Dry Weather Field Screening

North Central Texas Council of Governments

June 16, 2023

Purpose of a Storm Drain System




Rain Run-Off → **Storm inlet** → **Outfall** → **Surface Water**

Dry Weather Field Screening (DWFS)

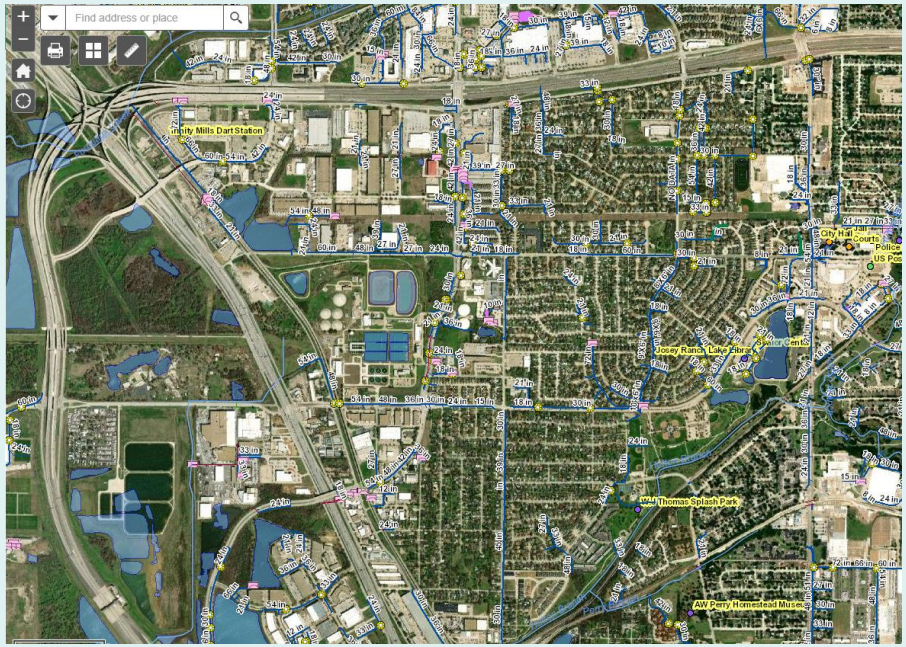
- What is it?
  - Analyze flow from outfalls during dry weather
  - Dry Weather sampling protocol:
    - no rain >0.1” within 72 hours
    - sample twice within 24 hours
    - 4 hours between sampling
    - May differ for Phase Is
- Why do we do it?
  - MS4 storm water permits requires it
  - Detect illicit discharges

Requirements for Phase II Level 4s

- In addition to the requirements described in Parts III.B.2(c)-(d) above, permittees who operate Level 4 small MS4s shall meet the following requirements:
  - (1) Identification of Priority Areas Permittees who operate Level 4 small MS4s shall identify priority areas likely to have illicit discharges and shall document the basis for the selection of each priority area and shall create a list of all priority areas identified. This priority area list must be available for review by the TCEQ.
  - (2) Dry Weather Field Screening By the end of the permit term, permittees who operate Level 4 small MS4s shall develop and implement a written dry weather field screening program to assist in detecting and eliminating illicit discharges to the small MS4.
- Dry weather field screening must consist of
  - (1) field observations; and
  - (2) field screening according to item (2)c. below. If dry weather field screening is necessary, at a minimum, the permittee shall:
    - a. Conduct dry weather field screening in priority areas as identified by the permittee in Part III.B.2(e)(1). By the end of the permit term, all of those priority areas, although not necessarily all individual outfalls must be screened.
    - b. Field observation requirements – The permittee shall develop written procedures for observing flows from outfalls when there has been at least 72 hours of dry weather. The written procedures must include the basis used to determine which outfalls will be observed. The permittee shall record visual observations such as odor, color, clarity, floatables, deposits, or stains.
    - c. Field screening requirements – The permittee shall develop written procedures to determine which dry weather flows will be screened, based on results of field observations or complaint from the public or the permittee's trained field staff. At a minimum, when visual observations indicate a potential problem such as discolored flows, foam, surface sheen, and other similar indicators of contamination, the permittee shall conduct a field screening analysis for selected indicator pollutants. The basis for selecting the indicator pollutants must be described in the written procedures. Screening methodology may be modified based on experience gained during the actual field screening activities. The permittee shall document the method used.

Selecting Your Outfalls/Priority Areas

- Permit requirement
- Size of outfall
- Land use
- Size of area discharging to the outfall
- Existing water quality criteria
- History of illicit discharges
- Site accessibility
- Site Safety
- Ownership



Carrollton's Dry Weather Field Screening Manual

Procedure for Outfall Selection

Carrollton will monitor only selected outfalls during the dry weather screening, not all outfalls. The list of outfalls may vary as new information is obtained on the criteria listed below.

Carrollton will determine which outfalls to monitor based on the following criteria:

1. Number of Spills and Complaints for an area
2. Selected Water Quality Index Parameters
3. Outfall size or the size of the area that drains to an outfall
4. Age of the Sewer and Water Lines in the city
5. Land Use

The number of spills and complaints for an area will help us determine which areas of the city may most affect the quality of our creeks.

Carrolton will use water quality monitoring data from selected monitoring locations in each creek to help determine problem areas. The screening will be based on the Water Quality Index. Of the nine WQI parameters, Carrollton will monitor for dissolved oxygen (DO), temperature, pH, turbidity, total phosphate, nitrates and conductivity. Carrollton has performed in stream monitoring prior to the MS4 permit. The sampling sites for water quality will be the same ones utilized during that time unless a sampling site is gone or has to be moved for better access by staff.

The size of the area that drains to an outfall and the size of the outfall may have a greater opportunity to discharge more pollutants to the creeks.

The age of the sewer and water lines may have a big impact on our creeks. As they age we may see more sanitary sewer overflows and water main breaks.

Land use may be useful in determining whether a particular activity or potential source of pollution is having an impact. Areas with many industrial and commercial activities may have a higher polluting potential and may not be reported as often as in the residential areas.

Carrollton's Site Selection

Outfalls to be Monitored for Dry Weather Screening 2021

Indian Creek:	**Reason for Selection:**	**Site Description:**	**Latitude and Longitude**
OF 0435	Large outfall from Commercial area	Off Hebron and Jahvani Ct	33.019738, -96.922647
OF 4040	Large outfall from Commercial & residential area	Outfall behind Kohls off Old Denton and Hebron	33.023416, -96.913887
OF 4041	Large outfall from Commercial & residential area	Outfall behind Kohls off Old Denton and Hebron	33.023596, -96.913871

Furneaux Creek:	**Reason for Selection:**	**Site Description:**	**Latitude and Longitude**
OF 1062	Commercial Area - Multiple inlets	Off MacArthur	32.988069, -96.913061
OF 2257	Industrial area - Many inlets	Off Nimitz Ln and Railroad	32.988224, -96.928171
OF 2258	Industrial area - Many inlets	Off Nimitz Ln and Railroad	32.988243, -96.928137
OF 2259	Industrial area - Many inlets	Off Nimitz Ln and Railroad	32.988245, -96.928104

Dudley Branch:	**Reason for Selection:**	**Site Description:**	**Latitude and Longitude**
OF 0215	Residential area - Lower numbers for SWM	OF off Virginia Pine	33.016195, -96.904943
OF 0216	Residential area - Lower numbers for SWM	OF off Virginia Pine	33.015962, -92.904931

Cooks Branch:	**Reason for Selection:**	**Site Description:**	**Latitude and Longitude**
OF 1117	Residential area, Many Connecting inlets	Under over pass by Bowie Dr	32.946567, -96.881845
OF 1113	Residential area, Many Connecting inlets	By Under pass by Fyke Rd	32.946445, -96.881925

VI Channel:	**Reason for Selection:**	**Site Description:**	**Latitude and Longitude**
Hutton			
OF 4281	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	32.935942, -96.915131
OF 4282	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	32.935944, -96.915073
OF 4279	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	32.934994, -96.915119
OF 4780	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	32.934985
OF 4278	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4276	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4277	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4275	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4274	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4273	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4271	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4272	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4269	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	
OF 4270	Outfalls by Industrial Area	Off Hutton Between Valwood and Champion RR	

