CAJUN INDUSTRIES, LLC

Probing

Preferred Methods
&
Guidelines

"*A Practical Approach*"

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Introduction

Underground utilities and obstructions pose significant risk to the safety, productivity, and mitigation costs on any project requiring construction of below-grade infrastructure. In the deep foundations industry, ***known and unknown*** obstructions below the working surface may affect the work. Whether driving a pile, digging an excavation, or drilling a shaft, employees are constantly at risk when it comes to dealing with what is below grade.

This document is a set of guidelines for all Cajun Business Units, and our Clients, to begin a project by ensuring the safety of all employees. These guidelines should be a starting point to prepare our projects for success, while providing the necessary steps to mitigate the risks associated with subsurface obstructions.

Purpose, Process, Payoff

- Purpose: Establish expectations and accountability between Cajun Business units, General Contractors and/or, Owners for underground obstruction exploration and identification.
- Process: Define the “who, what, when, where, how, & why” of the probing requirements and establish accountability for the process.
- Payoff: Ensure the safety of our employees by preventing excavators and/or deep foundation installers from contacting or damaging underground utilities.

When & Where to Probe

Let's face it, probing every pile location or excavation on every project is not, feasible, economical or enjoyable. It is the responsibility of our project teams to determine the necessity and method of probing for each project.

When to probe:

"Brown-field" projects in existing facilities such as refineries, chemical plants, or electrical substations with known (and unknown) underground utilities and obstructions should ALWAYS be probed. Even if the owner has provided as-built drawings for underground drainage or utilities, it does not mean the area is clear of obstructions. If the facility is older, it is very likely there are unused or abandoned utilities that will not show up on any as-built drawings. In addition, these drawings can be inaccurate or out of date. The project team (Project Superintendent & Project Manager) should work together with the owner to establish probing responsibilities and expectations, prior to mobilization.

When *NOT* to probe:

"Green-field" or large scale projects on properties with no previous infrastructure. Use your common sense! If we can establish the prior use of the property and determine the utility locations (or lack thereof) then probing is not economical or beneficial. Ensure that you have completed your One Call ticket and met with the appropriate locators to identify all known utilities. Once the One Call ticket is cleared, the excavation scope can commence.

Below are a few examples of when probing should, or should not be implemented:

Example 1 – Cajun has been awarded a large scale, green-field expansion project that was formerly a sugar cane field. The owner has removed the top 5' of soil and replaced with compacted fill and or sand.

In this instance, excessive probing or subsurface exploration would not be a valuable exercise. The project team should identify these factors, complete a One Call ticket, and obtain the necessary drawings showing the future or existing underground utilities. Remember, you may not be the first contractor on the project!

Example 2 – Cajun has been awarded a project in an existing facility that will increase the production of that unit by 30%. The project is composed of pipe-rack expansions, adding two new bays to the existing cooling tower and replacing an old boiler with a new, larger boiler. The facility is approximately 50 years old. The owner claims they have performed probing in the area on a previous project but cannot provide any documentation regarding the method, results or date of the probing.

In this instance, it is vital that the project team establish who will be responsible for probing, when it will take place, what method is being used, and which areas are being probed, prior to excavation or pile installation taking place.

How to Probe (Probing Methods)

There are a multitude of subsurface exploration options available to contractors and owners alike. It is up to the project team to decide which methods will be used and determine the appropriate frequency and depth of the exploration.

Below are examples and explanations of different probing tools available:

- Manual Probe Rod – These come in different lengths up to 10' tall and are best suited for soft permeable soils. This method can be self-performed by any Cajun Business unit or General Contractor.

- Hydro-Probing – This set up is comprised of a pressure washer that has been fitted with a high pressure rod and nozzle capable of penetrating stiffer soils. A water source is required and a method for control excess water or runoff should be determined. This method can be self-performed by any Cajun Business unit or General Contractor.

- Hydro-Excavation or "Daylighting" – This method should be used in high sensitivity areas where damage or injury can occur if an underground utility is contacted. This method is also beneficial when working in a facility that carries a high probability of unknown or improperly located utilities. The utility should be visibly identified and a mitigation plan should be completed prior to excavation or deep foundation installation. Your preferred hydro-excavation subcontractor can provide this service.

- Radio Frequency or Ground Penetrating Radar – This method is typically used by line locating services that are either contracted or self-performed by utility owner/operators. It is preferred that this method is used in conjunction with any of the above methods to increase the accuracy of locating the below ground utility in question. It should only be used as the sole locating method when the above methods are entirely non-feasible. It should be noted that radio frequency is the least accurate method of those described herein.

Probing Methods:

As discussed, the project team should determine the location, depth and frequency of the probing to be completed.

