



WHAT IS AN ADEQUATE SITE
INVESTIGATION FOR TRENCHLESS
CONSTRUCTION?

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INTRODUCTION

- **Why do we need to detail what an adequate site investigation is**
 - **Minimize Differing Site Conditions Claims**
 - **Cooperatively resolve the claims that do happen on the jobsite, not the courtroom**

WHO AM I?

- 37 years of experience representing contractors
- Numerous Industry advisory boards
- Louisiana Tech Trenchless Technology Center
- NASST presenter on use of Subgrade Utility Engineering
- Author, Legal Rights and Responsibilities Chapter of “Trenchless Construction and New Installation Methods”
- Co-Chair, NUCA Trenchless Committee
- Member, presenter, and author for various industry organizations including ASCE, ACPA, NUCA, AGC, and more

WHAT IS AN ADEQUATE SUBGRADE
INVESTIGATION?

UNDERLYING “PURPOSES” OF A SUBGRADE INVESTIGATION

- “In trenchless installation, as in all underground construction, the limiting geotechnical conditions are decisive in the *selection of a suitable drilling or jacking technique.*” See Stein, **TRENCHLESS TECHNOLOGY FOR INSTALLATION OF CABLES AND PIPELINES** (2005) at 4.1.

CONT.

- “The inclusion of geotechnical information in the contract provides both the Agency and the contractor a *consistent geotechnical baseline for what constitutes a differing site condition.*” See FHWA, **GEOTECHNICAL ENGINEERING NOTEBOOK GEOTECHNICAL GUIDELINE No. 15, “GEOTECHNICAL DIFFERING SITE CONDITIONS”** (1996) at 13.
- “An adequate site investigation is needed to *minimize the potential for problems, change orders, and claims.*” *Id.* at 13.

COLLECTION OF THE RELEVANT INFORMATION

- **STEP ONE:** Per FHWA, ASTM and AASHTO, *before any site-specific investigation*, engineers shall collect relevant “pre-existing information” (i.e. “Reconnaissance”). Successful subsurface investigations are normally “based on the result of previous work.”
- Obtain information “through personal communications with individuals with local knowledge.” See AASHTO MANUAL ON SUBSURFACE INVESTIGATIONS (1988) at 21; ASTM STANDARD D420-98, “STANDARD GUIDE TO SITE CHARACTERIZATION FOR ENGINEERING AND DESIGN PURPOSES (2003) at 4.1
- **STEP TWO:** Collect relevant *site-specific information*.

COLLECTION OF UTILITY INFORMATION

- **NUMBER ONE CAUSE OF DELAY IN HIGHWAY HEAVY CONSTRUCTION:**
 - UNMARKED/MISMARKED UTILITIES
 - LATE UTILITY RELOCATION
- **DO NOT RELY UPON UTILITY COMPANIES TO PROVIDE INFORMATION**

CONT.

- CenturyLink itself admitted:
- **The records are “incomplete” and include “inaccuracies.”**
- **“It may actually show up on the wrong side of the road . . . You’d be lucky to get the right side of the road.”**
- **“The actual location could vary by plus or minus 1,000 feet in any direction of where it was actually installed versus where it was recorded internally by CenturyLink to have been installed.”**
- **“And that would have been the horizontal location. . . . We do not capture the elevation.”**
- **The maps “aren’t accurate . . . not accurate to the point that you would use them for design purposes.”**

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- Rather than relying upon the *inaccurate and incomplete information from utility companies*, engineers should use Subsurface Utility Engineering (“SUE”) to locate and identify utilities.
- NOTE: For further information on the use of SUE, including its cost-effectiveness, *see my recent NASTT article entitled “Inaccurate Utility Information: How to Protect Against the Largest Problem on Highway Construction Projects with Subgrade Utility Engineering (SUE),” WM-T2-04*

COLLECTION OF SOILS/ROCK/HYDROLOGY INFORMATION

- “The structure and properties of the subsoil and the conditions can only be investigated economically with sampling tests *especially for trenchless installation.*” See Stein, TRENCHLESS TECHNOLOGY FOR INSTALLATION OF CABLES AND PIPELINES (2005) at 4.5.
- “The exploration *must be carried out through all strata that will be crossed by the structure vertically as well as horizontally.* The spacings must be selected on a case-by-case basis according to the geological circumstances and the civil engineering requirements.” *Id.* at 4.5.2.4.

