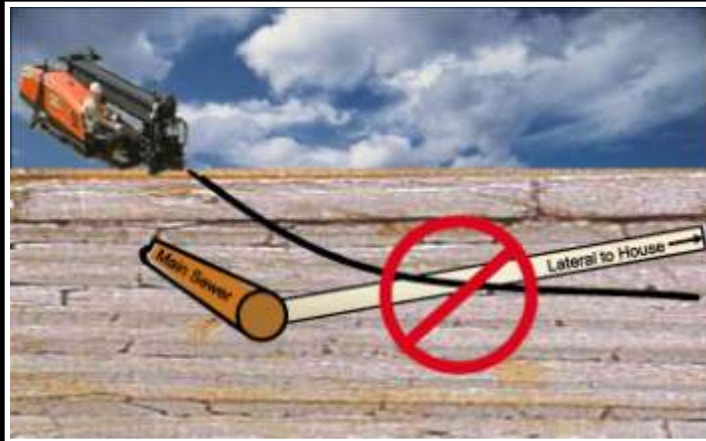


HYDROMAX USA

Gas Line And Sewer Crossbores



Danny Hixon & Jeff Griffiths
513-410-3301 757-353-1521

HYDROMAX USA

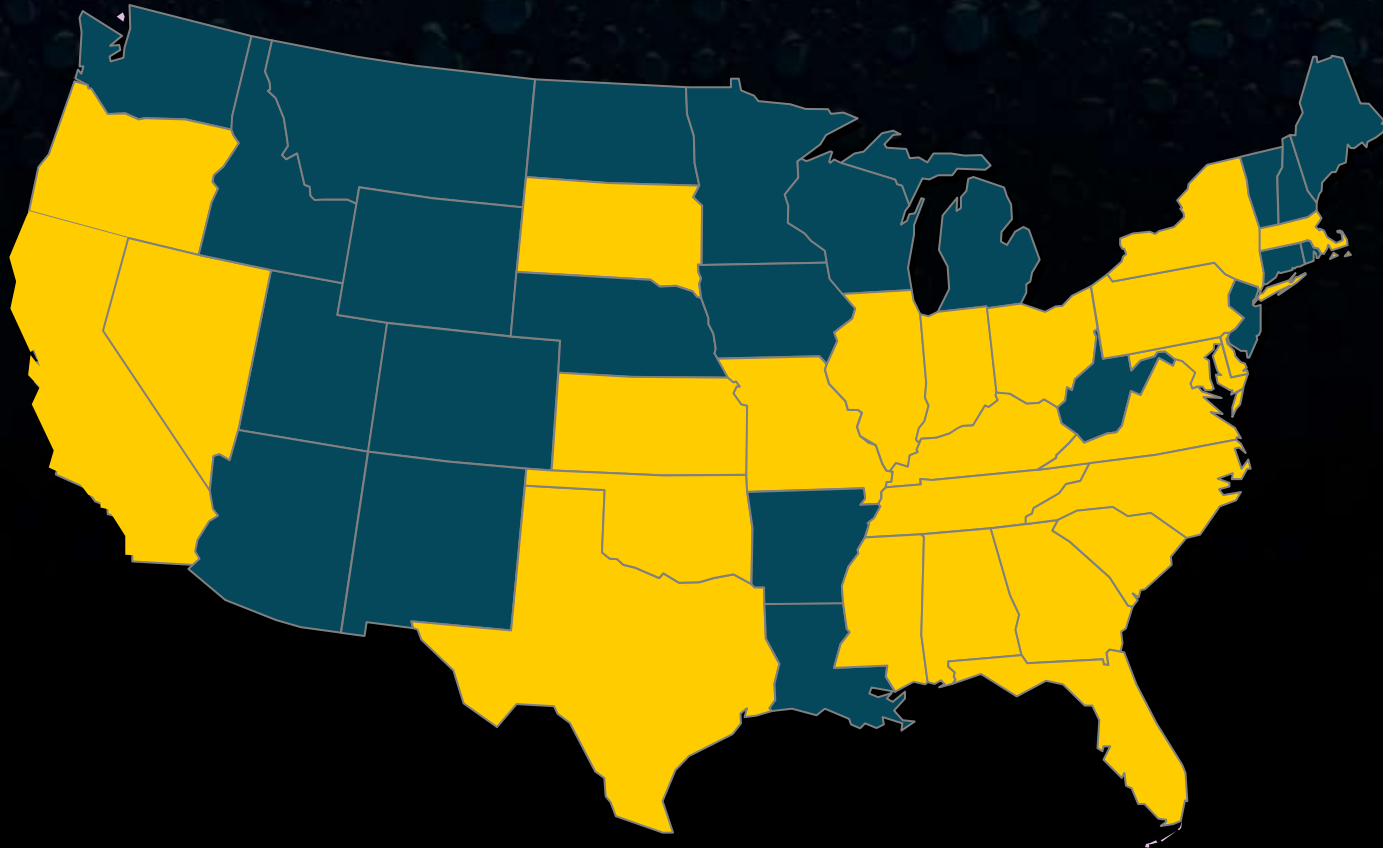
GOAL OF HYDROMAX USA

Hydromax USA is a “Professional Services” company that provides accurate and easily interpreted data, empowering the contractor, engineer and utility owner to make the right decisions regarding their buried infrastructure.

HYDROMAX USA

PROJECT LOCATIONS

In the last 7+ years our clients entrusted HUSA to work in 27+ states.



Our growth is the result of having experienced people, understanding client needs, providing better than expected data, and performing work at a reasonable cost.

CROSSBORE INTRODUCTION

- A Crossbore is any unintentional intersection between two underground utilities
- Typically caused by trenchless installation
- Experience shows 2-3 gas crossbores per mile in high potential conflict areas
- Gas utilities & installers have been proactive since 2000



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NEW & LEGACY CROSSBORES

New Construction



Legacy (existing)