- Location/Pattern – Determine what area should be probed. If the scope of work consists of scattered, stand-alone pile locations, then the pile location itself should be probed. Common practice is to probe the perimeter of the pile location at the desired frequency as well as an "X" across the pattern to ensure full coverage. If the work area consists of a foundation with multiple piles, then probing the perimeter (or just outside the perimeter) of the foundation footprint is an acceptable approach.

- Depth – Determine a reasonable depth to probe. Probing over 10' deep is not practical or necessary in most situations. Most facilities will have an established max depth for their utilities. This can be your baseline for the required probing depth. Work together with the Owner to establish this beforehand no matter who is responsible for probing.

- Frequency – Determine how often to probe. Usually this is every 2 inches. This should be established beforehand and documented on the Probe Card.

Probing Documentation (Probe Card)

Possibly the most important part of the probing process is completing the Probe Card. This card establishes the "what, when, how, & where", but most importantly, it establishes the **"WHO"**. Establishing accountability for the probing process is the most important step in the probing process. It is not meant to place blame or point fingers. It is meant to provide documentation that the work area has been probed and used as a means of "turnover" or "release" to the excavator or contractor. Documenting the responsible party allows the excavator or deep foundations installer to directly contact the right person with any questions or concerns.

In the following pages, you will find an example of the probe card. A native copy is available for use on the Cajun Intranet. This should also be provided to a General Contractor or Client if they are responsible for probing and do not have an appropriate document in place.

It is important to note that the probe card might not satisfy all the needs of a specific project. The probe card can be edited for an individual project or to meet any additional requirements requested by the client/owner.

Let the probe card help you!

CAJUN INDUSTRIES, LLC

Probe Card

Project Name: _____ **Job / Project No.:** _____

Location or Work Area: _____ **Date:** _____

Client: _____ **Pile/Foundation #:** _____

Shaft Mark: _____

Probing Method (circle one): Pile Location **OR** Foundation Perimeter

Pile/Foundation Size _____ **Pile/Foundation Coordinates:** _____

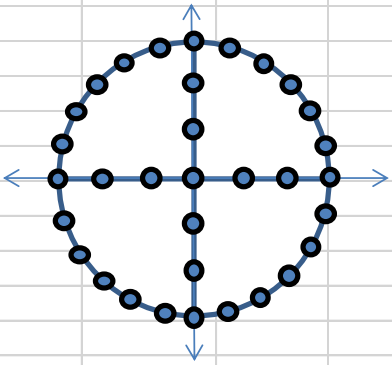
Probe Diameter: _____

Probe Depth: _____

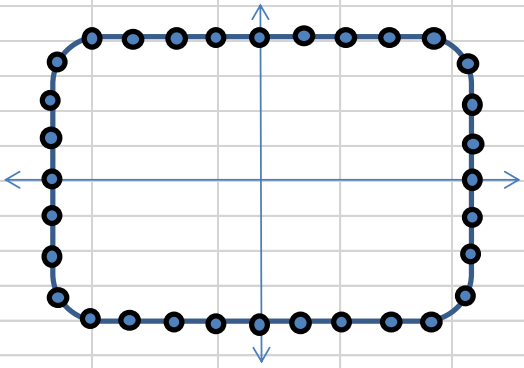
Spacing Between Probe Holes: _____

PROBE PATTERN

Pile Location



Foundation Perimeter



Use the area above to draw in any obstructions identified

Comments: _____

Obstructions Identified: ☐ Yes ☐ No

Description of Obstruction _____

Reference Drawing: _____

Reference RFI: _____

Person Who Performed Probing:

Print Name: _____

Company: _____

Signature: _____

Describe the obstruction type (Pipes, Ductbanks, roots, etc.), depth, size, diameter, distance from foundation or pile location, utility type, contents of utility, etc.

If necessary, provide probing results to client or owner

Lessons Learned (Conclusion)

We can all agree that dealing with the repercussions of contacting an underground utility is difficult, time consuming and costly. Make a point to establish the probing expectations at the estimate phase AND at the pre-construction meeting or client kick-off meeting. Too often, we attempt to determine the “who, what, when, where & how” of the probing process AFTER an underground obstruction has been contacted or damaged. It is up to the project team be proactive as opposed to reactive. These guidelines, along with the probe card, provide our employees with a set of tools to improve the safety of our employees.

The probe card is not a new document. It has been used successfully on previous Cajun projects with other Business Units, Contractors and Clients. Simply relying on the word of others that probing has been performed should be avoided. Remember, as the contractor, we are the ones who will pay the price. We owe it to ourselves to ensure the safety of our most valuable asset – Our People.