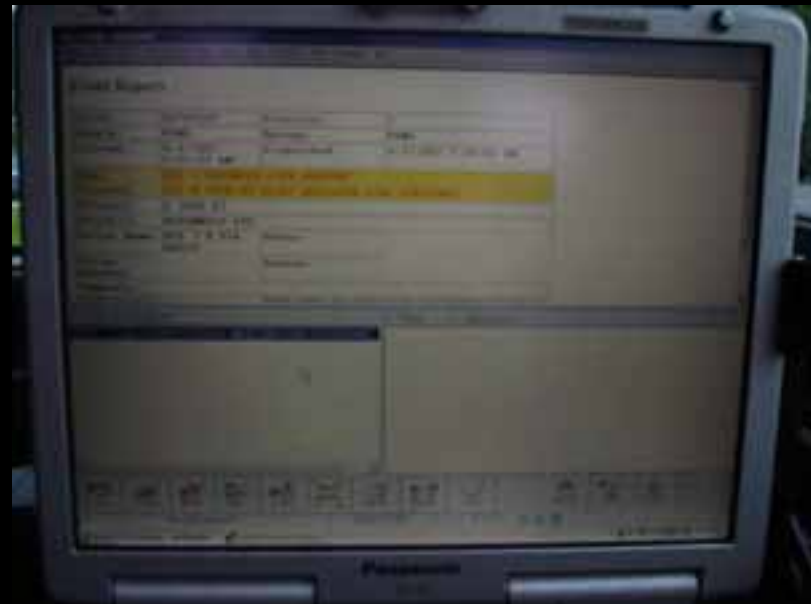
- The Bell County Communications Center opened its door in 1999, the first combined dispatch center in the United States to dispatch all county agencies from one building. The center serves the emergency needs of more than 260,000 people in Bell County.

Killeen Upgrades Vehicles With Mobile Data Terminals (MDTs)



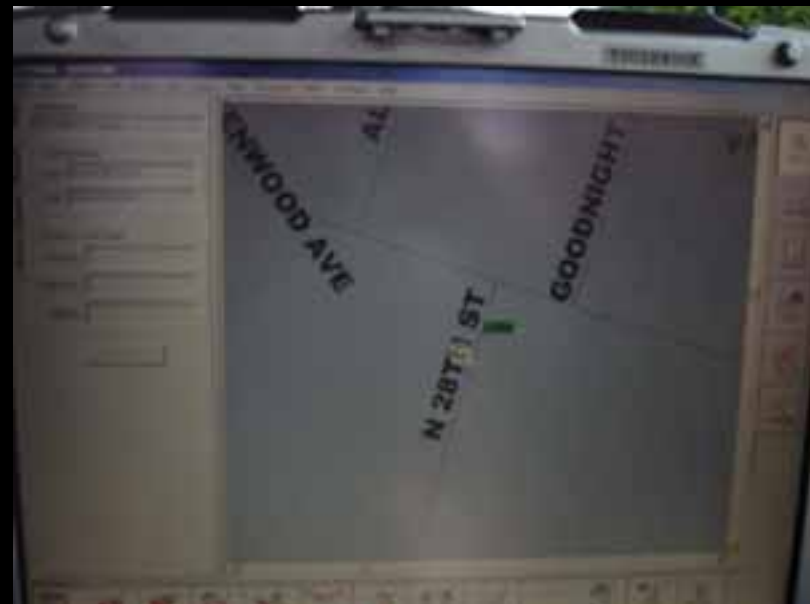
MDT Issues

- Not always reliable
- Street Data out-of-date
- Radio data transmission doesn't arrive on time
35% of the time
- Street Centerline data updated locally, on every MDT, from BCCC download or cd



MDT Issues Continued

- BCCC Street Address Ranges not accurate = address location on map not interpolated to proper location.



Old Faithful

- When the MDTs failed to provide the information needed responders relied on Old Faithful (the gray Map Book)



Why Did We Need New Map Books?

- From the maintenance perspective:
 - Automated Maintenance Procedures
to provide consistent, rich, and up-to-date information
- From the user perspective:
 - Because the MDT's are never going to be a single solution for event location
 - FD 'demanded' a tangible product for back-up in vehicles

More of Why Did We Need New Map Books?

- The current map books were just not good enough, out-of-date, and inadequate
- Map Book Production and Updates needed to be managed by a single department
- FD asks IT/GIS to produce an improved Map Book product utilizing GIS technology

So..... What Did We Do?