Phase I Requirements

- MS4 Screening and Illicit Discharges Inspections. To locate portions of the MS4 with suspected illicit discharges and improper disposals, the permittees shall continue implementation of the Dry Weather Screening Program (DWSP) described in Part III SectionB.2.h.i of this permit. Follow-up activities to eliminate illicit discharges and improper disposals may be prioritized on the basis of magnitude and the nature of the suspected discharge, sensitivity of the receiving water, or other relevant factors. The entire MS4, but not necessarily each individual outfall, shall continue to be screened at least once per five years.
- Priority Areas. The permittees shall continue to develop a list of priority areas likely to have illicit discharges. The permittees shall continue to evaluate and update this list each year and report the results in the annual report.
- Monitoring, Evaluating, and Reporting. The permittees shall continue to implement, and modify as necessary, the following monitoring or screening programs for dry weather, wet weather, and industrial and high-risk runoff:
  - DWSP. This program shall continue the permittees efforts to detect the presence of illicit connections and improper discharges to the MS4. All areas of the MS4 must be screened at least once during the permit term. The permittees may utilize modified screening methods based on experience gained during previous field screening activities; the screening methods are not required to conform to the protocol in 40CFR122.26(d)(1)(iv)(D). Sample collection and analysis is not required to conform to the requirements of Part V, Section B.2. of this permit, “Test Procedures”

Outfall Reconnaissance Inventory (ORI)

- Collect useful information:
  - outfall dimensions, material type, flow direction, land use, photo
- Describe the outfall location in terms so others can find the outfall
- Use the ORI form or one similar to record information
- Choose a usable naming convention for your outfalls

Outfall Reconnaissance Inventory

Outfall Reconnaissance Inventory (ORI) Field Sheet

North Central Texas Regional Protocol

Section 1: Background Data

Date:	Time (Military):	
Jurisdiction:	Subwatershed:	Outfall ID:
Temperature (°C):	Rainfall (in.) Last 24 hrs:	Last 48 hrs:
GPS Unit: #:	Latitude:	Longitude:
Camera:	Photo #'s:	

Land Use in Drainage Area (circle all that apply): Other: _____

Industrial Residential Commercial Institutional Open Space Known Industries: _____

Notes:

Section 2: Outfall Description (Circle all that apply)

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
__ Closed Pipe	RCP-Reinforced Concrete CMP-Corrugated Metal PVC-Polyvinyl Chloride HDPE-High Density Polyethylene Steel Other:_____	Circular Elliptical Box Single Double Triple	Diameter/Dimensions: _____	In Water: No Partially Fully With Sediment: No Partially Fully
__ Open Drainage	Concrete Earthen Rip-Rap Other:_____	Trapezoid Parabolic Other:_____	Depth: _____ Top Width: _____ Bottom Width: _____	
Flow Description (if present)	None Trickle Moderate Substantial			

Section 3: Quantitative Characterization for Flowing Outfalls

PARAMETER		RESULT	UNIT	EQUIPMENT
__Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	Stop Watch
__Flow #2	Flow depth		In	Tape Measure
	Flow width		Ft In	Tape Measure
	Measured length		Ft In	Tape Measure
	Time of travel		S	Stop Watch
Temperature			°C	Thermometer
pH			pH units	Test Strip/Meter
Ammonia			Mg/L	Test Strip/Comparator

Section 4: Physical Indicators for Flowing Outfalls (Circle all that apply)

INDICATOR	CHECK if present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor		Sewage Rancid/sour Sulfide Petroleum/gas Other:_____	1-Faint	2-Easily detected	3-Noticeable from a distance
Color		Clear Brown Gray Yellow Green Orange Red Other: _____	1-Faint colors in sample bottle	1-Clearly visible in sample bottle	3-Clearly visible in outfall flow
Turbidity		See Severity	1-Slight cloudiness	2-Cloudy	3-Opaque
Floatables; Trash not included		Sewage (Toilet Paper, etc.) Suds Petroleum (oil sheen) Other: _____	1-Few/slight;origin not obvious	2-Some; indications of origin (e.g., possible suds or oil sheen)	3-Some;origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls (Circle all that apply)

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage		Cracking/Chipping Corrosion Peeling Paint	
Deposits/Stains		Oily Flow Line Paint Other:_____	
Abnormal Vegetation		Excessive Inhibited	
Poor Pool Quality		Odors Colors Floatables Oil Sheen Suds Excessive Algae Other:_____	
Pipe Benthic Growth		Brown Orange Green Other:_____	

Section 6: Overall Outfall Characterization (Circle)

Unlikely Potential (presence of two or more indicators) Suspect (one or more indicators with a severity of 3) Obvious

Comments

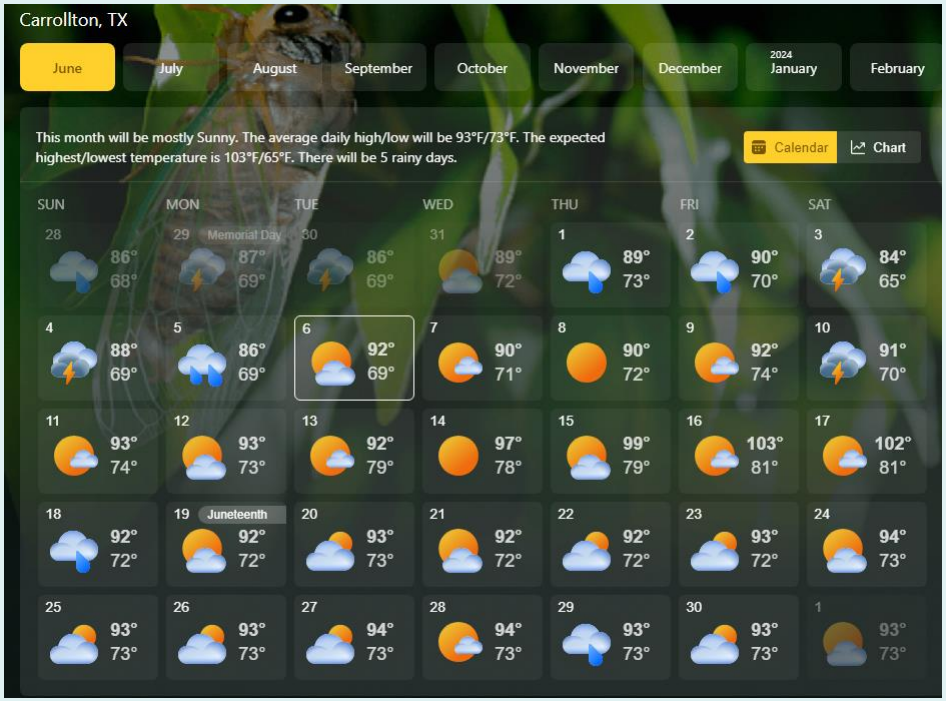
_____ Print Name

_____ Date & Initials

Adapted form courtesy of the Illicit Discharge Detection & Elimination: A Guidance Manual for Program Development and Technical Assessments

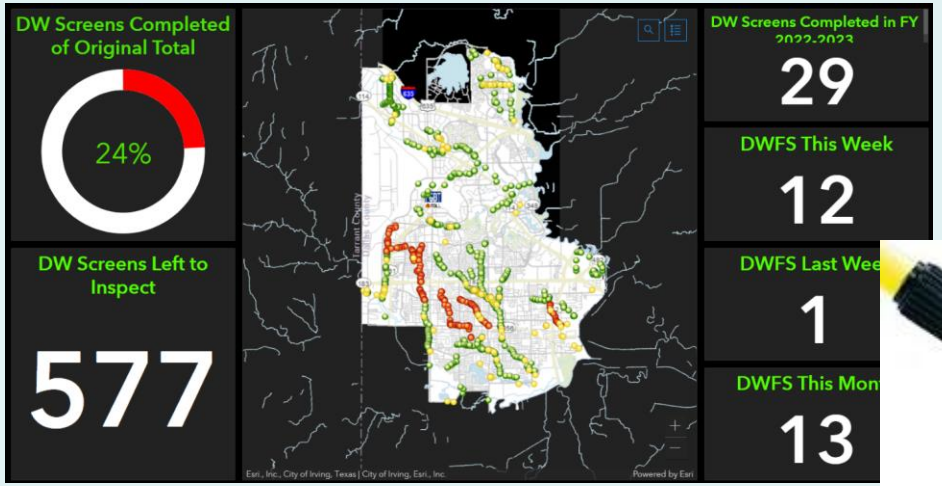
Planning for DWFS

- Organize outfalls by proximity
- Check outfall sampling history
- Weather
  - no rain for at least 72 hours (may differ for Phase 1) and no rain in the forecast depending on how many samples you are doing



