ASCE 38-22 SUE Standard Updates

Day 3 – 2:30pm-3:00pm
12/14/2023

Presenter: Wes Kaisershot, P.E.

Wes Kaisershot is an experienced professional civil engineer specializing in SUE, UC, utility engineering, oversight, and construction monitoring and verification with more than 25 years of experience. He has developed numerous utility investigations and roadway conflict analyses to provide AMA serving in the past as TxDOT's Austin District Utility Engineer, the private sector across multiple districts, as well as FHWA and ROW Division Utility policies. His deep and well-rounded experience allows him to successfully manage complex projects that require a high degree of attention to detail, expertise in federal and state regulations, knowledge of the various client levels in command, and appreciation for the work and review processes that occur. Wes developed the Buy America agreement between TxDOT and FHWA in 2011 and is a subject matter expert in this aspect and all aspects of the Utility Engineering and UC process.

Subsurface Utility Engineering (SUE)
Utility Week 2023

December 14, 2023

SUE, Survey, and Utility Coordination

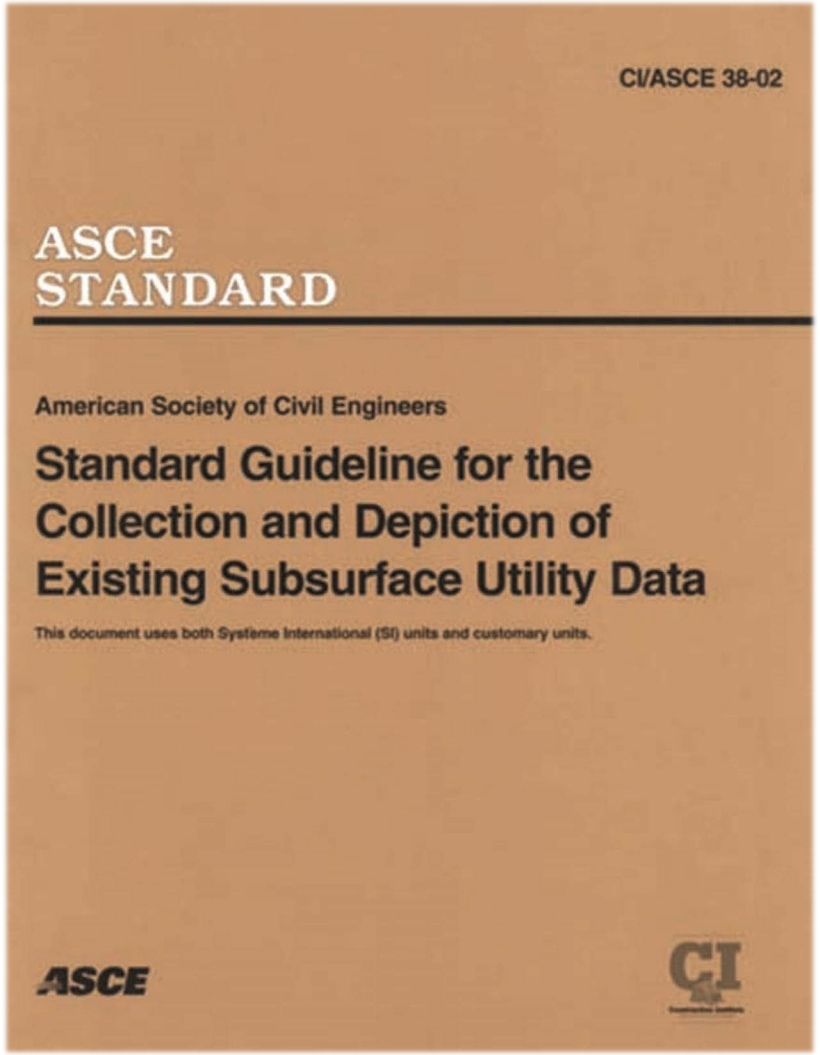
Central Texas (Austin/Round Rock)
800 Paloma Drive, Suite 240
Round Rock, TX 78665