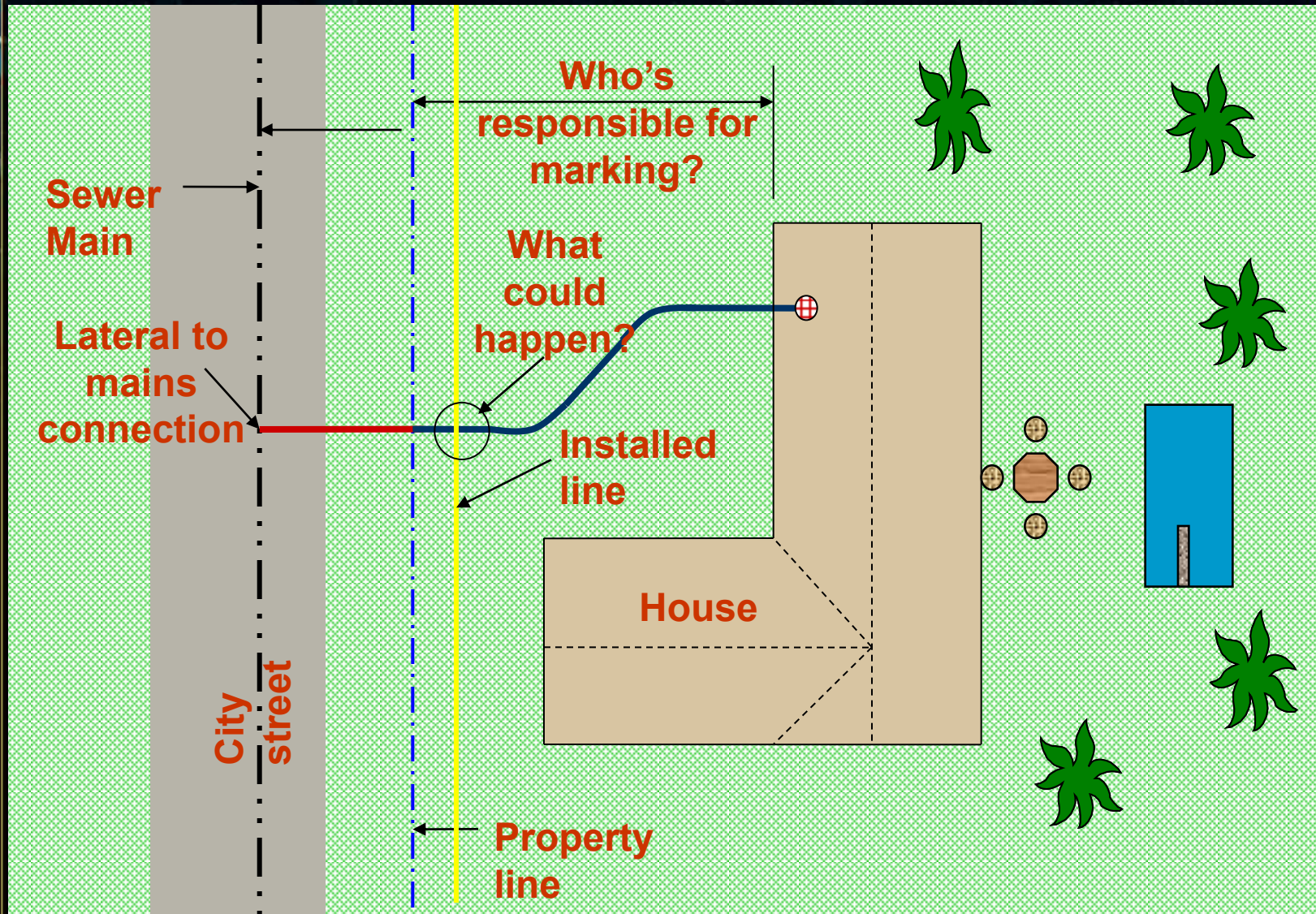


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