- First, we understood the need but needed staff to support the project
- We had a Project Manager and Database Administrator (vacant) but needed a GIS technician
- Eventually, we acquired a position through the budget process
- Hired Shannon
- Tasked Shannon to manage the Map Book project

The Project



Defining the Mission



- GIS Staff (Colen & Shannon) Meet with FD Chiefs
- Identify Items Requiring Change
- FD Develops ‘Wish List’
- GIS Staff Plans Project Outline

Now, how do we develop the end result?

Planning the Mission



Key Questions

- What kind of software?
- Training Needs?
- Time Involved?
- Ease of Update Process?
- Staff Requirements?

A Key Factor -- Killeen's Evolving GIS



Killeen Enterprise GIS

- 9.1 ArcSDE Versioned Work Environment
- Final Phase of Initial 5 Year Master Plan
- Data Conversion Process 90% Complete

Problem

- Minimal GIS Staff

Still Evolving....few 'go to' users in other departments

*Most users proficient with Autodesk products but have little formal ArcGIS training

Options

1. Use City's AutoCAD Resources

- Map Books being designed in CAD for other departments
- Rich technical support on staff
- Cumbersome conversion process (convert all new SDE data back to CAD)
- New GIS Staff has no training in AutoCAD

2. Purchase 3rd Party Software

- Many choices on the market
- But, additional maintenance required
- Basically, more software to keep up with

More Options

3. DS Map Book

- Free download from ESRI/EDN
- Developer sample, not supported by ESRI
- Great application, tons of support on ESRI user forums
- Testing environment proved tricky – multiple crashes/no explanation

4. MPS Atlas

- ESRI application under the PLTS product umbrella
- Can purchase stand alone – same cost as other ESRI extensions
- Full technical support and release updates provided by ESRI, under maintenance subscription

The Product



MPS Atlas

- Upgraded as core products released
- Batch processed map series
- Streamlined/upgraded maintenance workflow process
- Geodatabase driven (*shapefiles not supported)
- Maintenance
 - Dan or User Forums

Getting Started

First, You Need a Polygon

- MPS Atlas requires an AOI Feature Class to develop map series

AOI = Area of Interest
(any polygon feature class)

Answer for Killeen – a New Grid

Choosing the Grid



- Current city grid or response zones = NO
- Several grid cell samples developed for FD review
 - FD involved in EVERY step of initial product development
 - Gave ‘ownership’ of the project to FD staff

FD chose scale (final scale = 1:2,500)

Constructing the Grid

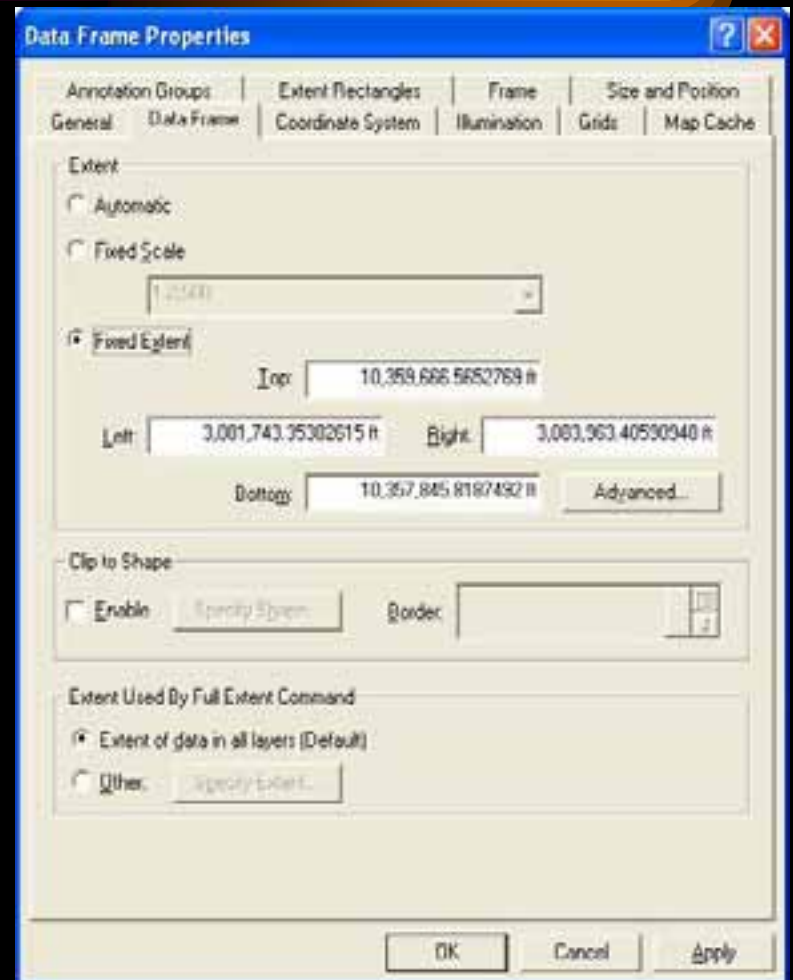
- Many ways to build grid (wizards, scripts, tools, software)
- Editing still required
- Personal preference on approach – as always, there are usually several ways to do something in GIS