Dallas/Fort Worth
4925 Sun Valley Drive
Fort Worth, TX 76119

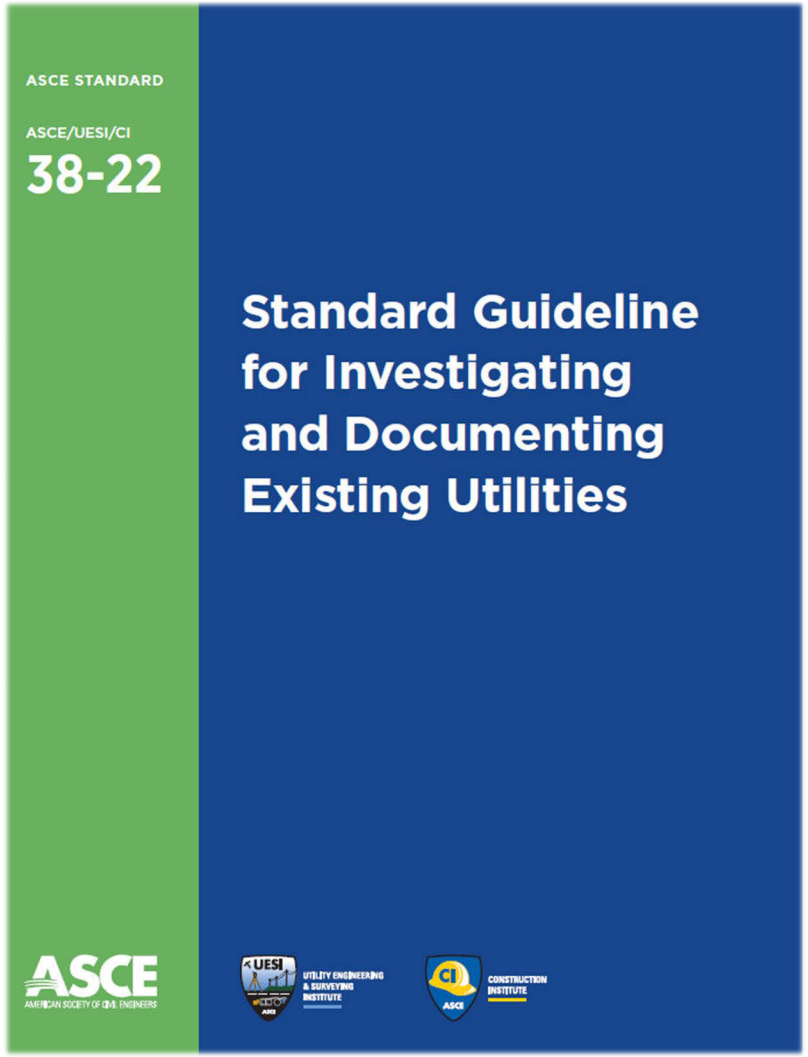
Denver (Headquarters)
6501 E Belleview Ave Suite 300
Denver, CO 80111

ASCE 38

SUE Standard



Original Standard (2002)



Revised Standard (2022)

Why SUE?

- Utility investigation data that allows for strong Utility Coordination
  - Avoid, Minimize, Accommodate
- Utility conflicts continue to be the primary project delay
- SUE vs. 811 Damage Prevention
  - SUE is an Engineering Standard, to an engineering “Standard of Care”