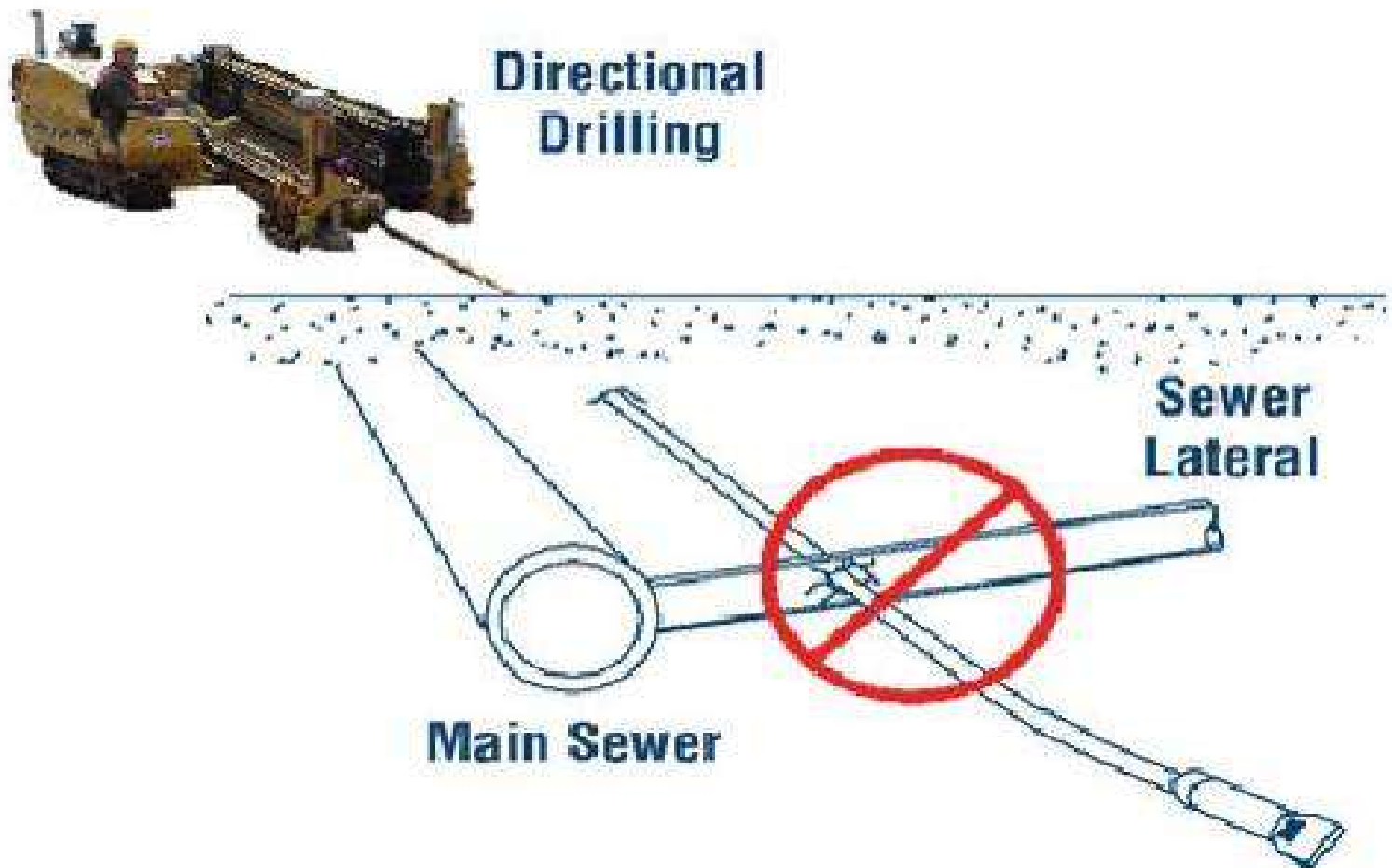