Checklist for Sampling

- ❑ Gloves
- ❑ Eye protection
- ❑ Phone
- ❑ Sunscreen/bug spray
- ❑ Sampling pole
- ❑ Bucket w/rope
- ❑ Clipboard
- ❑ Data sheets
- ❑ Pens
- ❑ Storm drain map
- ❑ Sample containers
- ❑ Pipet and tips
- ❑ DWFS kit and other test kits
- ❑ Thermometer
- ❑ DI water
- ❑ Turbidity meter
- ❑ pH meter
- ❑ Conductivity meter
- ❑ Paper towels
- ❑ Camera
- ❑ Waste container



Test Kits

- LaMotte 7446-01 StormWatch Drain Monitoring Kit **$588.17**
  - Designed to monitor illicit storm drain connections
  - Includes tests for pH, total chlorine, total copper, phenols, detergent surfactants, temperature and turbidity
  - Rugged carrying case allows for on-site use
- Ammonia-Nitrogen test kit

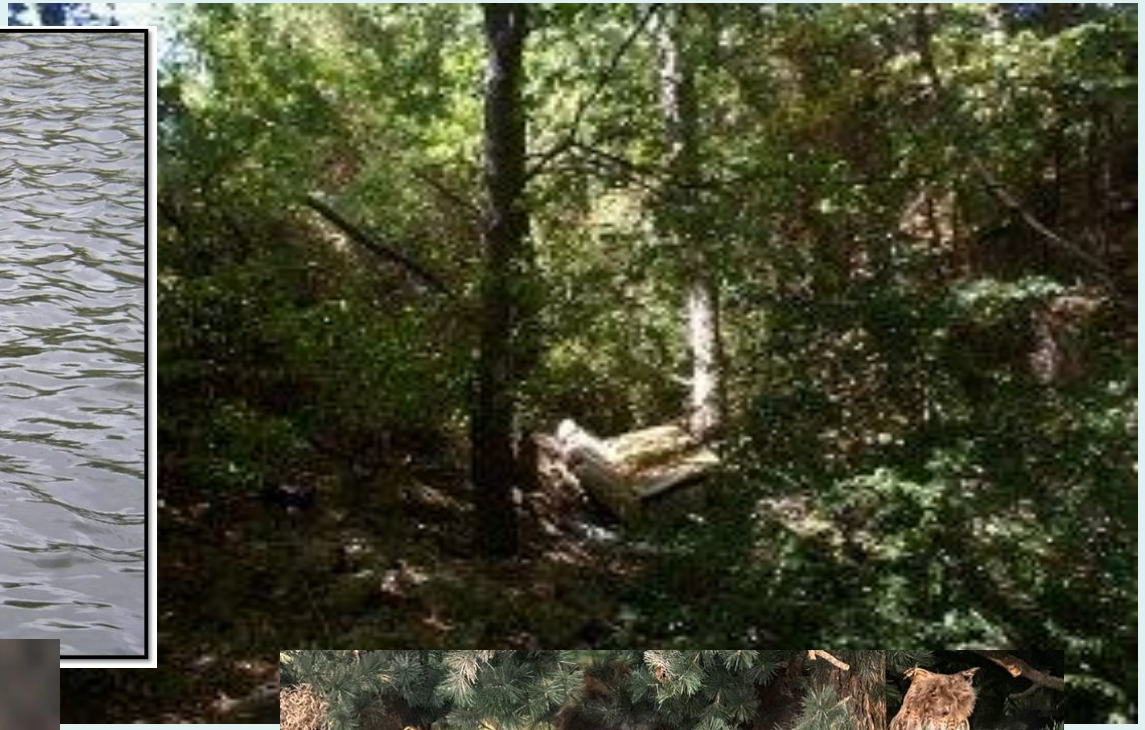
Site Safety

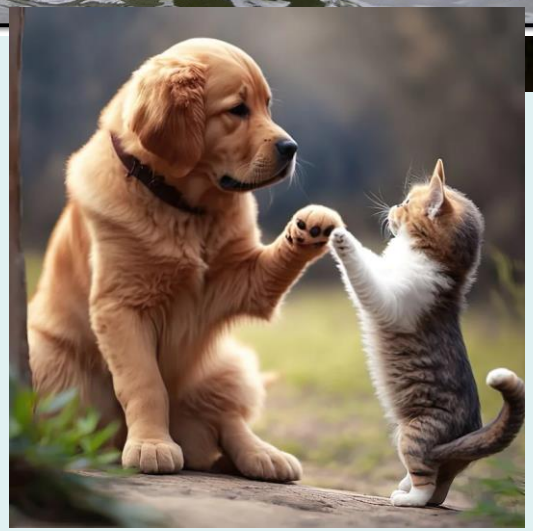
- Work in pairs if possible
- Have a cell phone or other communication device available
- Take along PPE and drinking water
  -gloves, eye protection

Site Safety

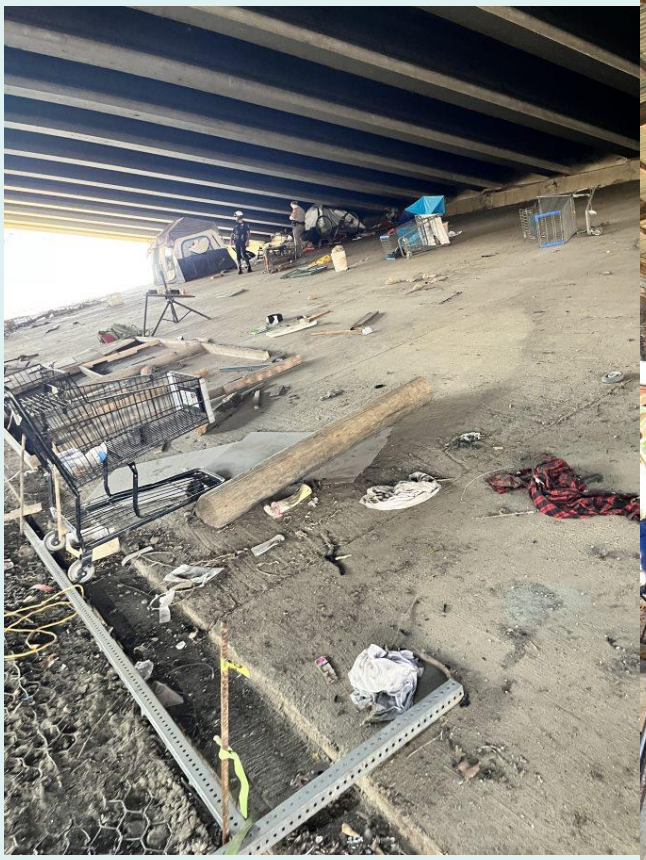
- Pull off the road if possible
  - use cones behind your vehicle if not possible
- Check the site for potential hazards
  - insects and snakes
  - poisonous plants
  - assorted animals

Site Safety





Site Safety




WGS84
±22ft
32.97640, -96.92865
ft
±7ft
449
°,T
±18
SE139
18Jan22 11:54 Ad-hoc
Carrollton TX 75006, United States
18-Jan-22 11:54:43

Data Sheet

CARROLLTON
TEXAS

Dry Weather Field Screening Data Sheet

Sample Collectors Name: _____
Location ID: _____
Location: _____
Receiving Water: _____
Stains or deposits in the outfall: _____
SiteNotes: _____
_____
_____

Calibration (within 24 hours of sampling)	Date	Time	Standard Value	Initial Meter Reading	Meter Adjusted to	Post Calibration

