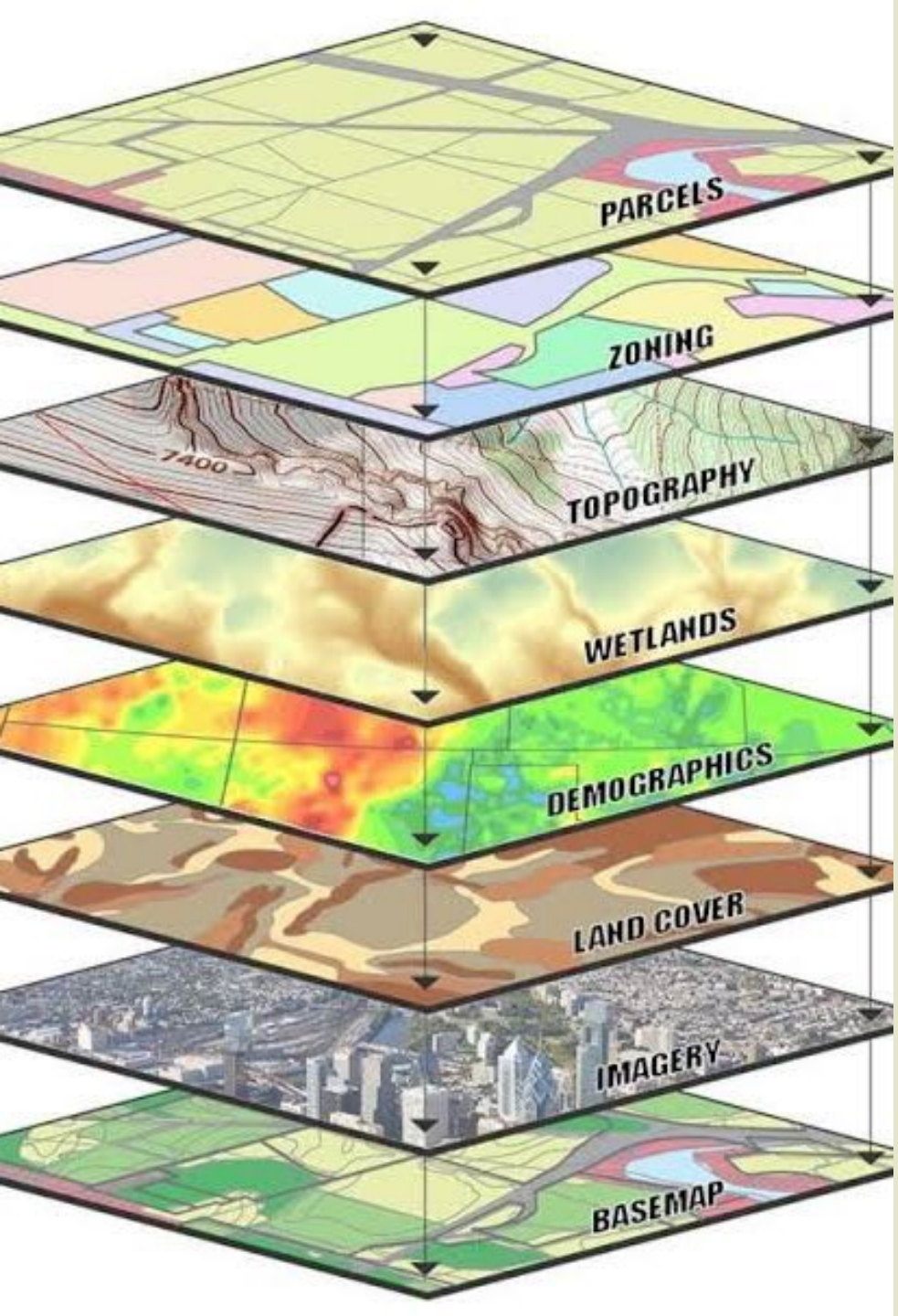
A GIS approach to Dry Weather Field Screening

CITY OF ARLINGTON

ENVIRONMENTAL MANAGEMENT

SARAH MENDOZA

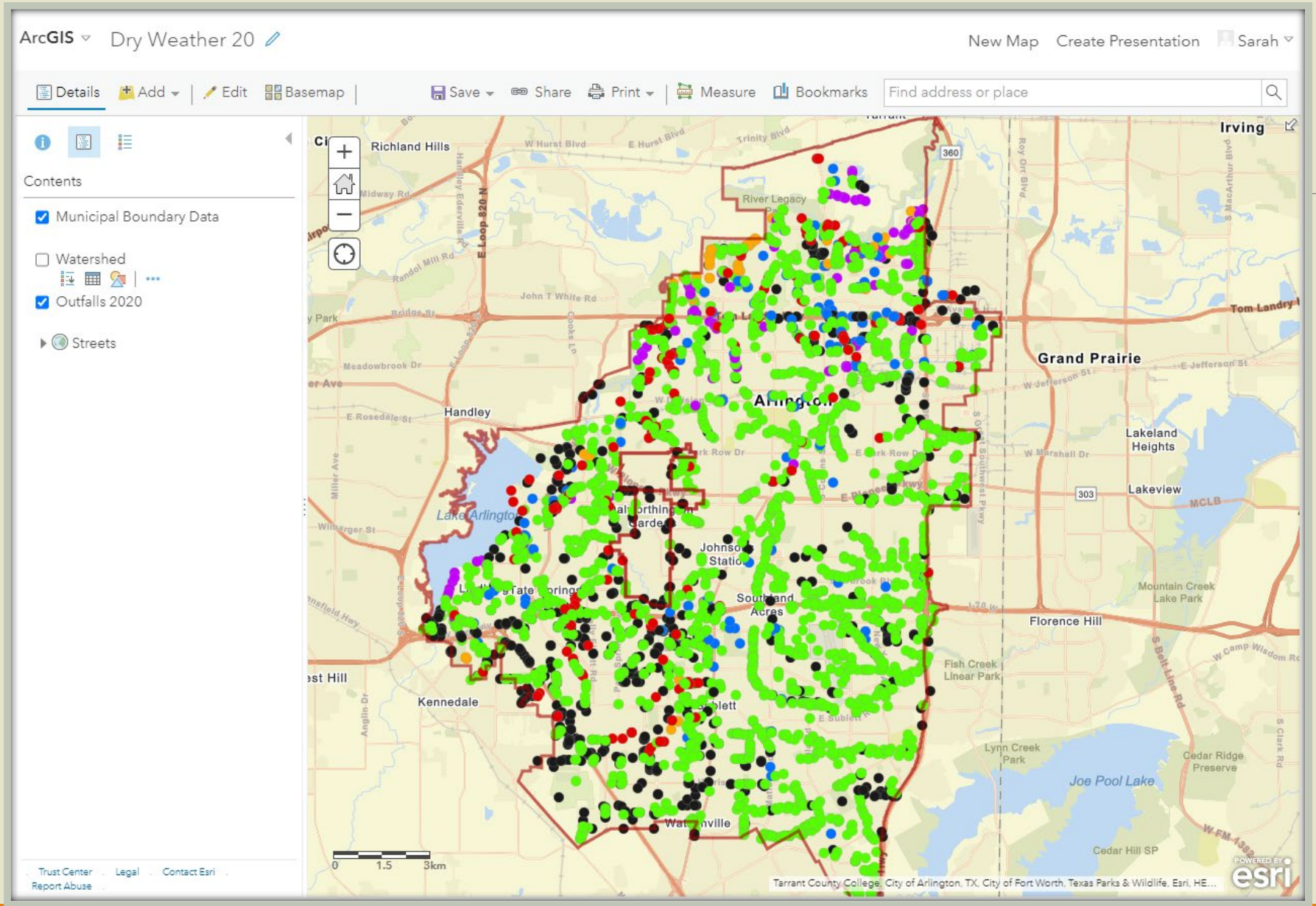


Geographic Information Systems (GIS)

ARCGIS (ESRI), AUTOCAD, CAD, QGIS, GRASS GIS, GEOMEDIA, AND MANY MORE.