SURVIVING A BLAST

DO WE HAVE A PROBLEM?



HOW OFTEN DOES IT HAPPEN?

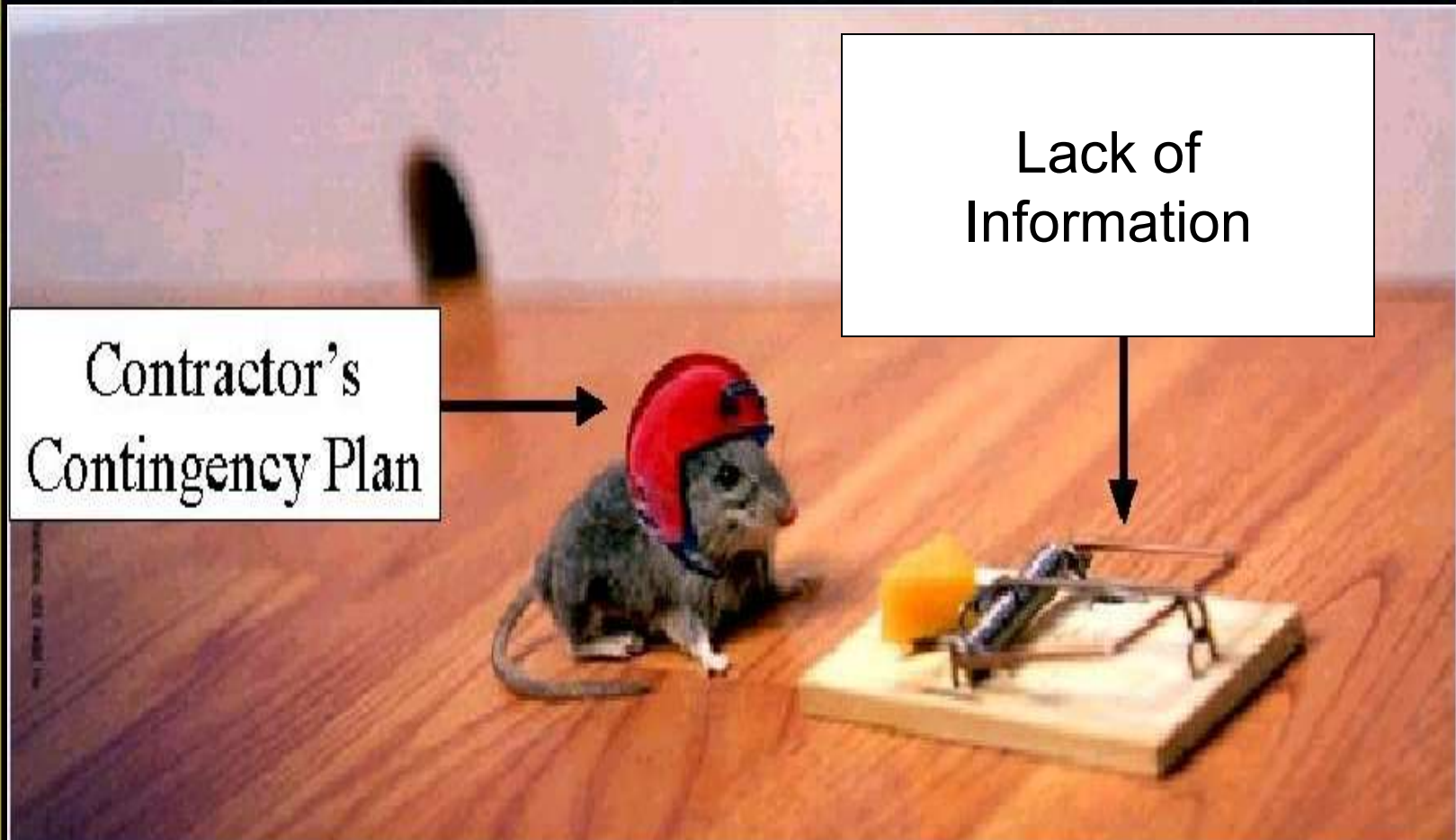


CGA CONFERENCE MARCH, 2008

- “How many of you have experienced Crossbores?”
 - 2/3 of attendees raised their hands
- CGA’s Locating Sewer Service Laterals Committee reached a stalemate and closed the initiative. The team, however, believes this is an important issue and does not want to be satisfied with the status quo. Best Practices Task Group reformed this fall.

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BE SMART. PROTECT YOURSELF.



Damage and Injury from Cross Bores

- **Gas cross bores can be considered a “ticking time bomb”**
- **The cross bore may lay dormant for decades**
- **Drain cleaners can easily cut the plastic gas line if it intersects the sewer**
- **Damages reportedly have been as much as \$30,000,000 for a single instance.**

Gas Explosions

- Who is responsible?
 - Sewer operator?
 - Gas installation contractor?
 - Gas distribution utility?
 - Drain cleaner?
 - Home owner?

Gas Explosion – Who Pays?

- **Contractors have limited ability to pay large judgments**
 - Limited liability coverage
- **Gas Utilities have often been found at fault**
 - Some states have statutes that set a limit on maximum judgments against utilities
- **Are Sewer Owners Liable?**
 - Sewer utility?
 - Home owner of the lateral?

Legislation

- **Most states' legislation requires some level of locating to be provided by sewer operator.**
- **A few states exempt sewers/laterals.**
- **All states need to require sewer locations.**
- **More education and guidance is required to adequately address cross bore safety.**

Technology Provides Solutions

- **Identification of legacy cross bores took a leap in 1999 with the introduction of lateral launched main line cameras combined with;**
- **Push rod cameras, combined with.;**
- **Pot holing**
- **GPS**
- **GIS mapping**
- **GPR, Acoustic and combinations are under development**

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PALO ALTO, CA

- 4 blocks inspected

07/16/2001 03:47:58 PM
Detection Spec Inc

bottom
of line

39 ft

USMH: 21-144
DSMH: 21-143

XP - Collapse Pipe Sewer

30.1 Ft.

3/29/2007 11:48

MINNESOTA

- 27 cross bores reported to the Minnesota Public Utilities Commission in a 6 month time period.



MIDDLETOWN OHIO 3/16/2006

- After seeing bubbles in the water and smelling the natural gas, the plumber told a grandmother and her three grandchildren to get out of the home immediately.