The Opportunity

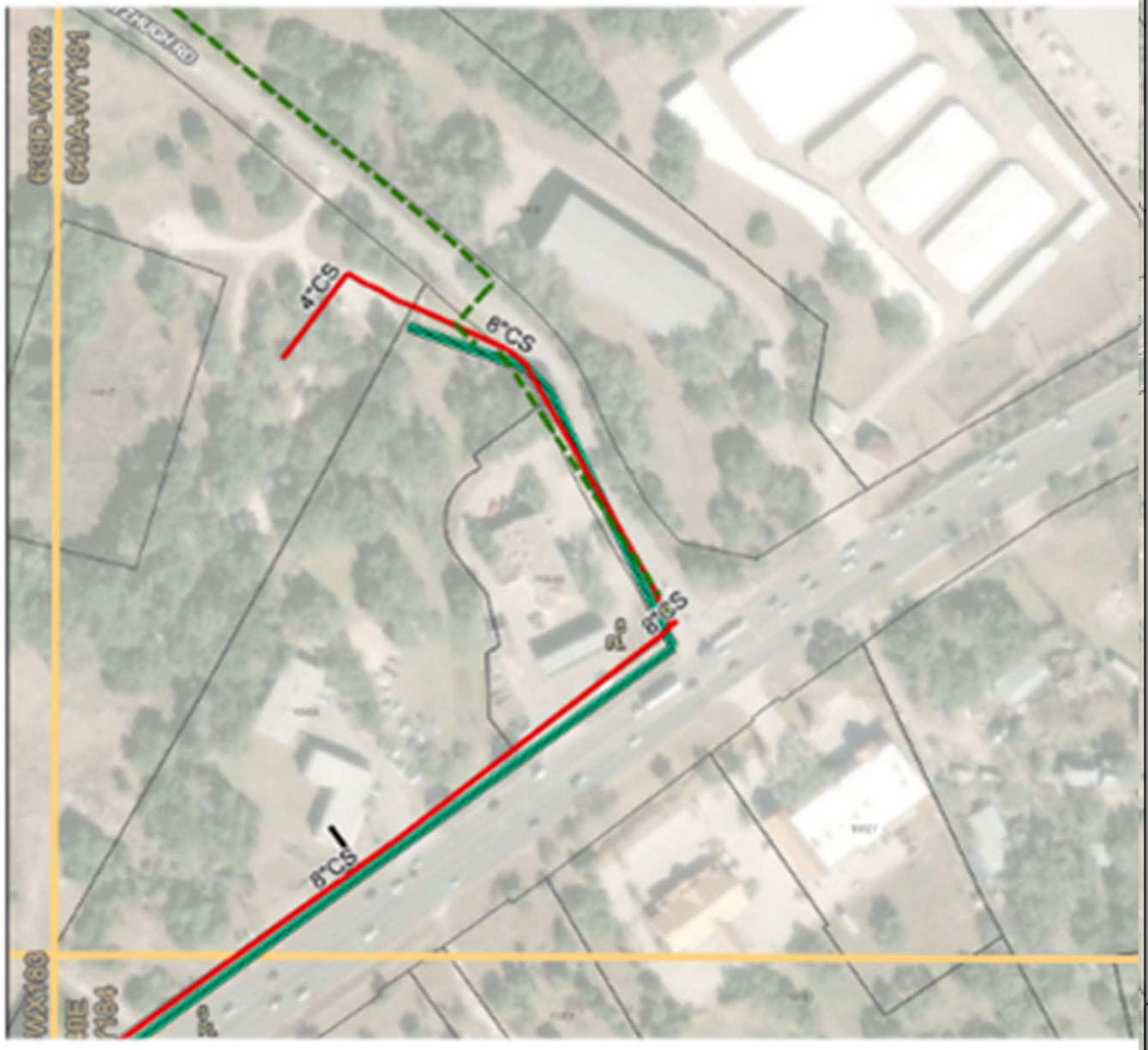
Quality Levels (QLs) of investigative “certainty”

QLA, QLB, QLC, QLD

SUE Investigation

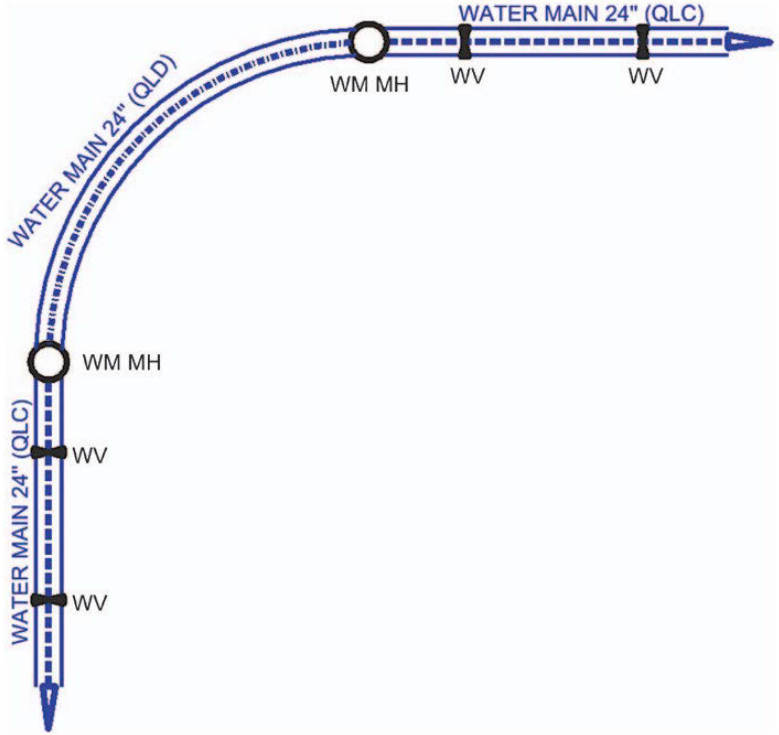
Quality Level D (QLD)