Just use ArcMap!

Creating a Custom Grid in Arc Map

(AOI Data Source)

- Create empty polygon feature class and add to Arc Map – start editing!
- Change scale to desired output size (our case: 1:2,500)
- Coordinates from fixed extent



***Bottom Left**

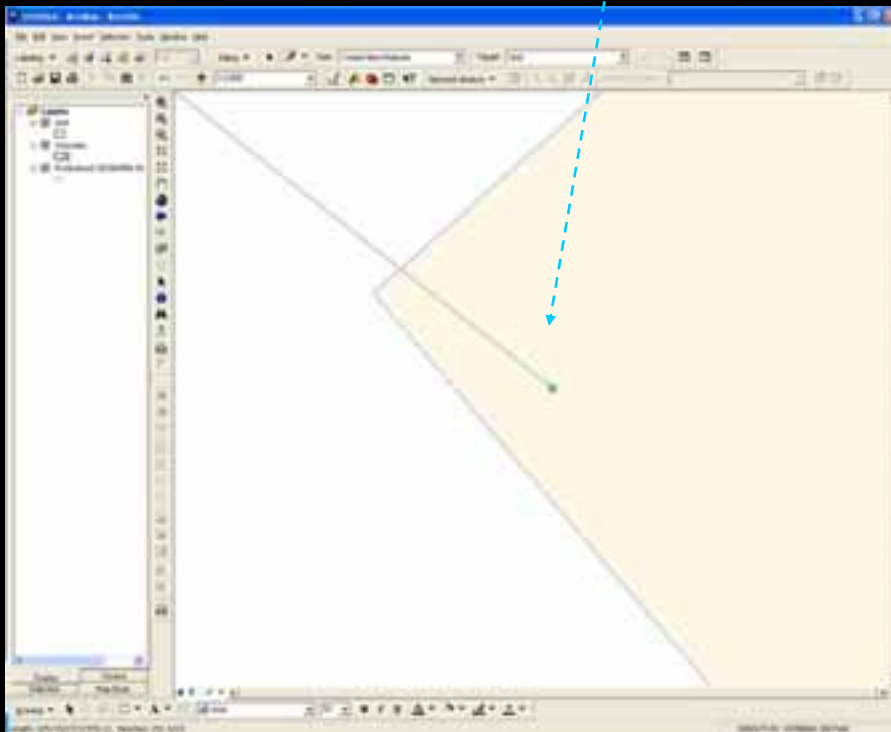
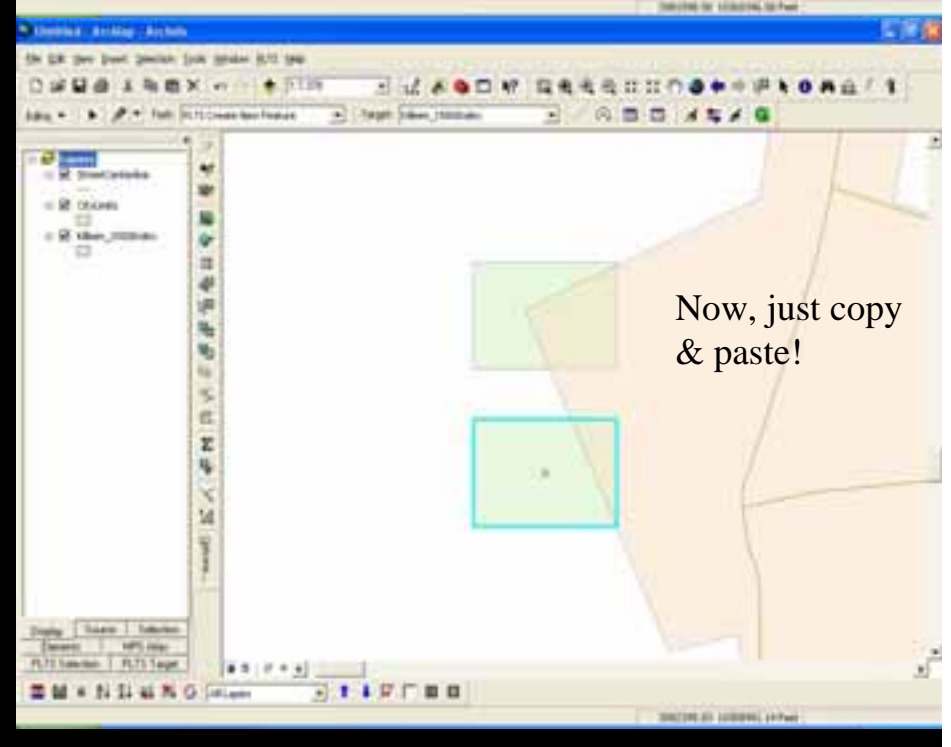
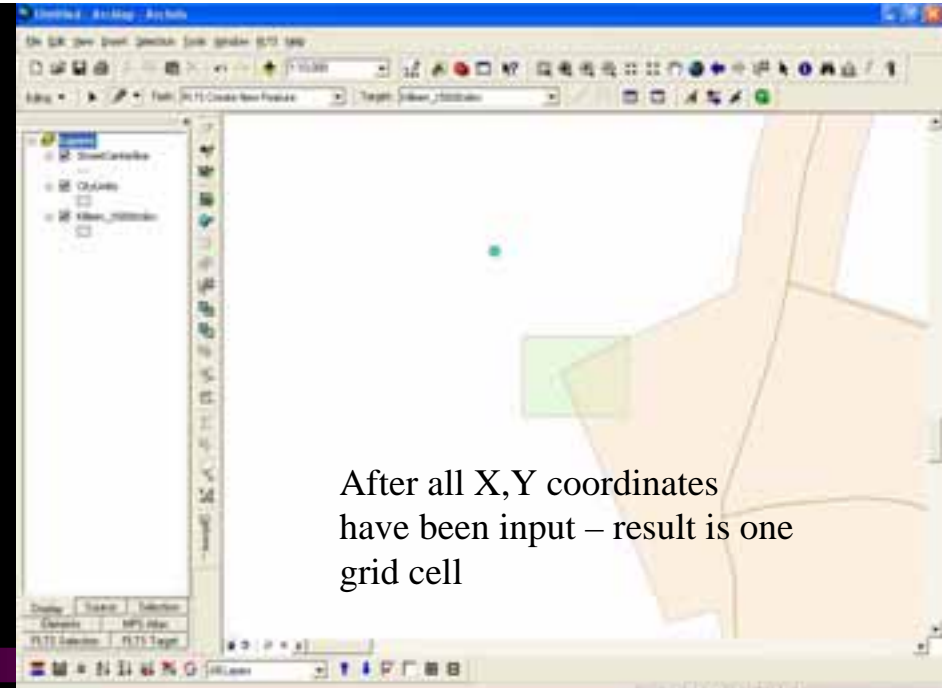
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Y= 3,081,743,35382