- *March 18, 2006*
Middletown Journal



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Headline:
March 13, 2006
Woman, Granddaughters Barely Escape Explosion



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**OK Natural Gas line
was installed in 1992**



ANOTHER CITY

- Just over 400 gas cross bores discovered over 200 miles of sewer main lines
 - One cross bore located at a school
- Averaged 2 cross bores per mile
- The utility mailed notices to over 50,000 residences asking them to first call a special phone number if they had a sewer backup.

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ANOTHER PROJECT

11,000 sewer laterals inspected

- 250 cross bores identified
- 2% were cross bores



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ODDS OF GETTING A HOLE-IN-ONE

1 in 12,000



A Montana Gimmie

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DO YOU WANT YOUR CONTRACTOR TO GAMBLE?



DUKE'S POLICIES

- Pre-Construction: Required pre-locating before any excavation
- Post Camera: Required to audit that there are no crossbores before ANY GAS UP
- Contract line items to *pre-locate* (often via camera) and *post-camera* all sewer mains and laterals, services and storm drains
- NPL completed 600 of almost 10,000 NPL Bore Cards in 2007

Research Where do cross bores occur? Why? Phase

- Main contributing causes of having shallow clearance between sewer laterals and gas utilities
 - Areas with a high water table *
 - Areas surrounding identified lakes *
 - Areas with low Macro Factors drift thickness cover *
 - Known areas with shallow sewer mains
 - Areas where the gas line is buried deeper than usual
 - Localized elevation changes (Terraced properties)
 - Homes with shallow or no basements
 - Privately owned sewer systems
 - Mobile home communities *
 - Sewer laterals that exit other than the basement floor

CURRENT METHODS TO FIND & AVOID CROSSBORESS

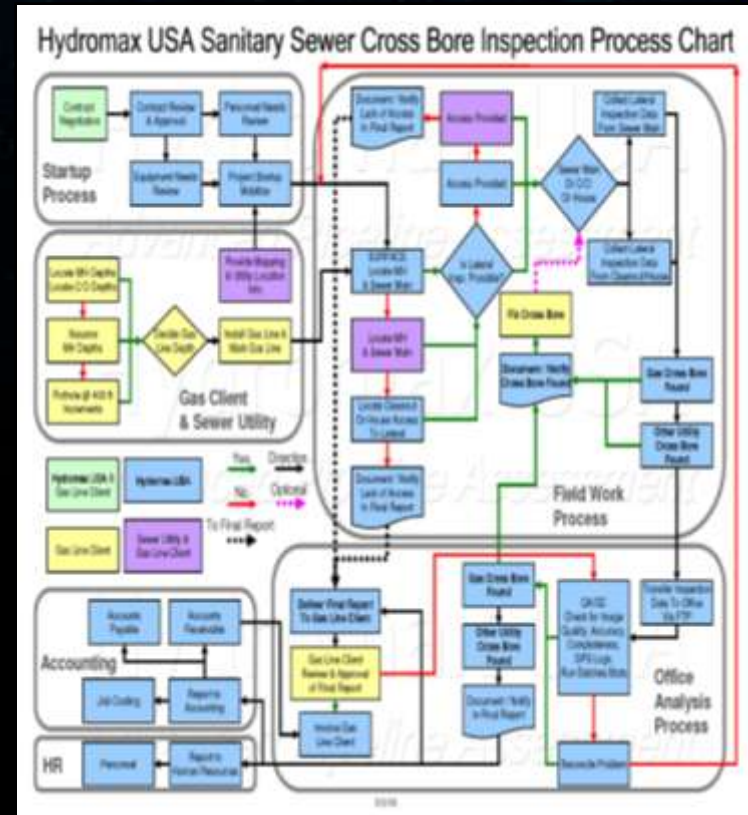
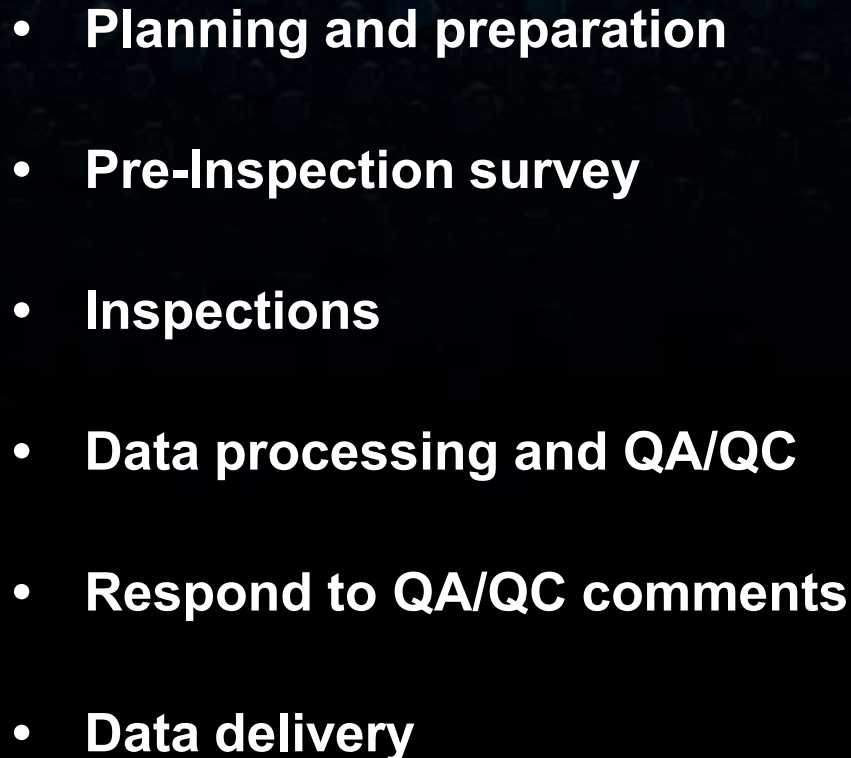
- **Open trench method (new const.)**
- **Map and record review method (new const. & legacy)**
- **Relative elevation method (new const. & legacy)**
- **Exposed sewer method (keyhole, new const.)**
- **Radio sonde method (new const.)**
- **Televising method (new const. & legacy)**