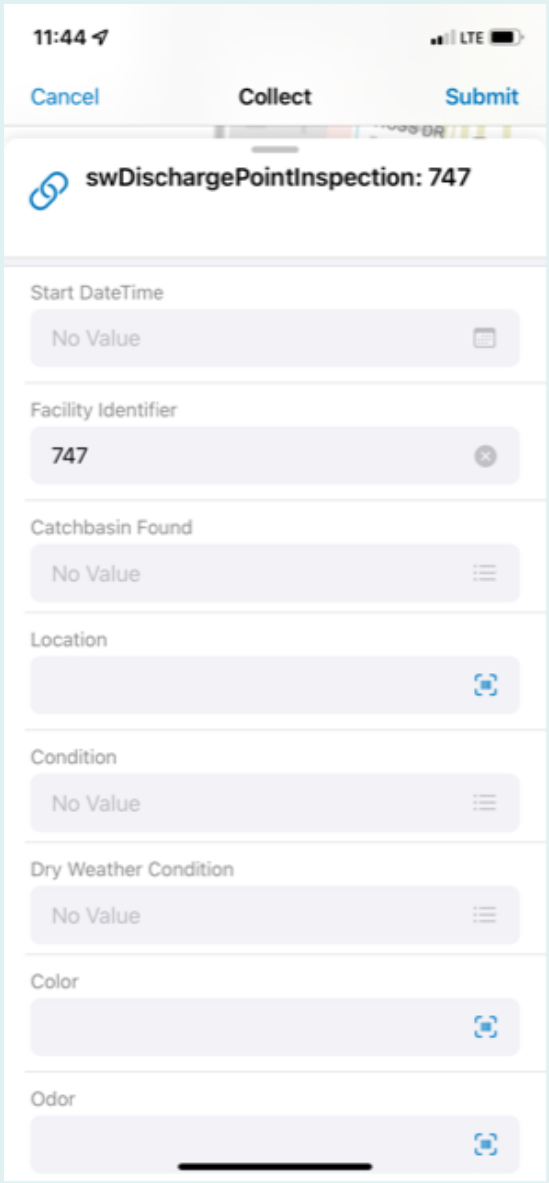
1st Visit Date:_____ Time:_____
Precipitation <72 hours: Yes No
Flow: None Low Med High
pH _____s.u.
Conductivity _____µS
Detergent _____ppm
Ammonia Nitrogen (NH4) _____ppm
Water Temp _____°C
Turbidity _____NTU's
Chlorine _____ppm
Color _____
Odor _____
Sewage Yes No Surface Scum Yes No
Trash Yes No Oil Sheen Yes No
Notes: _____
_____

2nd Visit Date:_____ Time:_____
Precipitation <72 hours: Yes No
Flow: None Low Med High
pH _____s.u.
Conductivity _____µS
Detergent _____ppm
Ammonia Nitrogen (NH4) _____ppm
Water Temp _____°C
Turbidity _____NTU's
Chlorine _____ppm
Color _____
Odor _____
Sewage Yes No Surface Scum Yes No
Trash Yes No Oil Sheen Yes No
Notes: _____
_____

Print Name

Print Name

Data Sheet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Catchbasin Found
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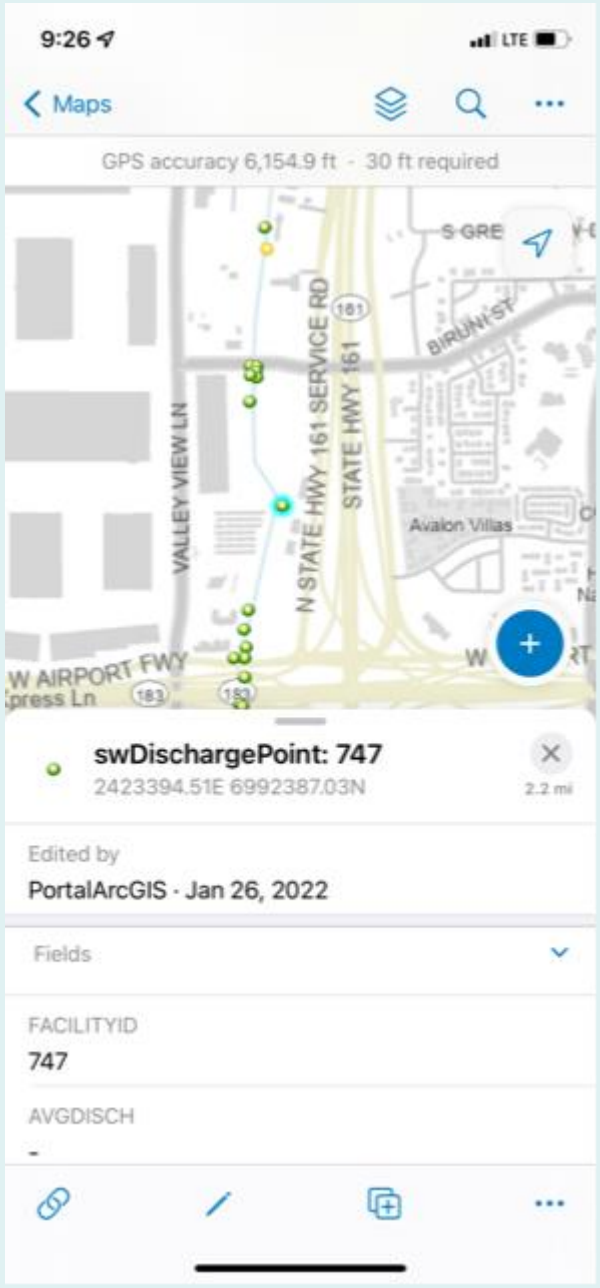
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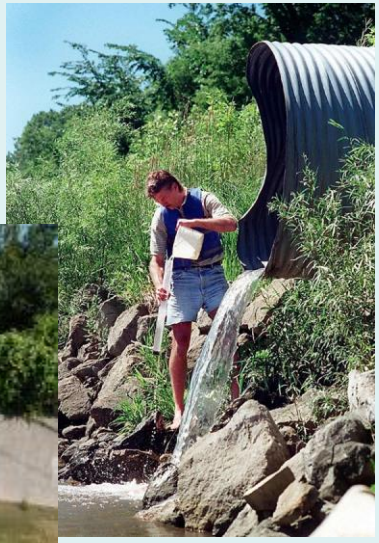
Maps
GPS accuracy 6,154.9 ft · 30 ft required
S GRE
BIRUNI ST
VALLEY VIEW LN
N STATE HWY 161 SERVICE RD
STATE HWY 161
Avalon Villas
W AIRPORT FWY
swDischargePoint: 747
2423394.51E 6992387.03N
2.2 mi
Edited by
PortalArcGIS · Jan 26, 2022
Fields
FACILITYID
747
AVGDISCH
-

Flow or No Flow?

- Drop leaves or grass in water at the mouth of the outfall to see if water is moving
  - Standing water
  - “Trickle” flow

Sampling techniques

- Discharge grab sample
- Collect samples using:
  - Bucket
  - Sampling pole
  - Sampling container
- Prior to collection, rinse sample container a minimum of twice



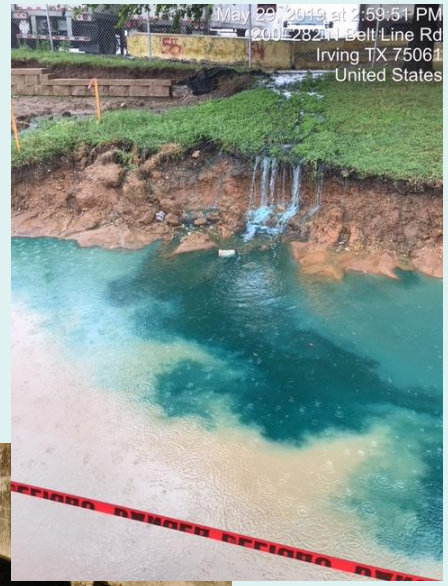
Suggested Sampling Sequence

1. Calibrate meters in the office
2. Initial site observations: trash, sewage, surface scum, etc.
3. Air temp*
4. Physical observations: flow, color, turbidity, odor, oil sheen
5. Water temperature
6. pH
7. Conductivity
8. Chlorine
9. Ammonia-Nitrogen
10. Detergent
11. Copper
12. Turbidity

Physical Observations of Outfall and Site

Physical observations

- Trash
- Surface scum
  - inorganic, not algal mats
- Oil sheen
- Iron fixing bacteria
- Sewage
- Odor
- Color