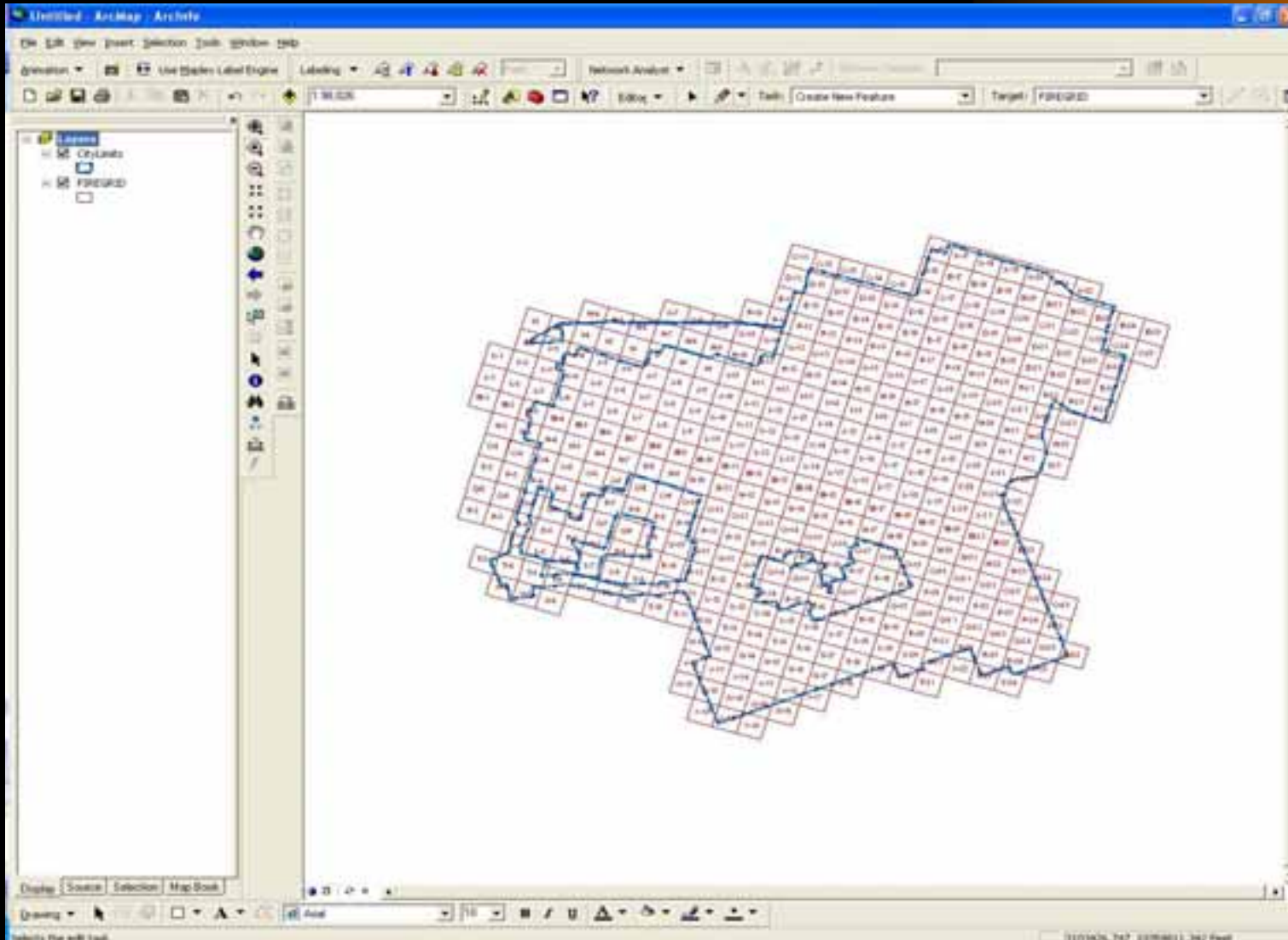
***Top Left**

***Etc...**

Absolute X, Y	
103570450107492	300174335302615

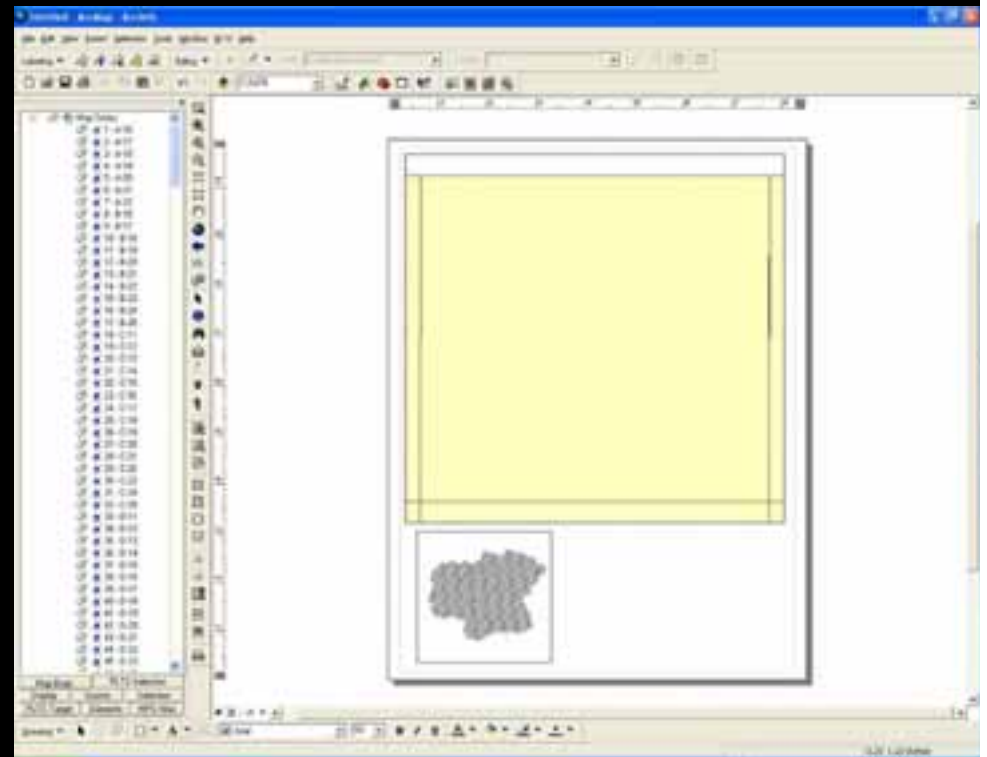


Final Grid



The Map Series

- Once the AOI feature class is created, the map series construction can begin
- MPS Atlas allows dynamic text, graphics (no need to perform repetitive tasks)
- Now, just create the maps



The Wish List



- Most Requested
 - The most requested item on the FD's list was to have color-coded hydrants
 - GPM (Gallons Per Minute) values are extremely important during calls

Map Sheet Scale Comparison

Then.....1" = 630'

Now..... 1" = 280'



The Map Sheet



Key Changes

- Color Coded Response Areas
- Symbolized Hydrant Flow Data
- Hydrology and Flood Zone Data
- More Detail
- Adjacent Map Sheet Locator

Indexing

- No index creation function in MPS Atlas 9.1

- But, can create with geoprocessing tools

Dissolve

- Dissolve street centerline segments

Merge

- Merge streets, grid, fire response zones

Edit table data as needed

INDEX			
STREETNAME	FIRE	EMS	GRID/PAGE #
1ST ST	1	1	1-11
1ST ST	1	1	1-12
1ST ST	1	CENTRAL	1-13
1ST ST	1	CENTRAL	1-14
1ST ST	1	CENTRAL	1-15
1ST ST	1	CENTRAL	1-16
1ST ST	1	CENTRAL	1-17
1ST ST	1	CENTRAL	1-18
1ST ST	1	CENTRAL	1-19
1ST ST	1	CENTRAL	1-20
1ST ST	1	CENTRAL	1-21
1ST ST	1	CENTRAL	1-22
1ST ST	1	CENTRAL	1-23
1ST ST	1	CENTRAL	1-24
1ST ST	1	CENTRAL	1-25