INSPECTION METHODS

- Typically involves using robotic CCTV camera or portable push cameras
- Involves locating and marking sewers within danger zone using radio sondes and receivers prior to gas installations (pre inspection of new line)
- Involves visual confirmation of “all clear” status of sewers within danger zone after gas installations (post inspection of new line & legacy)



PROJECT PROCESS



PRE-CONSTRUCTION MEETING

- Scope of installation, main/service limitations
- Safety requirements
- Traffic requirements
- Scheduling, gas updates
- Sewer, gas, water, traffic engineer, contact list
- Deliverables expectations



DETERMINE INSPECTION METHOD

- **Customers' budget, schedule, risk tolerance and regulatory requirements**
- **Location and size of project**
- **Main to structure or structure to main**
- **Will city support for cleaning?**

PRE-INSPECTION SURVEY

- Identify each pipe segment & total structures affected
- Total LF of sewer mains & catch basins / intersecting mains
- Water hydrant locations
- Pipe size and cleanliness
- Accessibility for entry, buried manholes



DOCUMENTS & MAPPING

- Traffic Permits
- Waste Hauler Permit
- Water Permits
- Occupant License
- Gas Prints
- Sewer Prints (Shape Files)
- Aerial Prints Showing Structures



PRE-INSTALLATION INSPECTION

- Debrief field crews prior to mobilization
- Verify crew's understanding of project & client expectations
- Determine entry point & direction
- Protect work area
- Check camera & calibrate locator
- Lower mainline camera & begin inspection



PRE-INSTALLATION INSPECTION

- Provide approximate X,Y,Z location of sewer main every +/- 20 LF
- If sewer main is too dirty to crawl, schedule cleaning truck
- Mark location & depth at every tap
- Launch lateral, mark depth & location at curb, sidewalk & foundation