ANALYZES, STORES, MANIPULATES AND VISUALIZES INFORMATION ON A MAP.

ISN'T JUST ABOUT MAKING MAPS. THE END USER DETERMINES THE MAP THAT IS CREATED.



ArcGIS Online

Schedule Screenings

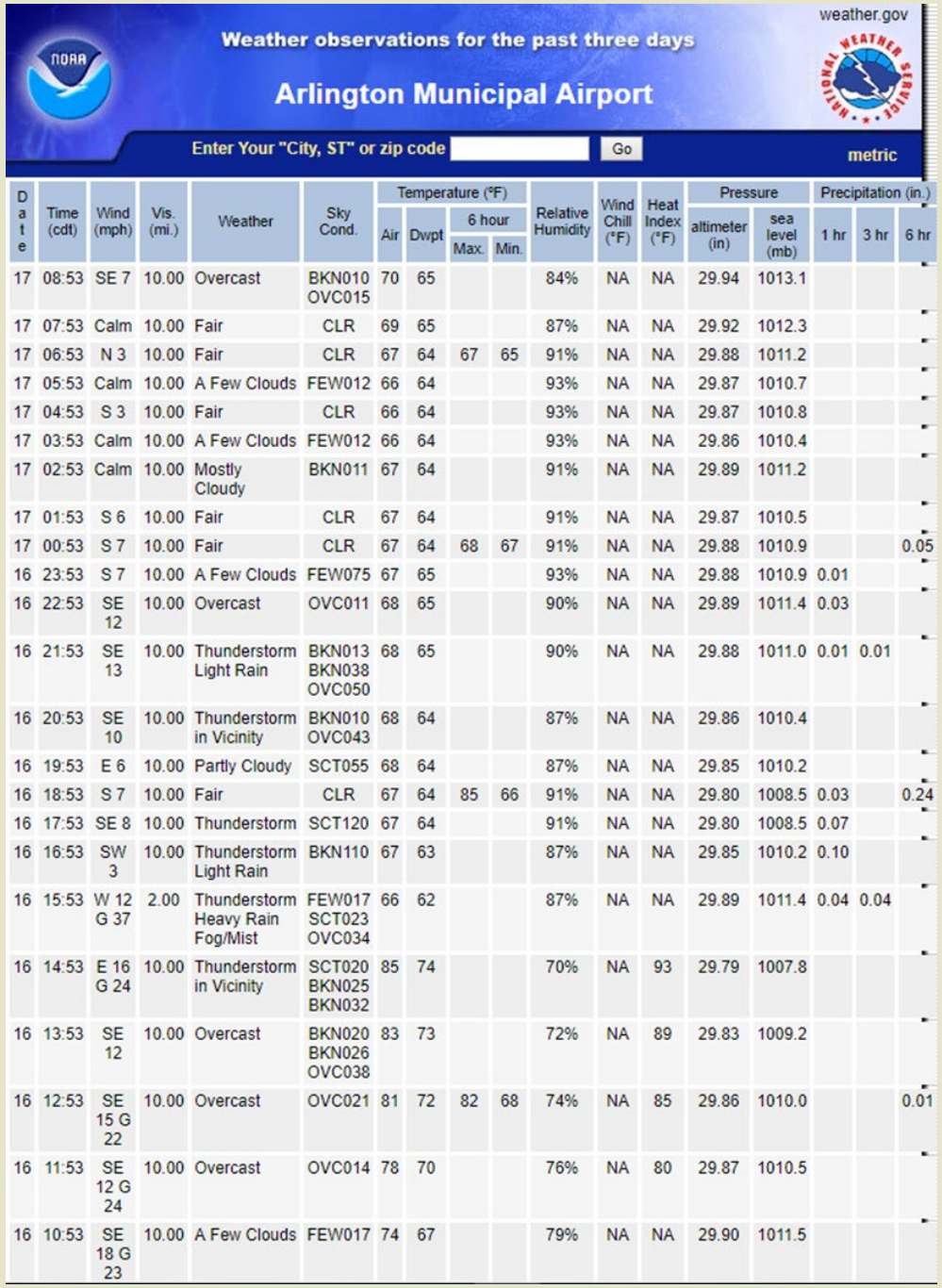
Do not sample within 72 hours of a rain event (>0.1”)