1ST ST	1	CENTRAL	1-26
1ST ST	1	CENTRAL	1-27
1ST ST	1	CENTRAL	1-28
1ST ST	1	CENTRAL	1-29
1ST ST	1	CENTRAL	1-30
1ST ST	1	CENTRAL	1-31
1ST ST	1	CENTRAL	1-32
1ST ST	1	CENTRAL	1-33
1ST ST	1	CENTRAL	1-34
1ST ST	1	CENTRAL	1-35
1ST ST	1	CENTRAL	1-36
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1ST ST	1	CENTRAL	1-40
1ST ST	1	CENTRAL	1-41
1ST ST	1	CENTRAL	1-42
1ST ST	1	CENTRAL	1-43
1ST ST	1	CENTRAL	1-44
1ST ST	1	CENTRAL	1-45
1ST ST	1	CENTRAL	1-46
1ST ST	1	CENTRAL	1-47
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1ST ST	1	CENTRAL	1-50
1ST ST	1	CENTRAL	1-51
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1ST ST	1	CENTRAL	1-53
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1ST ST	1	CENTRAL	1-56
1ST ST	1	CENTRAL	1-57
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1ST ST	1	CENTRAL	1-94
1ST ST	1	CENTRAL	1-95
1ST ST	1	CENTRAL	1-96
1ST ST	1	CENTRAL	1-97
1ST ST	1	CENTRAL	1-98
1ST ST	1	CENTRAL	1-99
1ST ST	1	CENTRAL	1-100

Lessons Learned



- Mistakes
 - Not soliciting the end user (EMTs and other emergency vehicle staff) for map book design ideas
 - Utilized City print facilities for production of map books

Goals



- Acquire additional feed back from end users
- Develop maintenance procedures
- Establish reproduction schedule
- Re-design index functionality
- Improve cartographic design
- Evaluate grid-options



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