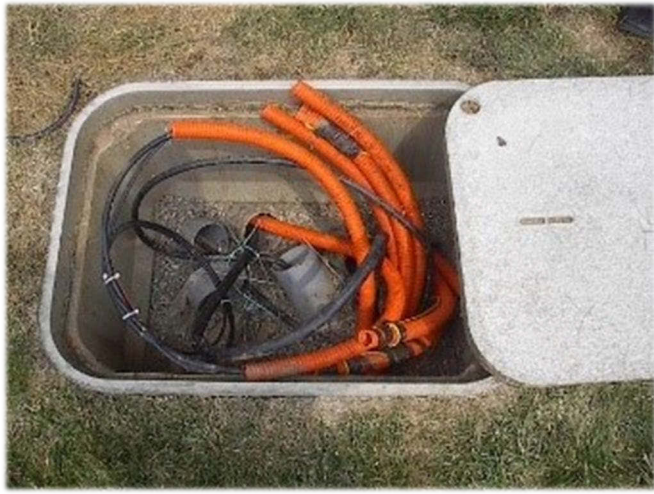
- Internet Based Research (AI)
- Planning, ENV, Inventory
- Utility records
- Permits
- Verbal recollections
- Service, visual indicators, 811 markings
- Site visit
- Professional in charge
- **Not “design” level SUE**



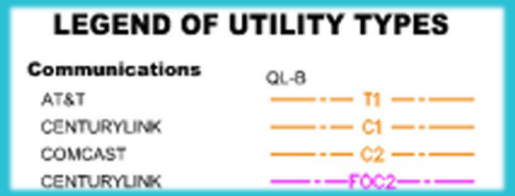
Quality Level C (QLC)

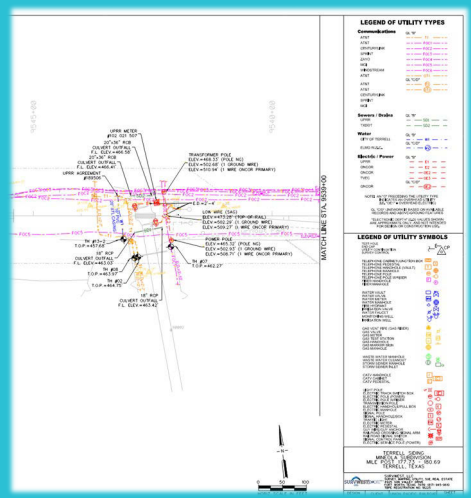
Quality level C is determined by documenting underground “utility segments” from existing second-party information to observable and surveyed visible utility features.





Quality Level B
(QLB)





QLB is determined by designating by **geophysical methods** correlating appropriate interpretations indicating a Utility Segment or Utility Feature

Documentation for the Utility Segment.

Tolerance: 0.2 ft (60 mm) or better.