Visit the site twice in a 24hr period

- Keep at least 4 hours between visits

Vary time and day of the week when sampling

- Follow-up sampling should be at roughly the same time of day



Weather observations for the past three days

Arlington Municipal Airport

weather.gov

Enter Your "City, ST" or zip code Go metric

Date	Time (cdt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour Max.	6 hour Min.				altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
17	08:53	SE 7	10.00	Overcast	BKN010 OVC015	70	65			84%	NA	NA	29.94	1013.1			
17	07:53	Calm	10.00	Fair	CLR	69	65			87%	NA	NA	29.92	1012.3			
17	06:53	N 3	10.00	Fair	CLR	67	64	67	65	91%	NA	NA	29.88	1011.2			
17	05:53	Calm	10.00	A Few Clouds	FEW012	66	64			93%	NA	NA	29.87	1010.7			
17	04:53	S 3	10.00	Fair	CLR	66	64			93%	NA	NA	29.87	1010.8			
17	03:53	Calm	10.00	A Few Clouds	FEW012	66	64			93%	NA	NA	29.86	1010.4			
17	02:53	Calm	10.00	Mostly Cloudy	BKN011	67	64			91%	NA	NA	29.89	1011.2			
17	01:53	S 6	10.00	Fair	CLR	67	64			91%	NA	NA	29.87	1010.5			
17	00:53	S 7	10.00	Fair	CLR	67	64	68	67	91%	NA	NA	29.88	1010.9			0.05
16	23:53	S 7	10.00	A Few Clouds	FEW075	67	65			93%	NA	NA	29.88	1010.9	0.01		
16	22:53	SE 12	10.00	Overcast	OVC011	68	65			90%	NA	NA	29.89	1011.4	0.03		
16	21:53	SE 13	10.00	Thunderstorm Light Rain	BKN013 BKN038 OVC050	68	65			90%	NA	NA	29.88	1011.0	0.01	0.01	
16	20:53	SE 10	10.00	Thunderstorm in Vicinity	BKN010 OVC043	68	64			87%	NA	NA	29.86	1010.4			
16	19:53	E 6	10.00	Partly Cloudy	SCT055	68	64			87%	NA	NA	29.85	1010.2			
16	18:53	S 7	10.00	Fair	CLR	67	64	85	66	91%	NA	NA	29.80	1008.5	0.03		0.24
16	17:53	SE 8	10.00	Thunderstorm	SCT120	67	64			91%	NA	NA	29.80	1008.5	0.07		
16	16:53	SW 3	10.00	Thunderstorm Light Rain	BKN110	67	63			87%	NA	NA	29.85	1010.2	0.10		
16	15:53	W 12 G 37	2.00	Thunderstorm Heavy Rain Fog/Mist	FEW017 SCT023 OVC034	66	62			87%	NA	NA	29.89	1011.4	0.04	0.04	
16	14:53	E 16 G 24	10.00	Thunderstorm in Vicinity	SCT020 BKN025 BKN032	85	74			70%	NA	93	29.79	1007.8			
16	13:53	SE 12	10.00	Overcast	BKN020 BKN026 OVC038	83	73			72%	NA	89	29.83	1009.2			
16	12:53	SE 15 G 22	10.00	Overcast	OVC021	81	72	82	68	74%	NA	85	29.86	1010.0			0.01
16	11:53	SE 12 G 24	10.00	Overcast	OVC014	78	70			76%	NA	80	29.87	1010.5			
16	10:53	SE 18 G 23	10.00	A Few Clouds	FEW017	74	67			79%	NA	NA	29.90	1011.5			

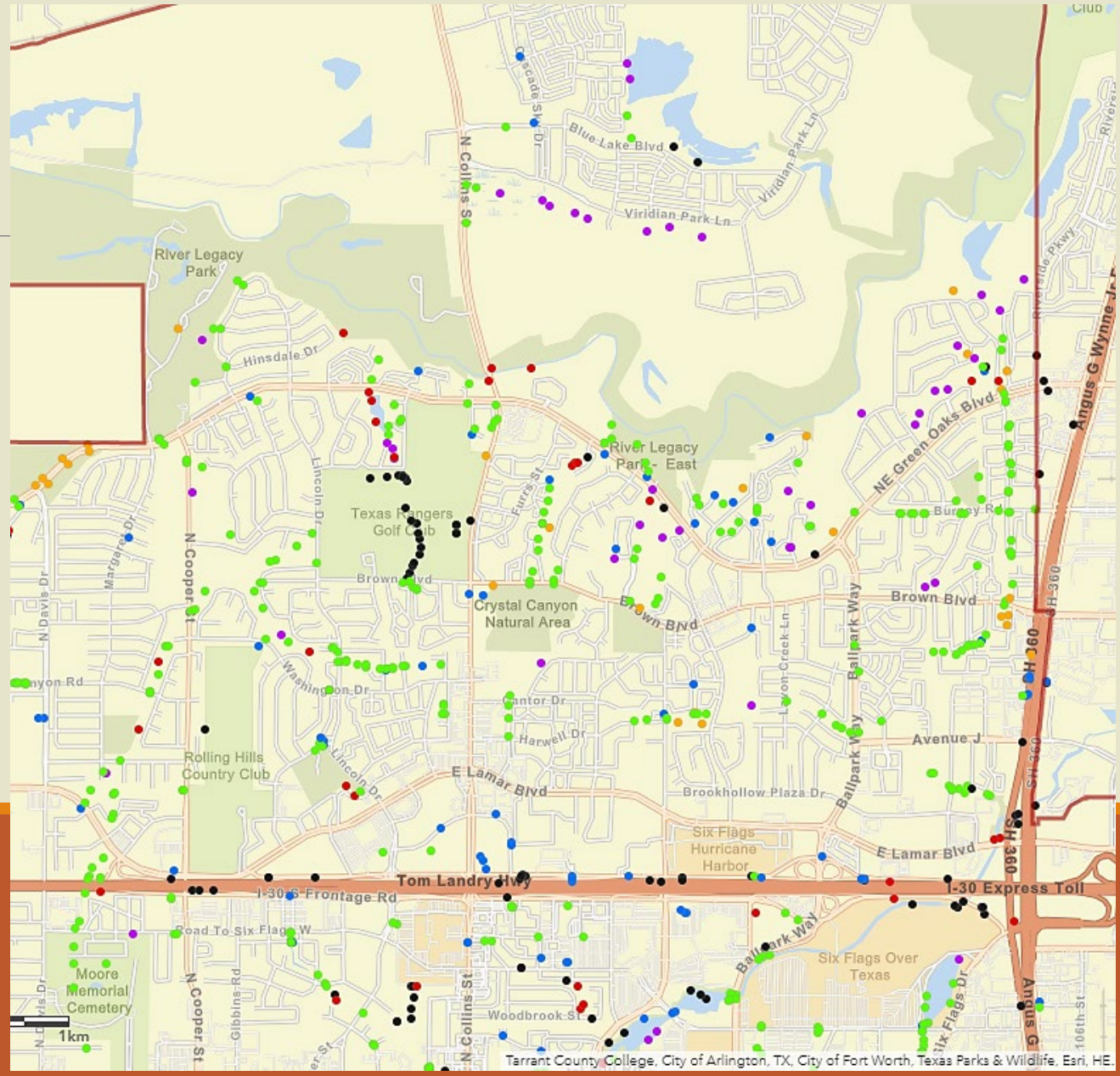
Preparing a route

Locate:

- GIS
- GPS
- Other Maps

Contact before entering private property:

- Resident
- Facility
- Electric Company
- Gas Company
- Water Treatment Plants

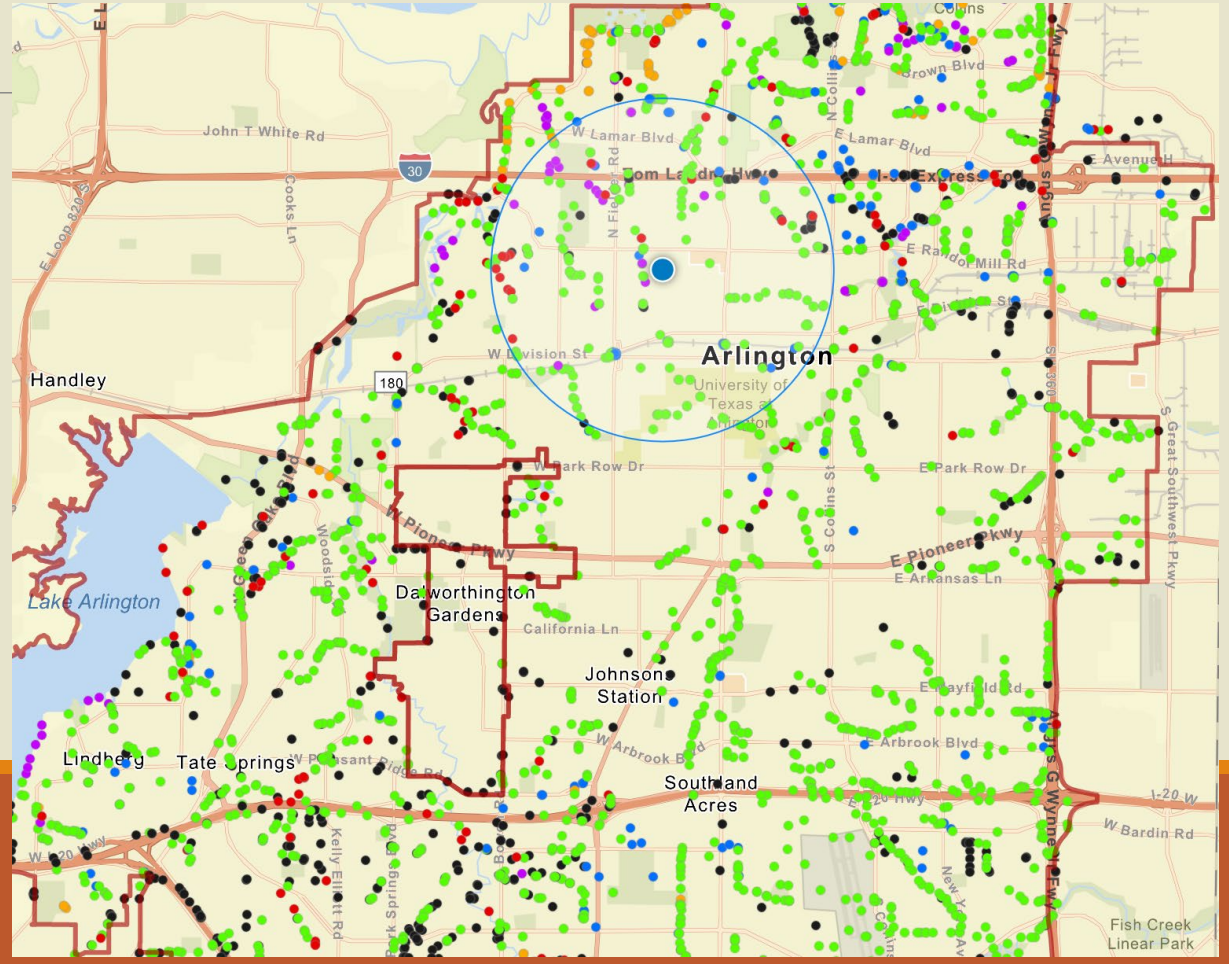


Esri Explorer

❖ Used as a GPS to access outfalls

Features:

- Basemaps
- Layers
- Markup



Other ways to access outfalls:

- Maps (i.e. your city's virtual maps)
- GPS system (Garmin, Tom Tom, etc.)

What is an outfall?

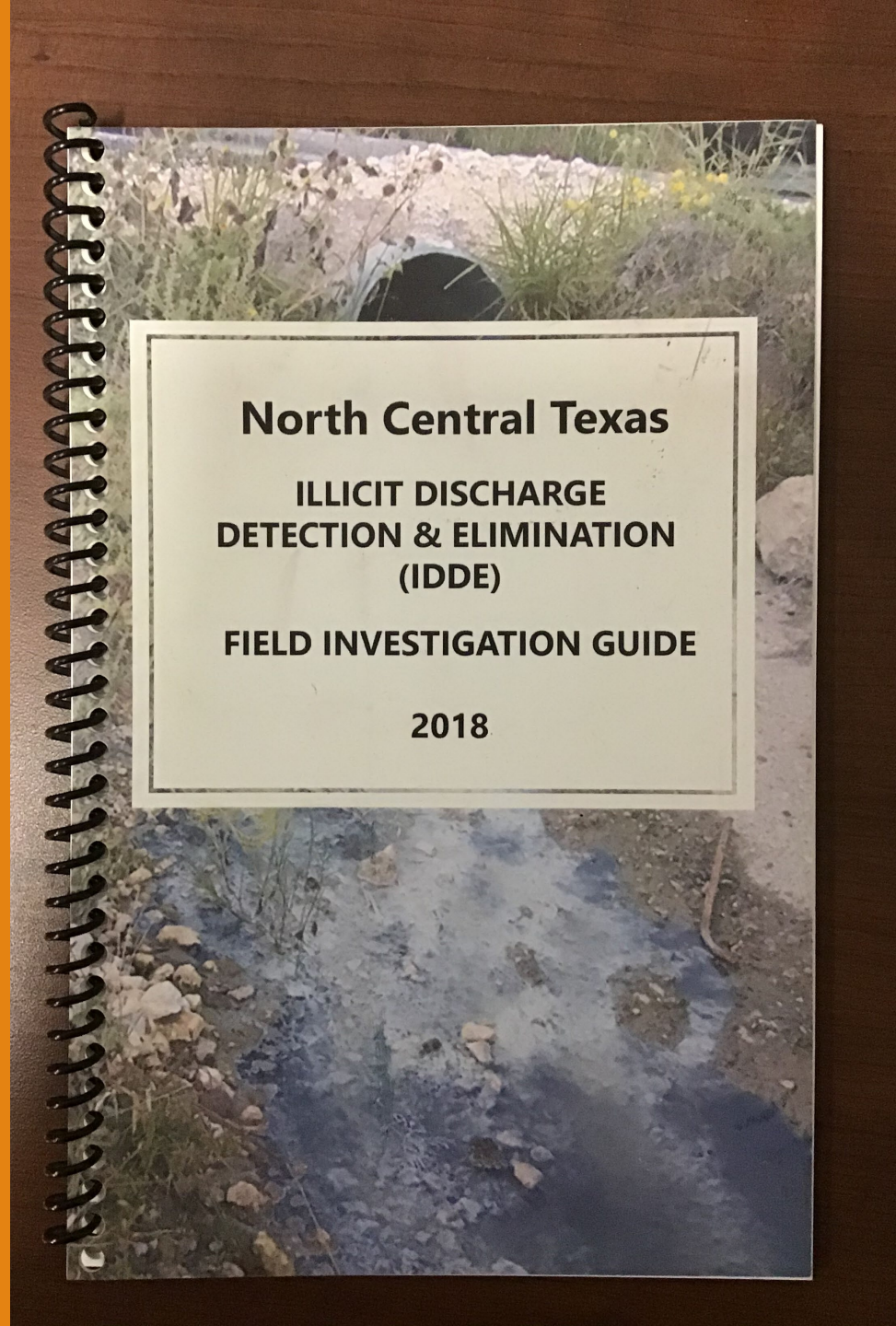
A discharge point where a “separate storm sewer system discharges to the waters of the United States or to another MS4”

Let's head out into the field!

Detecting an Illicit Discharge

Dry weather screening is a field test method for inspecting stormwater drainage areas to help locate and identify harmful and illicit discharges to a municipal stormwater system.

Inspecting a storm drainage system during dry weather is an effective way to find illicit discharges since there should not be any water flowing during dry weather.



Data Collection

- Shape

  Round, Oval, Rectangle, Box, & Swale.