Surface Scum

Synthetic Sheen vs Natural

- Natural breaks up
- Synthetic sheen stays together

Natural

Synthetic Sheen

Sewage

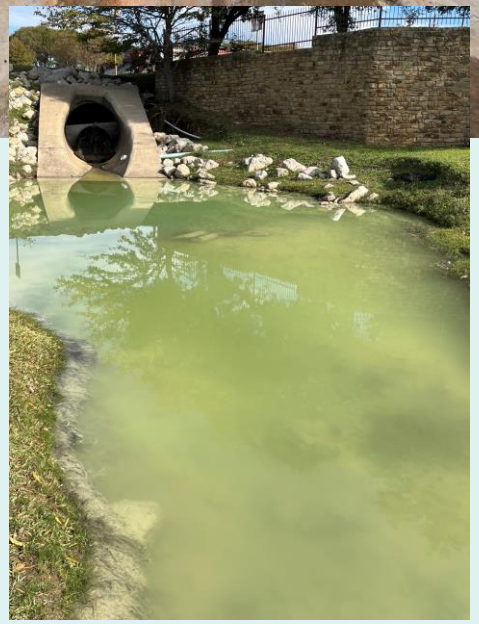
- Obvious visual indicators:
  - fecal material,
  - toilet paper
  - other “flushables”
- More subtle indicators:
  - gray to black water,
  - sewage fungus
  - Tubifex worms
  - odor

Odor

- No odor
- Rotten egg: raw sewage, decomposing organic matter, lack of oxygen
- Chlorine: water main breaks/flushings, swimming pool, industrial discharges
- Sharp, pungent odor: chemical or pesticides
- Musty – sewage, decomposing organic matter
- Gasoline – industrial, vehicle/equipment leaks, illegal dumping
- Sweet or fruity – commercial wash water, wastewater
- Other

Color

- Tan to light brown – sediments from rain, construction sites
- Tea/Coffee – decaying organic matter (leaves)
- Milky white – paint, lime, milk, grease, concrete, swimming pool filter backwash
- Milky or dirty dishwater gray – gray water/wastewater with musty odor
- Milky gray/black – raw sewage
- Dark red, purple, blue, black – dyes, inks
- Orange-red – leachate from iron deposits, oil well operation
- Green, yellow, brown/green/yellow, blue/green – algae, sewage, vehicle wash
- Other



Field Sample Analysis

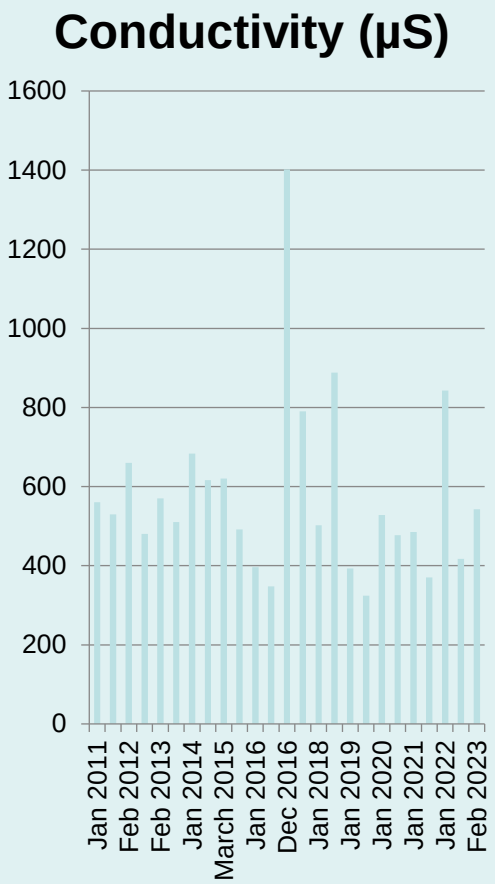
pH, Conductivity, Turbidity, Temperature, Ammonia Nitrogen, Detergents, Chlorine, Copper, Phenols

pH

- Measures the acidity and alkalinity of a solution
  - Calibration
  - pH 6-9 supportive of aquatic life
  - in our area, pH is usually between 7-8.5
  - algae, limestone, concrete channels can increase the pH with increasing temperatures
  - Extreme high or lows could indicate commercial or industrial discharges

Conductivity

- Measure of the ability of water to pass an electrical current
- Know your creeks!!!!
- May have to check this over months for “normal” - 100-1000µS/cm might be normal for fresh water
  - Level of concern depends on the creek
- Significantly elevated electrical conductivity may indicate that pollution has entered the waterbody
- A measure of electrical conductivity cannot tell you what the pollutant is, but it can help identify that there is a problem
- Potential sources –
  - Septic systems/wastewater
  - Irrigation
  - Overuse of fertilizer
  - Concrete batch plant



Conductivity

- Measure of the ability of water to pass an electrical current.
- In water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge). Organic compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity when in water. Conductivity is also affected by temperature: the warmer the water, the higher the conductivity. For this reason, conductivity is reported as conductivity at 25 degrees Celsius (25 C).
- In streams and rivers is affected primarily by the geology of the area through which the water flows. Streams that run through areas with granite bedrock tend to have lower conductivity because granite is composed of more inert materials that do not ionize (dissolve into ionic components) when washed into the water. On the other hand, streams that run through areas with clay soils tend to have higher conductivity because of the presence of materials that ionize when washed into the water. Ground water inflows can have the same effects depending on the bedrock they flow through.
- Discharges to streams can change the conductivity depending on their make-up. A failing sewage system would raise the conductivity because of the presence of chloride, phosphate, and nitrate; an oil spill would lower the conductivity.

Chlorine

- Level of concern – 0.2 mg/L (or any detection)
- Potential sources:
  - Water line/hydrant flushing
  - Water main breaks
  - Pool discharge
  - Irrigation

EPA COMPLIANT

LaMotte

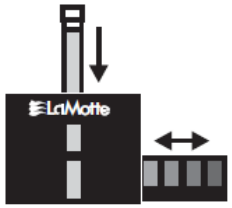
DPD FREE, TOTAL & COMBINED CHLORINE TEST KIT

OCTA-SLIDE METHOD
MODEL SL-26 · CODE 3308

QUANTITY	CONTENTS	CODE
50 50	*Chlorine DPD #1R Tablet (6999A) *Chlorine DPD #3R Tablet (6905A)	*6905A-6999ABOX
2	Test Tubes, plastic, w/caps	0106
1	Octa-Slide Viewer	1100
1	Chlorine Octa-Slide Bar, 0.2-3.0 ppm	3401

*WARNING: Reagents marked with an * are considered to be potential health hazards. To view or print a Material Safety Data Sheet (MSDS) for these reagents go to www.lamotte.com. To obtain a printed copy, contact LaMotte by e-mail, phone or fax. To order individual reagents or test kit components, use the specified code number.

USE OF THE OCTA-SLIDE VIEWER



The Octa-Slide Viewer should be held so non-direct light enters through the back of the viewer. With sample tube inserted at top, slide the Octa-Slide bar through the viewer and match with color standard.

EPA ACCEPTED PROCEDURE

EPA Accepted for NPDWR compliance monitoring. For compliance monitoring a Check Standard should be prepared.

CHECK STANDARD PREPARATION: 1 ppm equivalent solution

1. Dissolve 891 mg of potassium permanganate in 1000 mL of distilled water in volumetric flask (1000 ppm equivalent solution). Prepare fresh daily.
2. Dilute 1 mL of this solution to 1000 mL with distilled water in volumetric flask. This solution is equivalent to 1 ppm Free Available Chlorine.

PROCEDURE

FREE AVAILABLE CHLORINE

1. Fill a test tube (0106) to 5 mL line with sample water.
2. Add one *Chlorine DPD #1R Tablet (6999A). Cap tube and and mix until disintegrates.
3. Immediately insert test tube into the top of the Oct-Slide Viewer (1100). Slide the Chlorine Octa-Slide Bar (3401) into the Viewer. Match sample color to a color standard. Record as ppm Free Available Chlorine. Retain this sample if Total Residual and Combined Chlorine are to be determined.

TOTAL RESIDUAL CHLORINE & COMBINED CHLORINE

4. Add one *Chlorine DPD #3R Tablet (6905A) to sample from Step 3 above. Cap and mix until tablet disintegrates.
5. Insert test tube into the Octa-Slide Viewer (1100). Match sample color to a color standard. Record as ppm Total Residual Chlorine.
6. To obtain Combined Chlorine, subtract Free Available Chlorine from Total Residual Chlorine.

Combined Chlorine, ppm =
Total Residual Chlorine - Free Available Chlorine

NOTE: Thoroughly clean and rinse test tubes after each use.