Quality Level A (QLA)

TEST HOLE DATA FORM
TH 12

SURVWEST
6501 E. Belleview Ave. STE 300 | Englewood, CO 80111

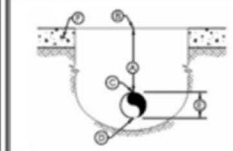
PROJECT NAME:	8th Street Test Holes		
SW Project No.:	P200007	Vacuum Truck No.:	VT2
Utility Type:	FOC	SUE Field Manager:	J. Telford
Utility Owner	Kinetic	Field Technicians:	JM | 0
Date Completed:	01/28/20	Weather:	Ptly Cldy

TEST HOLE DATA

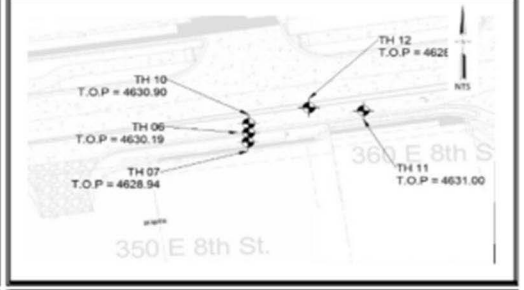
Approximate Station: 0 Offset: 0

A	Depth to Top of Utility:	7.76
B	Existing Surface Elevation	4635.98
C	Top of Utility Elevation:	4628.22
D	Utility Material Type:	PVC
E	Outside Diameter of Utility (Inches):	4 - 4"
F	Existing Pavement Thickness (Inches):	N/A

TEST HOLE SECTION (NTS)



SHOT DESCRIPTION	POINT NUMBER	NORTHING (Y)	EASTING (X)	EXISTING GRD. ELEV (Z)	TEST HOLE MARKER
12	CC1011	1399232.16	3231284.45	4635.98	5/8"IR W/ CAP



SurvWest, LLC

COLORADO LICENSED 41281 PROFESSIONAL ENGINEER 2/17/2020

SW Project Manager D. Smallwood Completed By: DJS Checked By: DAS

Tolerance: 0.1 ft (30 mm) vertical

QLA, QLB, QLC, QLD?

What is needed now?

What is needed later?

Strategic approach

SUE Documentation

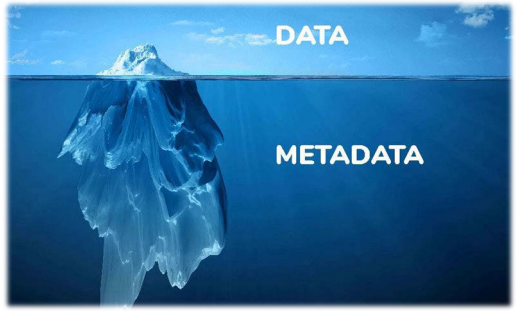
Utility Report

Utility Attributes

- Overhead
- Depth
- Utility owner
- Utility type
- Size and shape
- Encasement
- Configuration

- Operational status
  - Active/Inactive
- Abandoned
- Unknown
- Date of install
- Condition
- Material Type
- Tracer wire
- Pressure
- Voltage

Investigation
Metadata



- Data that defines the collection of data
- Project data
  - Survey datum
  - Project task dates
  - Records
  - Deliverables
- Type of geophysical methods
- Project limits
- Areas unable to be investigated
- Utilities not in scope
- Time of day and weather
  - Overhead power and telecom sag elevations

Utility Report

- ***Attributes***
- ***Metadata***
- Signed by a Professional Engineer
- Project description
  - Areas investigated
- Methods/Equipment used
- Documented utility owners
- Software
- Areas investigated
  - Linear feet designated/# Test Holes
  - Conflict Analysis
  - Pictures/LiDAR

Formatting Deliverables

SUE Deliverables

TEST HOLE DATA FORM
TH 08

SURVWEST | SURVEY•MAPPING UTILITY•SUE REAL ESTATE
6501 E. Belleview Ave. STE 300 | Englewood, CO 80111

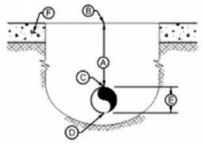
PROJECT NAME:	8th Street Test Holes		
SW Project No.:	P200007	Vacuum Truck No.:	VT2
Utility Type:	FOC	SUE Field Manager:	J. Telford
Utility Owner	Kinetic	Field Technicians:	JM ⋮ 0
Date Completed:	01/27/20	Weather:	Cloudy