- Dimensions (in.)
- Material

  Concrete, Metal, PVC, Plastic,

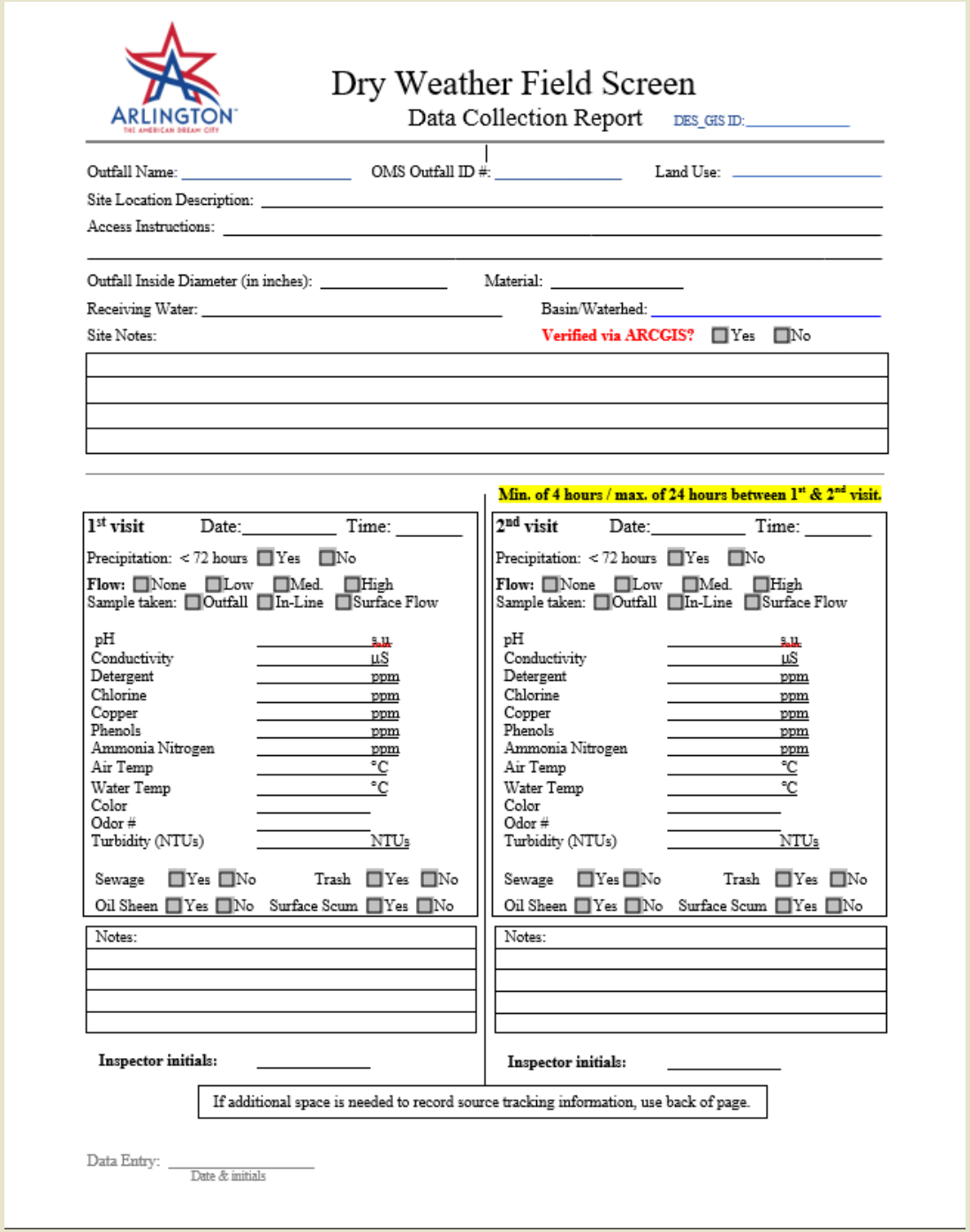
  & Earthen.

- Land Use

  Residential, Commercial, Industrial,

  Municipal, & Institutional.

- Coordinates (if an outfall is found in the field).
- Flow Severity (if applicable).



ARLINGTON
THE AMERICAN DREAM CITY

Dry Weather Field Screen
Data Collection Report

DES_GIS ID:_____

Outfall Name: _____ OMS Outfall ID #: _____ Land Use: _____

Site Location Description: _____

Access Instructions: _____

Outfall Inside Diameter (in inches): _____ Material: _____

Receiving Water: _____ Basin/Waterhed: _____

Site Notes: Verified via ARCGIS? ☐Yes ☐No

Min. of 4 hours / max. of 24 hours between 1st & 2nd visit.

1st visit Date:_____ Time: _____		2nd visit Date:_____ Time: _____	
Precipitation: < 72 hours	☐Yes ☐No	Precipitation: < 72 hours	☐Yes ☐No
Flow:	☐None ☐Low ☐Med. ☐High	Flow:	☐None ☐Low ☐Med. ☐High
Sample taken:	☐Outfall ☐In-Line ☐Surface Flow	Sample taken:	☐Outfall ☐In-Line ☐Surface Flow
pH	_____ s.u.	pH	_____ s.u.
Conductivity	_____ µS	Conductivity	_____ µS
Detergent	_____ ppm	Detergent	_____ ppm
Chlorine	_____ ppm	Chlorine	_____ ppm
Copper	_____ ppm	Copper	_____ ppm
Phenols	_____ ppm	Phenols	_____ ppm
Ammonia Nitrogen	_____ ppm	Ammonia Nitrogen	_____ ppm
Air Temp	_____ °C	Air Temp	_____ °C
Water Temp	_____ °C	Water Temp	_____ °C
Color	_____	Color	_____
Odor #	_____	Odor #	_____
Turbidity (NTUs)	_____ NTUs	Turbidity (NTUs)	_____ NTUs
Sewage ☐Yes ☐No Trash ☐Yes ☐No		Sewage ☐Yes ☐No Trash ☐Yes ☐No	
Oil Sheen ☐Yes ☐No Surface Scum ☐Yes ☐No		Oil Sheen ☐Yes ☐No Surface Scum ☐Yes ☐No	
Notes:		Notes:	
Inspector initials: _____		Inspector initials: _____	

If additional space is needed to record source tracking information, use back of page.

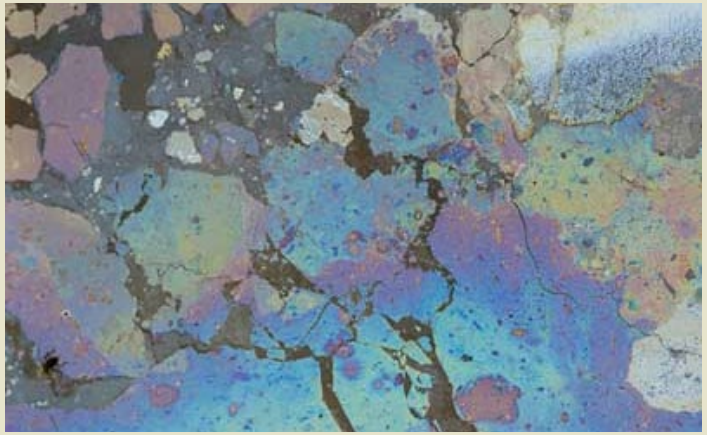
Data Entry: _____
Date & initials

Outfall inside of an outfall.