Ammonia Nitrogen

- Detects ammonia
- Levels > 1.0 - investigate
- Potential sources:
  - Sewage
  - Decomposing organic matter
  - Animal waste
  - Chemical industries
  - Pesticides/fertilizers

AMMONIA NITROGEN TEST KIT
Code 3351-02 | Octa-Slide Method

LaMotte

QUANTITY	CONTENTS	CODE
30 mL	Ammonia Nitrogen Reagent #1	4797WT-G
30 mL	*Ammonia Nitrogen Reagent #2	*4798WT-G
2	Test Tubes, 2.5-5.0-10.0 mL, plastic, w/caps	0106
1	Ammonia Nitrogen Octa-Slide 2 Bar, 0.2-3.0 ppm	3438-01
1	Octa-Slide 2 Viewer	1101

To order individual reagents or test kit components, use the specified code number.

*Reagent is a potential health hazard. **READ SDS:** lamotte.com
Emergency information:
Chem-Tel USA 1-800-255-3924
Int'l, call collect, 813-248-0585

READ SDS

Warning! This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully.
Not to be used by children except under adult supervision.

USE OF THE OCTA-SLIDE 2 VIEWER

PROCEDURE

1. Insert the Ammonia Nitrogen Octa-Slide 2 Bar (3438-01) into the Octa-Slide 2 Viewer (1101).
2. Fill test tube (0106) to the 5 mL line with sample water.
3. Add 4 drops of Ammonia Nitrogen Reagent #1 (4797WT). Cap and mix. Wait 1 minute.
   NOTE: When testing salt (sea) water, increase the amount of Ammonia Nitrogen Reagent #1 to 8 drops.
4. Add 12 drops of *Ammonia Nitrogen Reagent #2 (4798WT). Cap and mix. Wait five minutes.
   NOTE: When testing salt water, the reading should be taken after 1 minute to prevent precipitation.
5. Insert test tube into the top of the viewer. Hold the Viewer so that non-direct light enters through the back. Match sample color to a color standard. Record as ppm Ammonia Nitrogen (NH_3-N).

Detergents

- Level of concern - 0.2 mg/L
- Potential sources:
  - Residential or commercial carwashes
  - Laundry
  - Charity carwashes
  - Parking lot cleaning
  - Many more…

DETERGENT KIT

LaMotte

Code 4507-02 | Drop Count, 1 Drop = 1 ppm

QUANTITY	CONTENTS	CODE
2 x 30 mL	*DS Indicator Reagent	*4508-G
15 mL	DS Reference Solution	4513-E
50 g	pH Adjustment Powder	4509-H
1	Test Tube, Test Sample w/cap	0282
1	Test Tube, Reference Sample w/cap	0283
1	Test Tube, 1-8 mL, plastic, w/cap	0755
1	Pipet, glass	0347
1	Spoon, 0.25 g, plastic	0695

To order individual reagents or test kit components, use the specified code number.

*Reagent is a potential health hazard. **READ SDS:** lamotte.com
Emergency information:
Chem-Tel USA 1-800-255-3924
Int'l, call collect, 813-248-0585

READ SDS

Warning! This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

PROCEDURE

HYDROGEN PEROXIDE

1. Use the calibrated test tube (0755) to measure 5 mL of the sample solution. Add to the screw cap tube marked Test Sample (0282).
2. Use the 0.25 g spoon (0695) to add one measure of pH Adjustment Powder (4509). Shake until dissolved.
3. Fill the pipet (0347) with *DS Indicator Reagent (4508) by squeezing the rubber bulb, then inserting pipet into reagent. Add this amount of *DS Indicator Reagent to the Test Sample tube. Cap the tube. Hold the tube by the index finger and thumb. Shake for 1 minute.
4. Allow the tube to stand until the two layers of the solution separate. The water layer will settle to the bottom and the reagent layer will rise to the top. Use chart below to determine if detergent is present.

Bottom Layer	Top Layer	Quick Reading
Colorless	Colored	No Detergent in sample
Some Color	Some Color	Some Detergent in sample
Colored	Colorless	High Detergent in sample

NOTE: If the amount of detergent in the sample is to be determined, save this Test Sample and proceed to Step 2.

STEP 2 - Determine the Amount of Detergent Present

1. Use the calibrated test tube (0755) to measure 5 mL of detergent-free water. Add to the screw cap tube marked Reference Sample (0283). (On field trips it may be necessary to carry a small supply of detergent free water.)
2. Use the 0.25 g spoon (0698) to add one measure of pH Adjustment Powder (4509). Shake until dissolved.
3. Fill the pipet (0347) with *DS Indicator Reagent (4508) by squeezing the rubber bulb, then inserting pipet into reagent. Add this amount of *DS Indicator Reagent to the Reference Sample tube.
4. Add one drop of DS Reference Solution (4513). Cap the tube. Hold the tube by the index finger and thumb. Shake for 1 minute.
5. Allow the tube to stand until the two layers of solution separate. The color produced in the bottom (water) layer is equivalent to 1 ppm of detergent.
6. Compare the color in the bottom layer of the Test Sample Tube from Part I to the color of the bottom of the Reference Sample Tube.

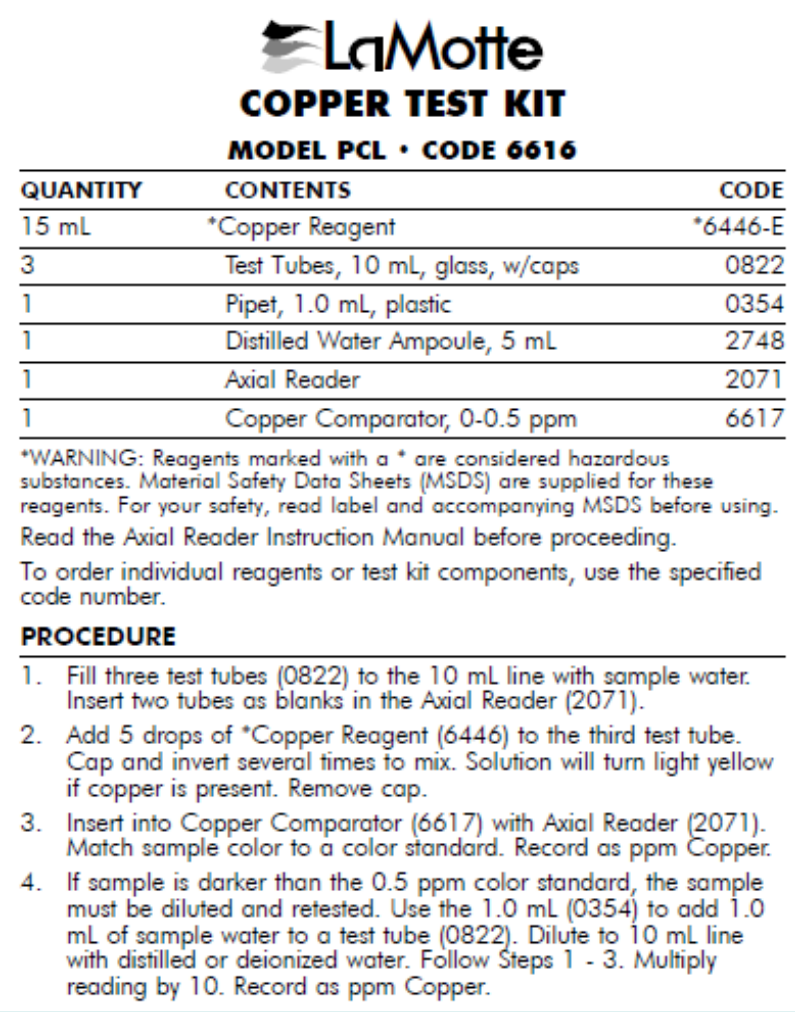
If Test Sample Color Is:	Test Sample Contains:
Lighter than Reference	Less than 1.0 ppm Detergent
Same as Reference	1.0 ppm Detergent
Darker than Reference	More than 1.0 ppm Detergent

7. Add one drop of DS Reference Solution (4513) to the Reference Sample Tube. Shake to mix. Compare the color as before. The color in the Reference Sample is now equal to 2.0 ppm. Continue this procedure, counting the number of drops of DS Reference Solution (4513) added, until the color of the bottom layer in each tube is the same. Each drop of the DS Reference Solution (4513) added to the Reference Sample Tube is equal to 1 ppm detergent in the sample.

   NOTE: If at any time the top layer of the Test Sample or Reference Sample becomes colorless, add more DS Indicator Reagent (4508). The amount of this reagent added is not important as long as there is some color in the top layer.