PRE-INSTALLATION INSPECTION

- **If lateral can't be inspected using mainline CCTV camera, schedule pushrod inspection**
- **Repeat process for storm main, storm laterals, and catch basins where applicable**
- **Supervisor physically walks segment to ensure nothing is left unmarked**
- **Submit data for QA/QC**
- **Digital deliverables typically provided:**
 - **Video files**
 - **Mapping & segment reports**
 - **Letter of completion**
 - **Inspection database**

POST-INSTALLATION INSPECTION

- Schedule post-installation inspections per direction of the client
- Protect work area
- Check equipment & calibrate locator
- Perform inspection



POST-INSTALLATION INSPECTION

- Video inspect all sewer mains and laterals in work area
- Scheduled inspections w/ home owners where access is needed when using pushrod cameras
- Use alternate methods when CCTV equipment is insufficient
- Submit data for final QA/QC processing & delivery



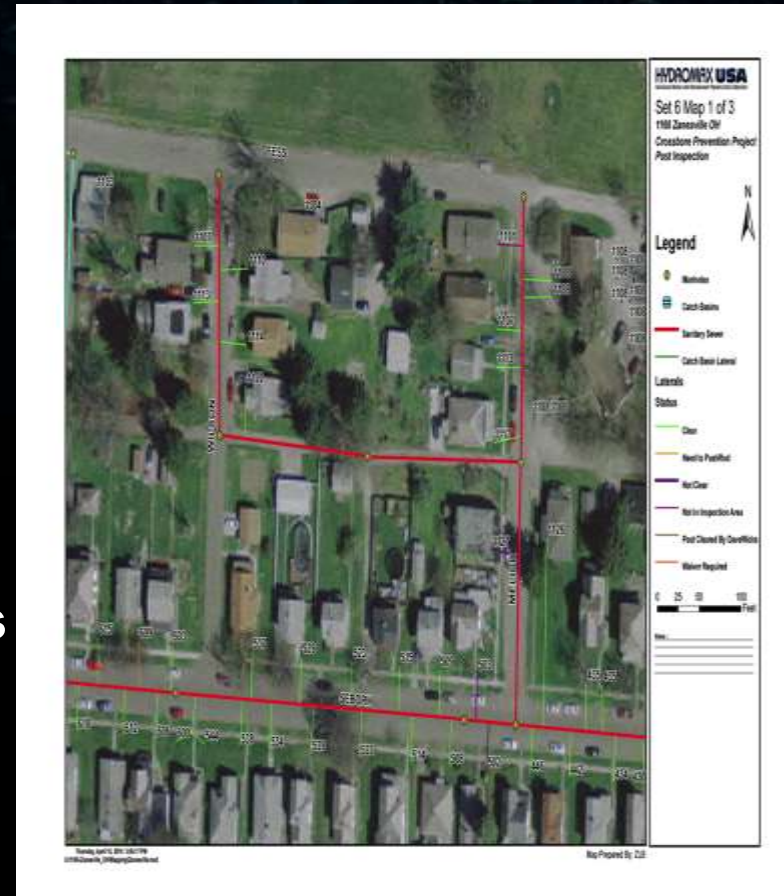
DATA PROCESSING

- Data delivered from field to data center daily
- Deliverables compared against client-supplied prints, work orders & pre-inspection survey
- Completeness of inspection determined by data analyst



DATA PROCESSING

- Permanent mapping & marking delivered
- Letters of completion not issued until crews, data analyst and supervisor agree the work is complete
- Uploads to FTP site upon completion for client access to records and videos
- Long term storage options



UNIQUE CHALLENGES

- Large diameter inspections
- Small diameter inspections
- Force mains
- Cleaning laterals on legacy work
- Deep line locating
- Above & below ground interference
- Depth estimation
- Multiple laterals on a single tap
- Vacant properties
- Down spouts
- State routes or high traffic streets
- Main cleaning issues
- Short notice projects without mapping
- Weather
- Excavation versus proximity waivers
- Equipment limitations
- No involvement in planning or scheduling

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Questions?

Danny Hixon
Gas Services Manager, Hydromax USA
(513) 410-3301
danny.hixon@hydromaxusa.com