Trash is subjective

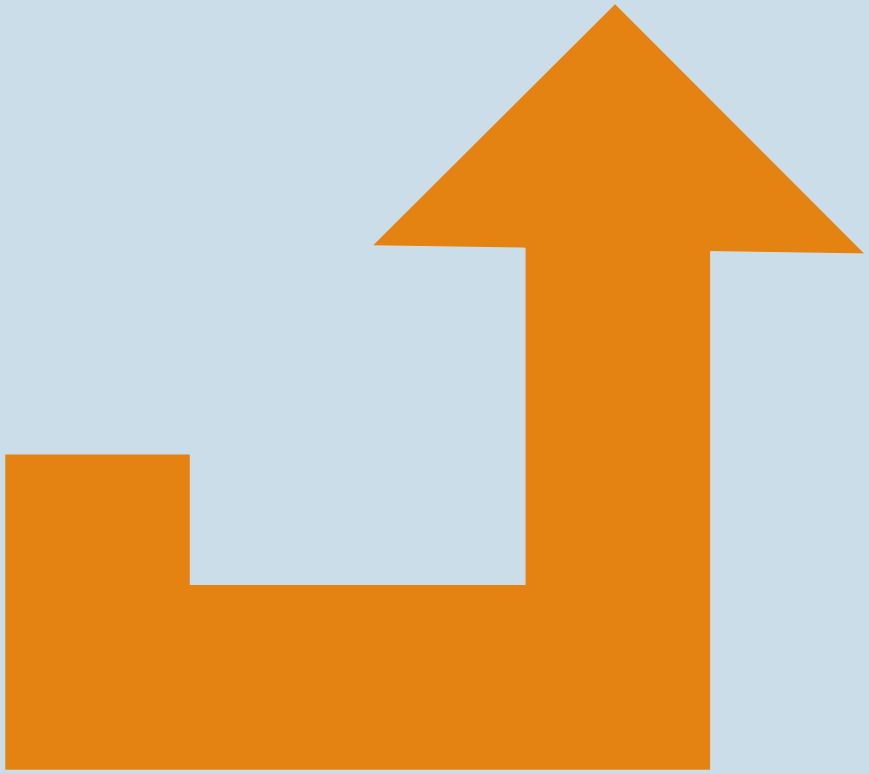
Sewage

Scum

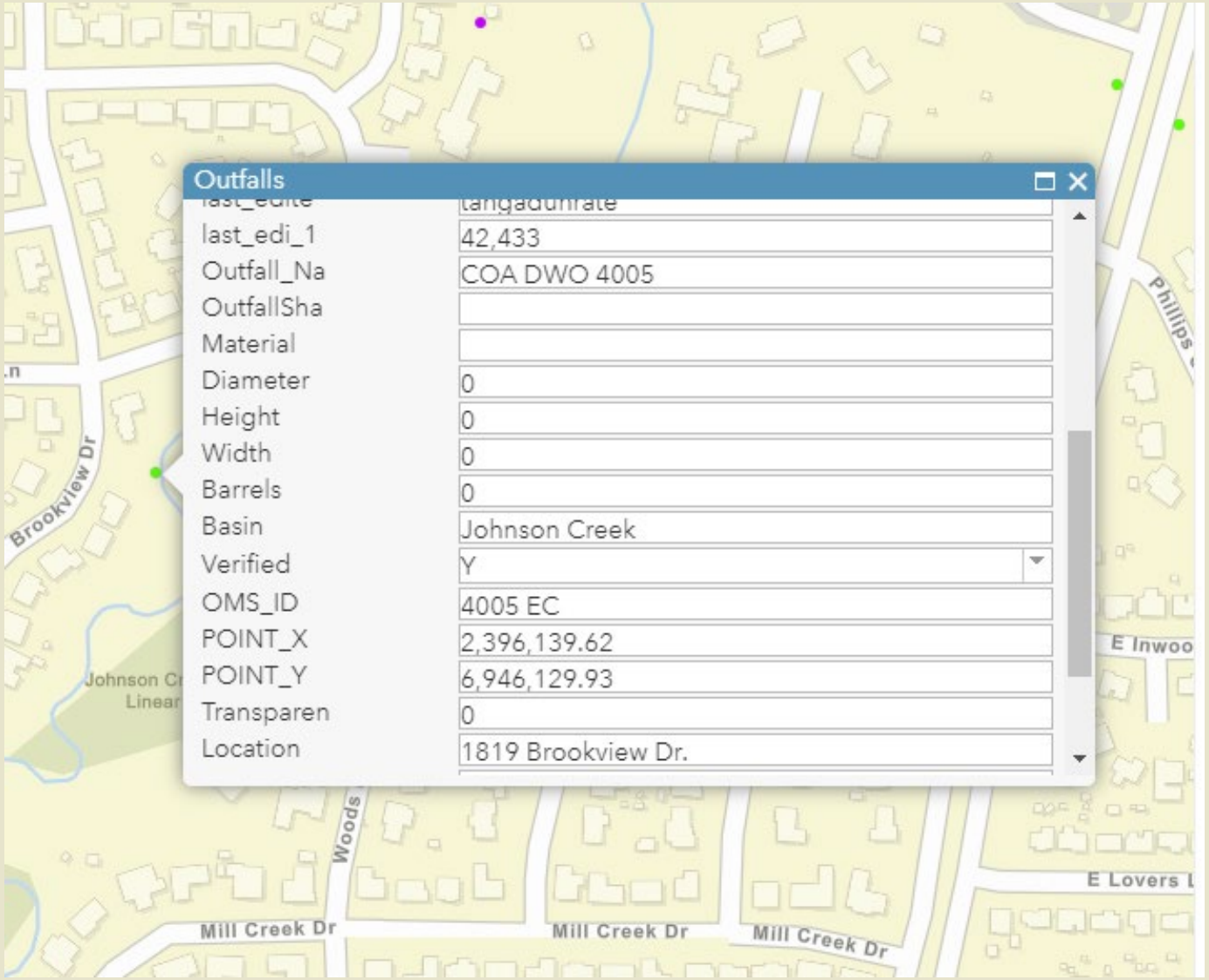


Hydro Sheen

Test water to determine possible factors of an Illicit Discharge



Back to the office



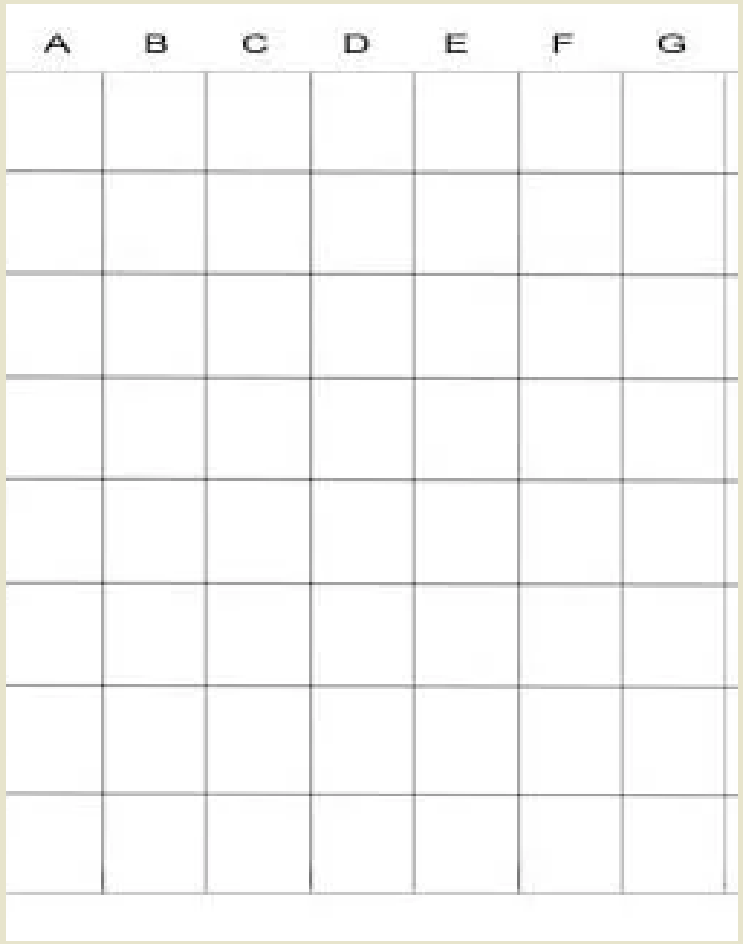
Log Data into ArcGIS Online

Use the Dry Weather Screening Sheets to log data.

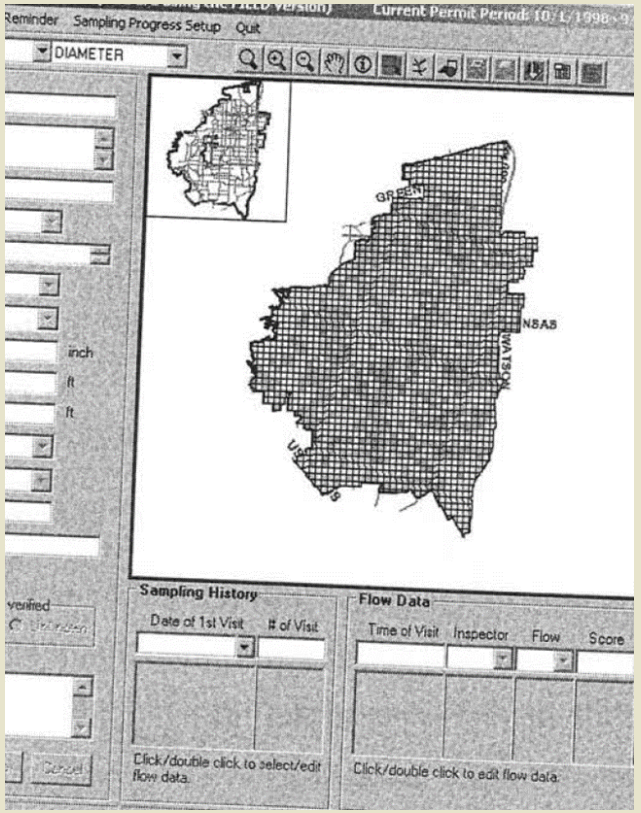
Recording the watershed for each outfall is important.