TEST HOLE DATA

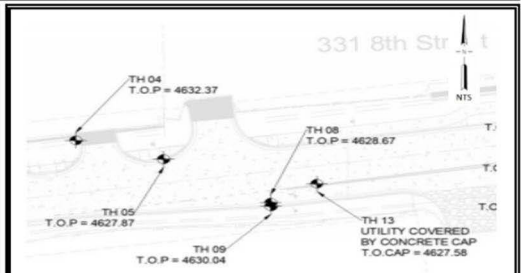
Approximate Station: 0 Offset: 0

A	Depth to Top of Utility:	2.76
B	Existing Surface Elevation	4631.43
C	Top of Utility Elevation:	4628.67
D	Utility Material Type:	PVC
E	Outside Diameter of Utility (Inches):	4 - 4"
F	Existing Pavement Thickness (Inches):	N/A

TEST HOLE SECTION (NTS)

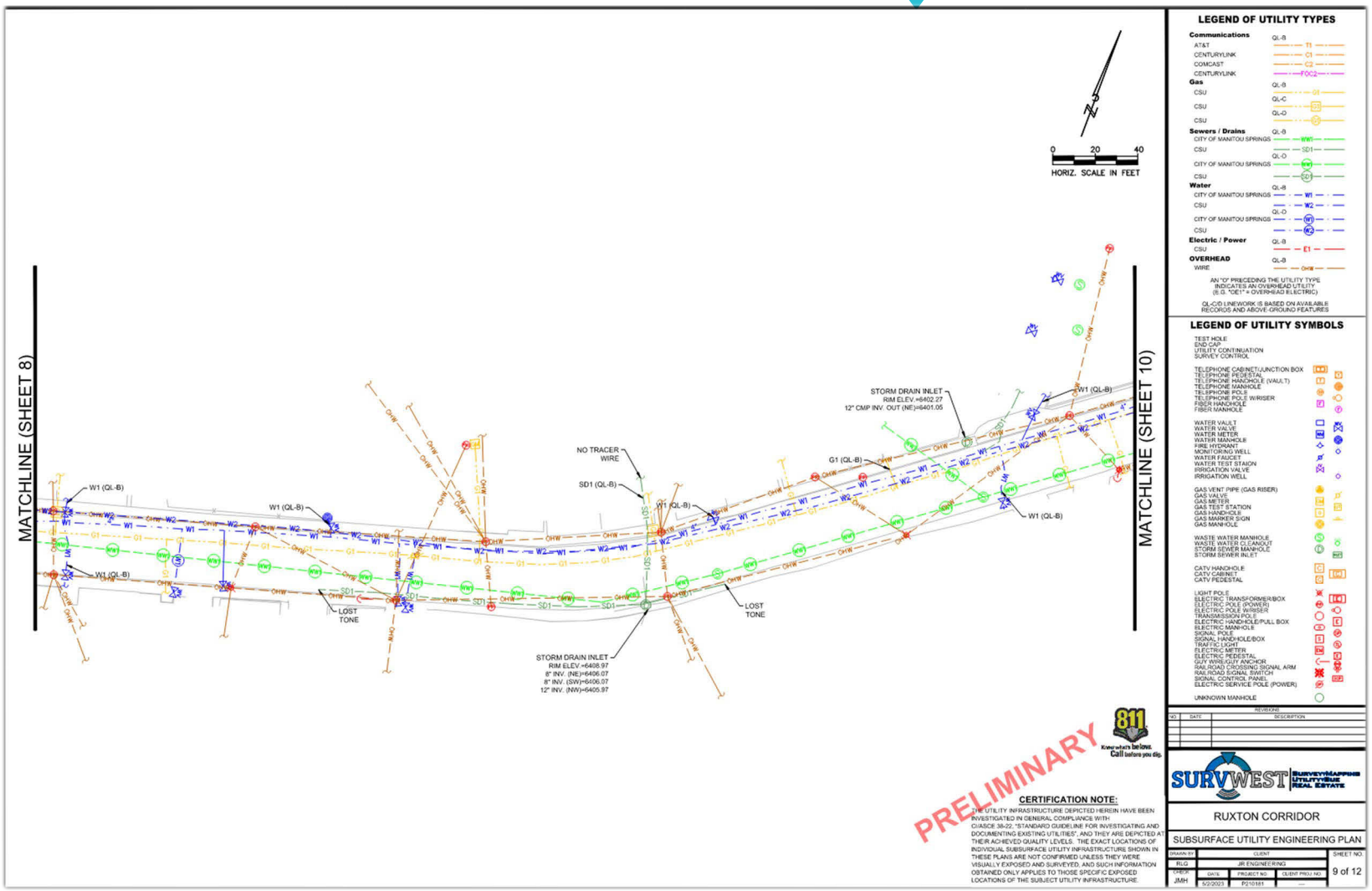