Copper

- Level of concern – 0.2mg/L
- Found everywhere in small amounts.
- Larger amounts may indicate an illicit discharge.
- Potential sources:
  - Industry



LaMotte

COPPER TEST KIT

MODEL PCL • CODE 6616

QUANTITY	CONTENTS	CODE
15 mL	*Copper Reagent	*6446-E
3	Test Tubes, 10 mL, glass, w/caps	0822
1	Pipet, 1.0 mL, plastic	0354
1	Distilled Water Ampoule, 5 mL	2748
1	Axial Reader	2071
1	Copper Comparator, 0-0.5 ppm	6617

*WARNING: Reagents marked with a * are considered hazardous substances. Material Safety Data Sheets (MSDS) are supplied for these reagents. For your safety, read label and accompanying MSDS before using.

Read the Axial Reader Instruction Manual before proceeding.

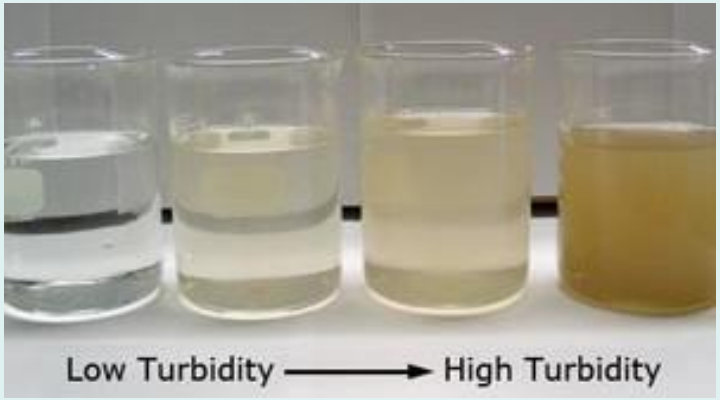
To order individual reagents or test kit components, use the specified code number.

PROCEDURE

1. Fill three test tubes (0822) to the 10 mL line with sample water. Insert two tubes as blanks in the Axial Reader (2071).
2. Add 5 drops of *Copper Reagent (6446) to the third test tube. Cap and invert several times to mix. Solution will turn light yellow if copper is present. Remove cap.
3. Insert into Copper Comparator (6617) with Axial Reader (2071). Match sample color to a color standard. Record as ppm Copper.
4. If sample is darker than the 0.5 ppm color standard, the sample must be diluted and retested. Use the 1.0 mL (0354) to add 1.0 mL of sample water to a test tube (0822). Dilute to 10 mL line with distilled or deionized water. Follow Steps 1 - 3. Multiply reading by 10. Record as ppm Copper.

Turbidity

- Measure of water clarity, <15 NTU is “normal”
- Possible sources:
  - Soil erosion
  - Water main break
  - Sanitary Sewer Overflow
  - Algae blooms
  - Construction, dredging or dewatering



Field sample analysis

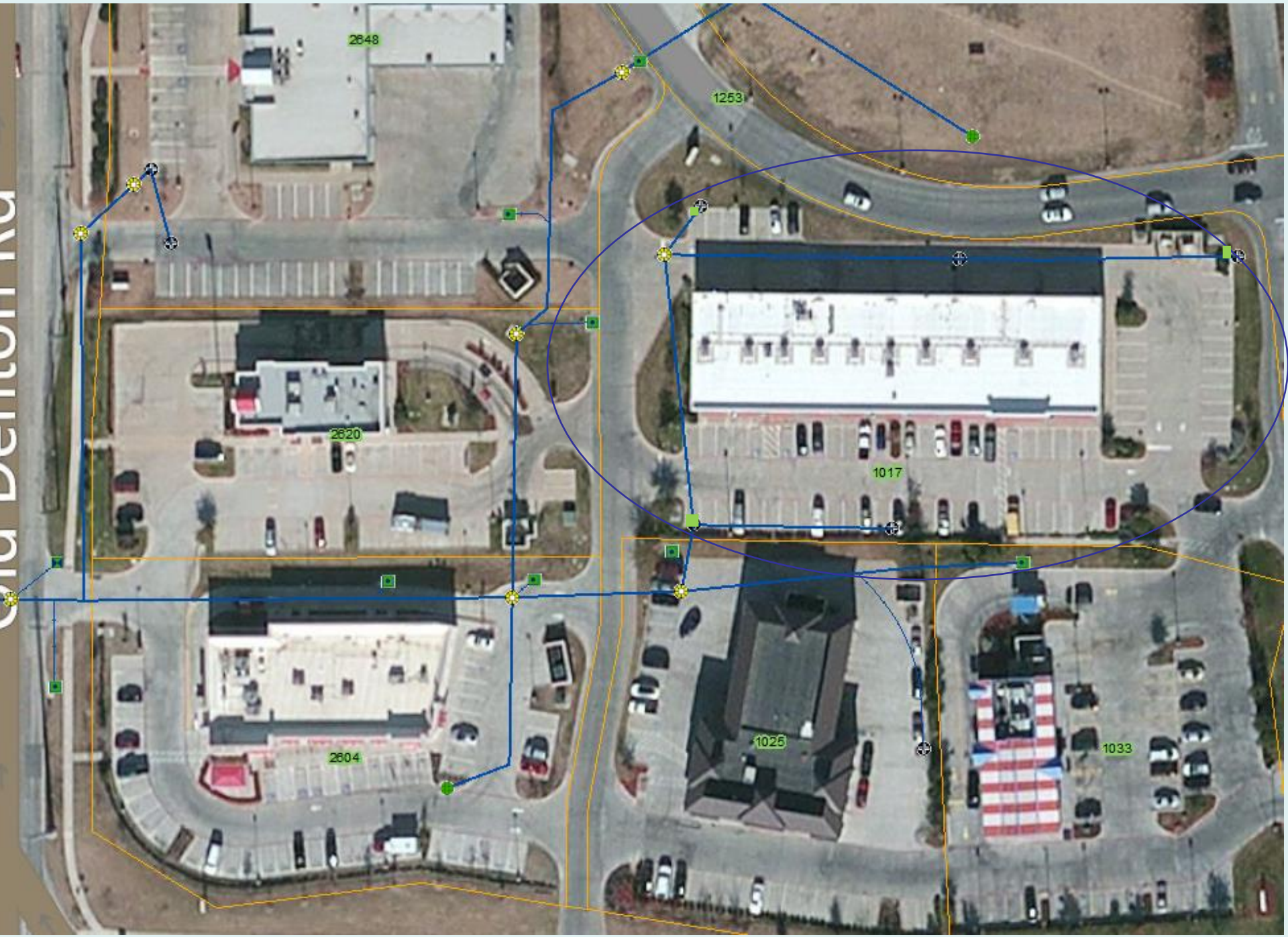
- QA/QC for sample analysis
  -ensures the test was done correctly
  -run the test on deionized water blank sample
- Disposal of wastes –
  - Ammonia nitrogen
  - Detergents
  - Copper

Questions?

Field Portion
1 hour

Case Study #1

- Thursday, October 23, 2014 at 1pm – complaint that sewage was coming up out of the storm drain in the parking lot, including a very strong odor.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2620
1017
2604
1025
1033


2648
1253
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PVT07-3MH008
2620
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1017
6 IN
6 IN
8 IN
PVT07-3MH006
8 IN
6 IN
1025
1033
2604
8 IN


Railford Rd
MacArthur Dr
Texas Department of Public Safety
Old Denton Rd
E Trinity Mills Rd
President George Bush Tpke
President George Bush Tpke
Trinity Mills Rd W
TX-190 E
Trinity Mills Rd W
TX-190 E
E Trinity Mills Rd
1028
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1016