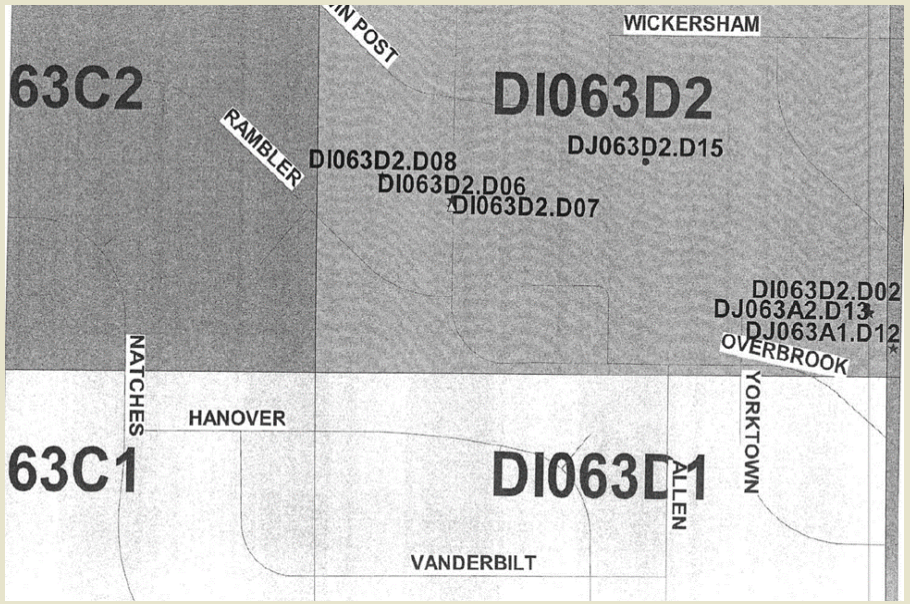
The Watershed Approach

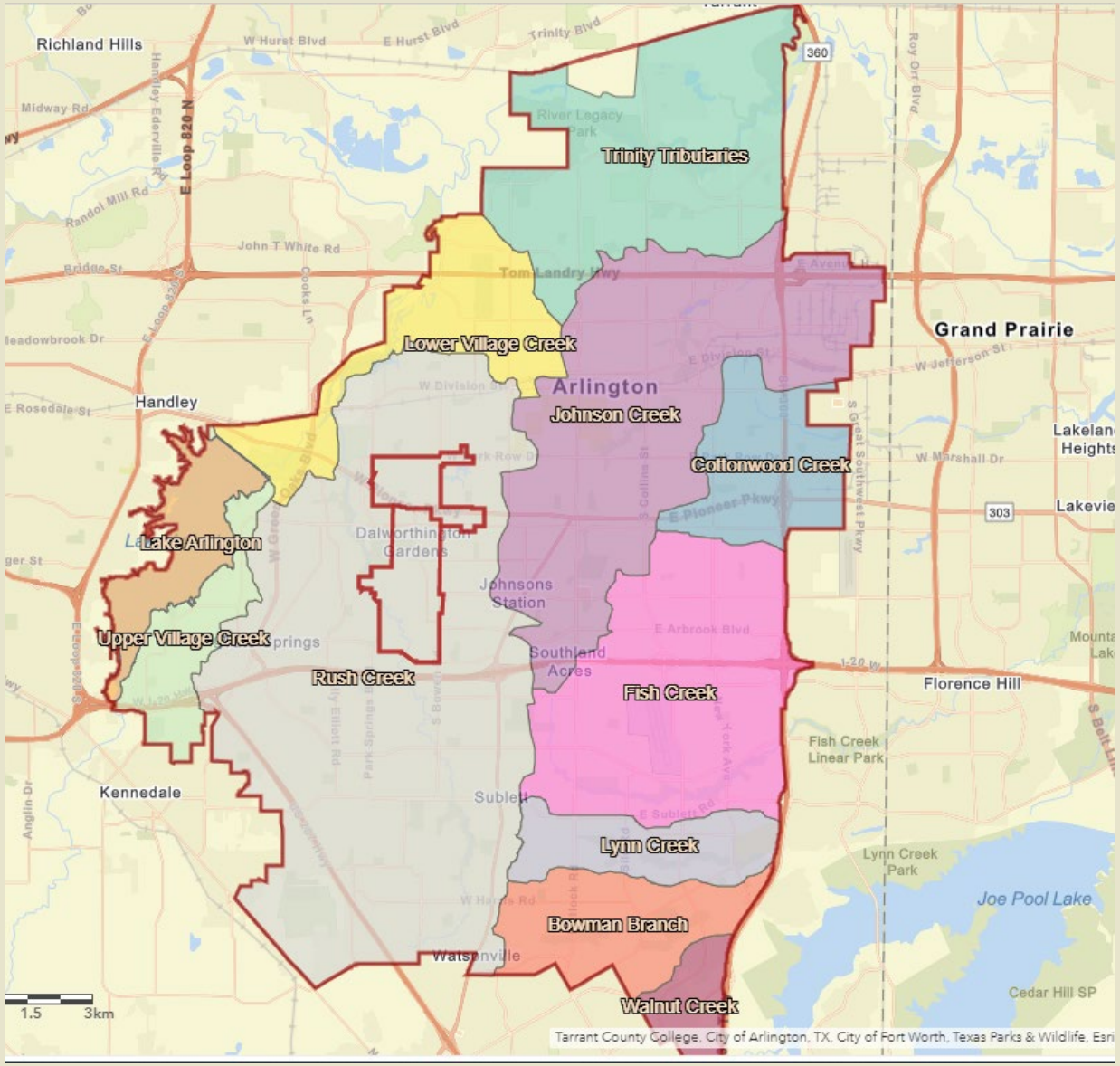
The Grid System (2003-2014)



Quarter mile grid system application developed by Water Utilities & Engineering Services Dept. (now PT&T).

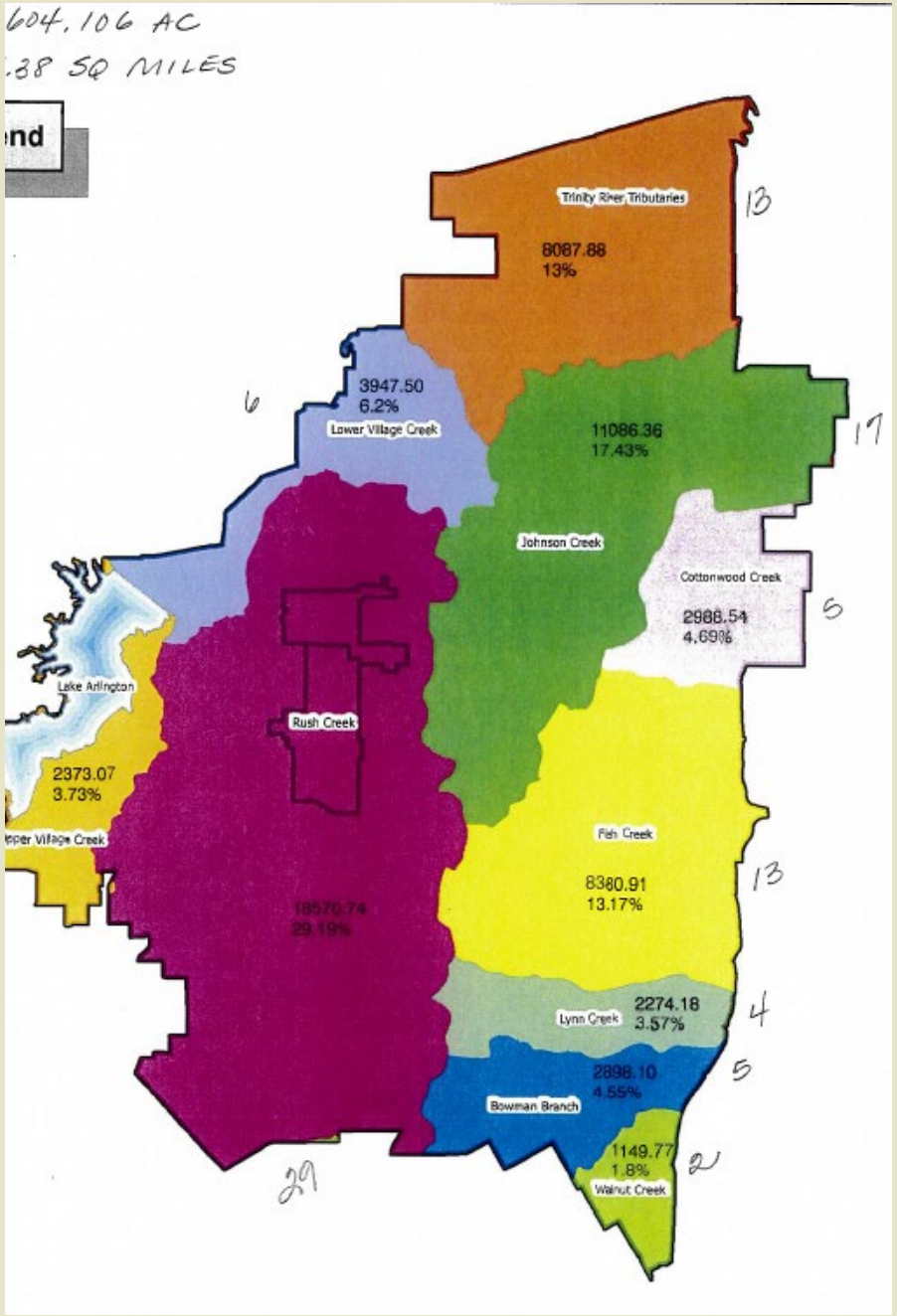






How do we make outfall screening better?

- ARLINGTON HAS 10 WATERSHEDS.
- DETERMINE THE AMOUNT OF OUTFALLS IN EACH WATERSHED.
- MERGE ALL DATABASES AND OVERLAP CURRENT DATABSE WITH OLD DATABASE.
- VERIFY ALL OUTFALLS THAT LINE AND DON'T LINE UP.



What is next? After all outfalls have been verified?

100 Sq. Mi. = 64,000 Acres

CoA= 99.7 Sq. Mi. OR 63,808 Acres

Land: 95.8 Sq. Mi.= 61.312 Acres

Water: 3.2 Sq. Mi. = 2048 Acres

Total Watershed Acreage: 61,844.17 Acres

63,604.106 Acres (99.38 Sq. Mi.) measured city limits in GIS (not including Pantego and DWG). This also includes Lake Arlington.