SHOT DESCRIPTION	POINT NUMBER	NORTHING (Y)	EASTING (X)	EXISTING GRD. ELEV (Z)	TEST HOLE MARKER
08	CC1006	1399173.98	3230975.97	4631.43	5/8"IR W/ CAP



SurvWest, LLC

SW Project Manager D. Smallwood Completed By: DJS Checked By: DAS

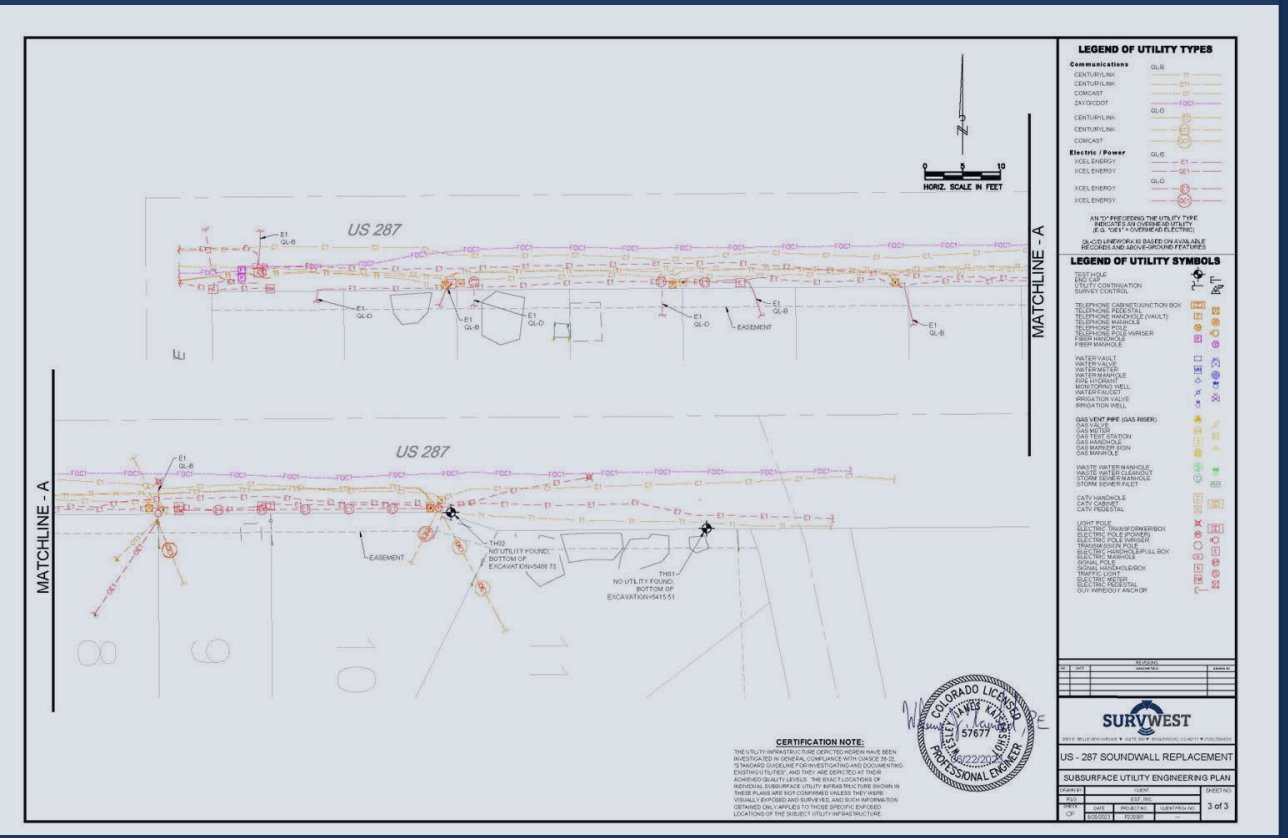


Cost benefits of SUE

Purdue University

Virginia, Ohio, North Carolina, Texas, Oregon, Wyoming, and Puerto Rico. Included in the study were rural, urban, suburban, arterial, and interstate projects.