Texas Department of Public Safety
Old Denton Rd
MacArthur Dr
Raiford Rd
E Trinity Mills Rd
President George Bush Tpke
07-3MH051
07-3MH050
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07-3MH101
07-3MH102
07-3MH147
07-3MH043
07-3MH059
07-3MH031
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PVT07-3MH002
PVT07-3MH009
PVT07-3MH007
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Texas Department of Public Safety
Old Denton Rd
MacArthur Dr
Raiford Rd
E Trinity Mills Rd
President George Bush Tpke
07-3MH051
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PVT07-3MH002
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PVT
PVT07-3MH009
07-3MH176
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8 IN
Old Denton Rd
1100
8 IN
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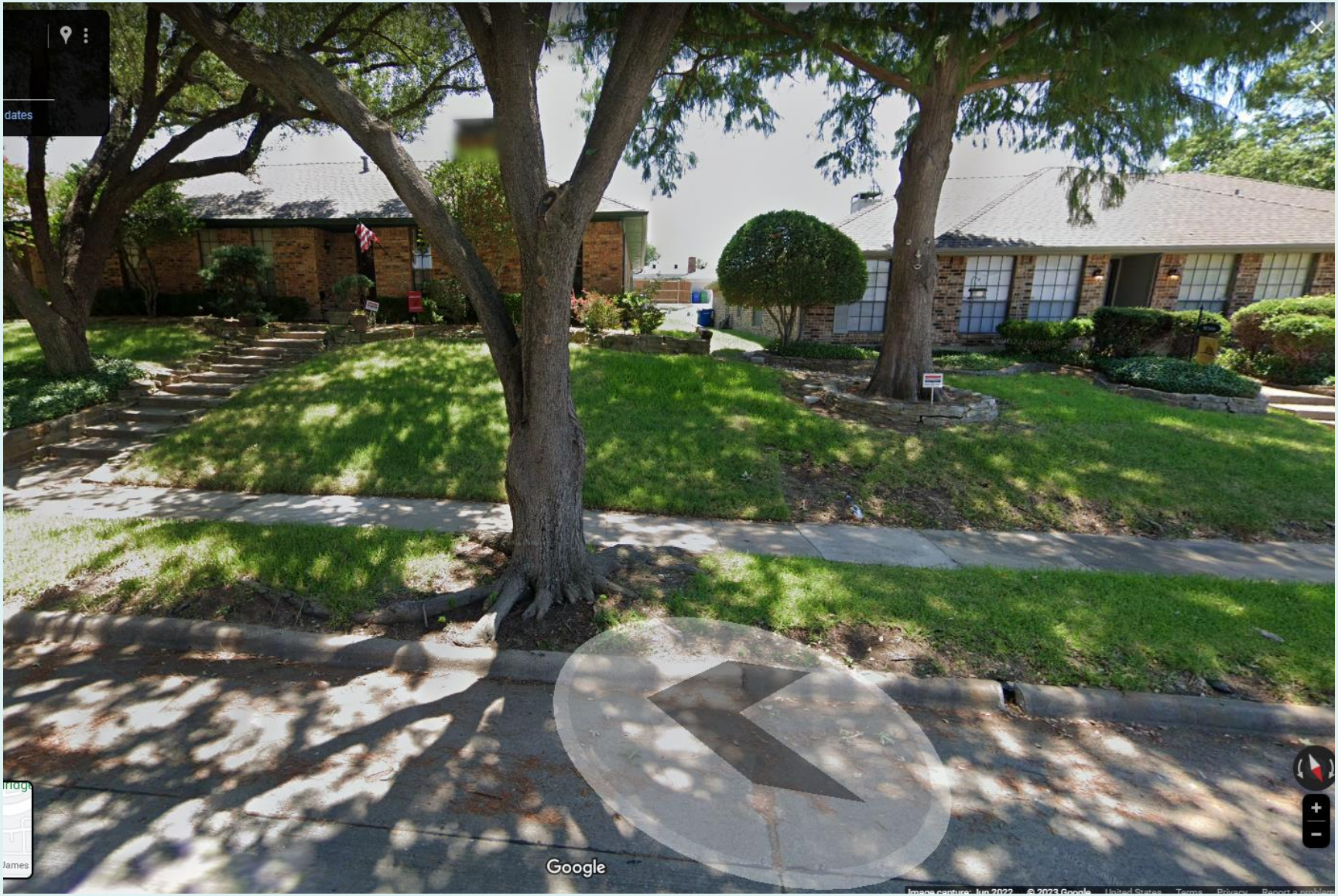
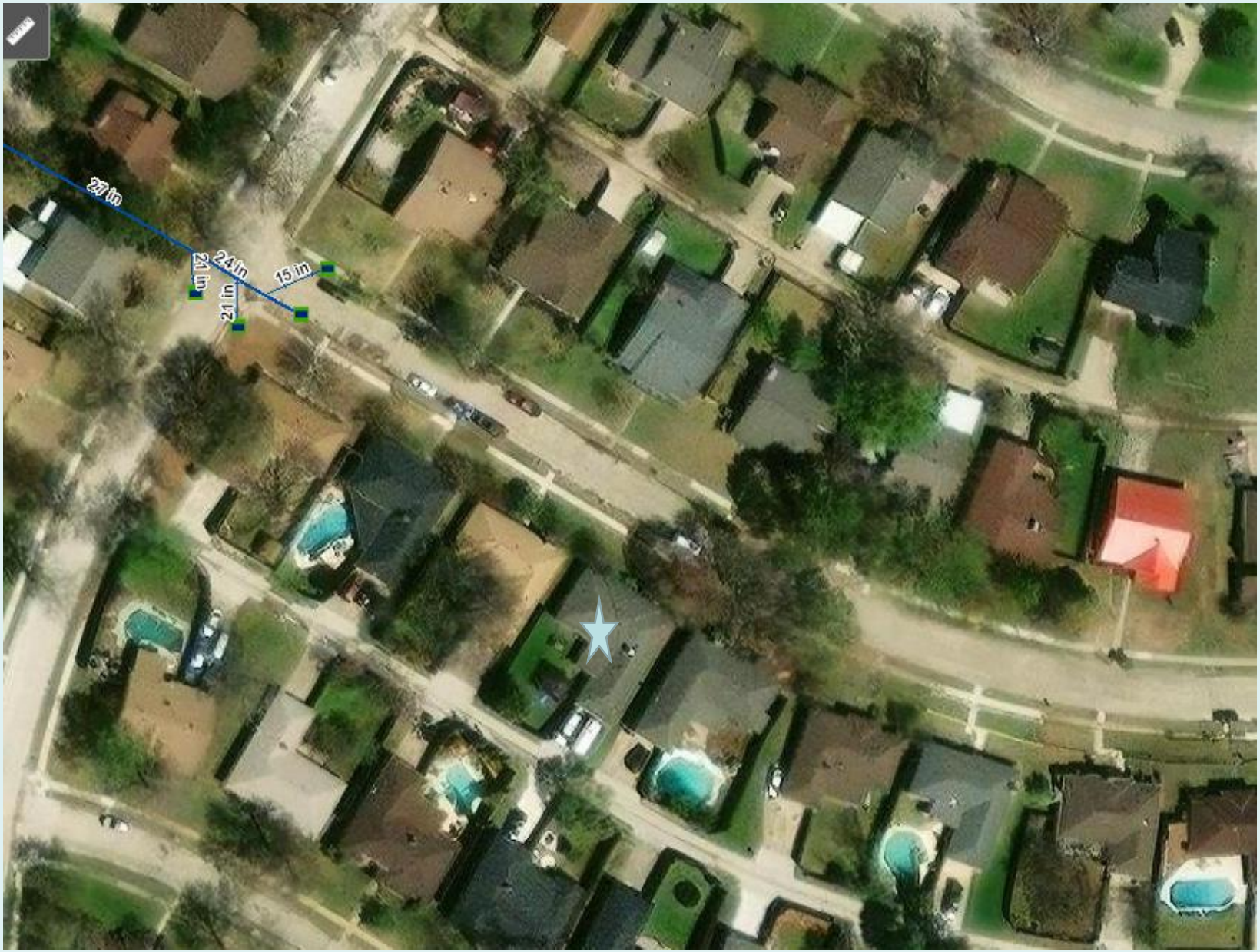
1016
TX-190 W
Trinity Mills Rd W
TX-190 W
President George Bush Tpke

Case Study #2


dates
Google


1605 Delaford Dr
Carrollton, Texas
Google Street View
Jun 2022
See more dates
Google


237 in
24 in
21 in
15 in

Lab Data:

- **Hardness – 1770 mg**
- **Calcium – 530 mg/l**
- **Magnesium – 108 mg/l**
- **Iron – 8.53 mg/l**

Water hardness is classified by the U.S. Department of Interior and the Water Quality Association as follows:

Classification	mg/l or ppm	grains/gal
Soft	0 - 17.1	0 - 1
Slightly hard	17.1 - 60	1 - 3.5
Moderately hard	60 - 120	3.5 - 7.0
Hard	120 - 180	7.0 - 10.5
Very Hard	180 & over	10.5 & over

Other IDDE Methods

- Optical Brighteners
- Method
- When/where to use

Questions?