$4.62 saved for every $1 spent on SUE in Design and Construction costs



Penn State

$22.21 was saved per $1 of SUE in project costs, on average. These savings include costs associated with Utility relocation, damage, and restoration; traffic delay; business impacts; user service; environmental impacts; and legal and litigation.

Geophysical methods of SUE investigations

Electromagnetic

Pipe & Cable Locator

Ground Penetrating Radar (GPR)

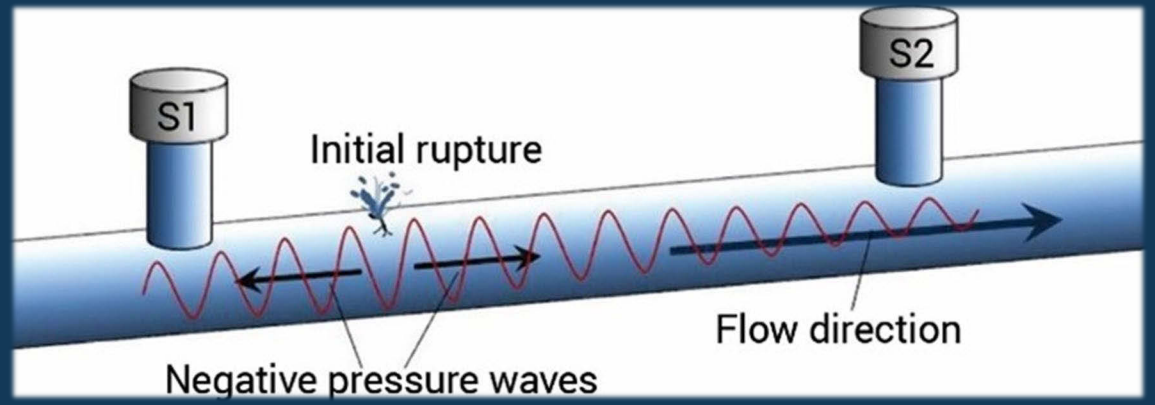
Sonde and Tracing Cable

Magnetic Methods

- Total Field, Gradiometric methods
- Iron/steel utility pipelines
- Shallow buried valve boxes
- Manhole covers (covered)
- Well caps
- Property pins.

Elastic Wave Methods

- Acoustic emission
- Mechanical stress deformation and “noise” (acoustic emission) can be monitored by various transducers
  - Inducing a sound into or onto a pipe
  - Letting product escape the pipe i.e. water running at a hydrant



High Cost/Specialized Methods

- Rare in SUE today
- Advancing tech

ISOTOPIC (RADIOMETRIC)

- Geiger counters
- Contaminated by radioactive compounds
- Specialty locating crews only

INERTIAL

- Like submarine tracking positions by using gyroscopes.
- Surveyed position in entry of a pipe, sonde used, repeated inertial movements
- Mapping probe Hot tap into pipe
- Pressurized and unpressurized lines

CHEMICAL

- Leaked Natural gas can be detected with flame ionization or photo ionization techniques.
- Products in pipe left during construction

MICROGRAVITATIONAL

- Large utilities (or tunnels) that are predominantly empty.
- Mass of empty pipe vs. filled pipe
- Time consuming and expensive
- Lesser Quality Levels (C/D) should be considered

BORE-HOLE GEOPHYSICS

- Getting closer to the utility through “geotechnical” means
  - Oil/Gas industry
  - Soil strength samples
- Triangulation survey locations if multiple bore-holes along a utility

Questions?

Wes Kaisershot, PE
VP, Director of Engineering

Jerry “Heath” Hilbig, PE
Texas Utility Operations Leader

512-694-9210 | wkaisershot@survwest.com

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Thank You!

Networking Break