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- “[T]he explorations for *microtunneling and pipe jacking* . . . above the groundwater level should be carried down to at least 2 m below the pipe invert. If the pipe to be installed is situated in the groundwater, the exploration should be deep enough so that it corresponds to the distance of pipe invert (jacking invert) to the groundwater level but with a maximum of 3 m.” *Id.*

RELEVANT INFORMATION FOR DESIGN, BIDDING, AND CONSTRUCTION

- See **HANDOUT** at 7-8 **SUMMARY OF RELEVANT INFORMATION**
- **NOTE:** “Knowledge of the *site-specific hydrogeological conditions* substantially determines the *choice of the method in trenchless installation* and is therefore decisive for the successful execution of the construction measures.” See Stein, **TRENCHLESS TECHNOLOGY FOR INSTALLATION OF CABLES AND PIPELINES (2005)** at 4.4.

OWNER'S DUTY TO DISCLOSE SUBGRADE DATA

- Court decisions throughout much of the country have established that a project owner has a *duty implied at law to disclose relevant subgrade information generated or received*. See, e.g. *Warner Construction Corp. v. City of Los Angeles*, 2 Cal. 3d 285, 293-94, 466 P.2d 996 (Cal. 1970) (City knew that cave-ins occurred in both test holes, but failed to disclose this in bore logs); *Jacksonville Port Authority v. Parkhill-Goodloe Co.*, 362 So.2d 1009 (Fla. Dist. Ct.App. 1978).
- The FHWA has also recognized this as a legal obligation. See Geotechnical Engineering Notebook Geotechnical Guideline No. 15, "Geotechnical Differing Site Conditions" (1996) at 15 ("All pertinent subsurface information should be disclosed in the contract documents.").

WHAT IS THE CONTRACTOR'S ROLE IN
THE SUBGRADE INVESTIGATION

“SITE” MEANS “SIGHT”

- **“We are not aware of any case where the Changed Conditions clause has been interpreted as charging a contractor with knowledge of the conditions at the site that *could not be discovered by a visual examination of the site.*” *Appeal of Lee R. Smith, 66-2 BCA ¶ 5857, ASBCA No. 11135, 1996 WL 498 (1966).***

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- There is also a very *practical reason for this*. “The Agency [owner] spends months in project development to collect information about subsurface conditions at the project site. The Agency’s engineers assess the reliability and representativeness of the available data in project design. The contractor, on the other hand, has a limited time during bidding in which to assimilate all the available data and develop his interpretation.” See **GEOTECHNICAL ENGINEERING NOTEBOOK GEOTECHNICAL GUIDELINE NO. 15, “GEOTECHNICAL DIFFERING SITE CONDITIONS (1966) at 13.**
- **For Microtunneling Projects, the Contractor’s First Subgrade Investigation Should Occur as Part of its Pit Excavation.**

WHY DO SOME ENGINEERS FAIL TO
COLLECT AND PROVIDE THE RELEVANT
SUBGRADE INFORMATION FOR
TRENCHLESS PROJECTS?

EXAMPLES

- **For *general guidance*, see Stein, TRENCHLESS TECHNOLOGY FOR INSTALLATION OF CABLES AND PIPELINES (2005). See also National Utility Contractors Association's TRENCHLESS CONSTRUCTION AND NEW INSTALLATION METHODS (5TH Ed. 2022).**

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- For *state* examples, see, e.g., CALTRANS GEOTECHNICAL MANUAL (2022); GEOTECHNICAL MANUAL MICHIGAN (2019); OREGON DOT GEOTECHNICAL DESIGN MANUAL (2019); NEW YORK DOT GEOTECHNICAL MANUAL; INDIANA GEOTECHNICAL MANUAL (2021); WISCONSIN DOT GEOTECHNICAL PROJECT DEVELOPMENT REPORTS, AND SUPPORT FOR DESIGN-BUILD PROJECTS (2020); WASHINGTON DOT GEOTECHNICAL DESIGN MANUAL (2011); VERMONT VTRANS GUIDELINES FOR THE SUBSURFACE INVESTIGATION PROCESS (2011); NORTH CAROLINA DOT GEOTECHNICAL INVESTIGATION AND RECOMMENDATIONS MANUAL (2021); ILLINOIS DOT GEOTECHNICAL MANUAL (2015); NORTH DAKOTA DOT DESIGN MANUAL (2020);

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- **KANSAS DOT GEOTECHNICAL MANUAL (2007); WASHINGTON DOT GEOTECHNICAL DESIGN MANUAL (2011); OHIO DOT SPECIFICATIONS FOR GEOTECHNICAL EXPLORATION (2022); CONNECTICUT DOT GEOTECHNICAL ENGINEERING MANUAL (2005); FLORIDA DOT SOILS AND FOUNDATION HANDBOOK (2000); SOUTH CAROLINA DOT GEOTECHNICAL DESIGN MANUAL (2019); COLORADO GEOTECHNICAL DESIGN MANUAL (2021); VIRGINIA DOT GEOTECHNICAL ENGINEERING MANUAL (2021); ALABAMA DOT GEOTECHNICAL MANUAL (2021); KENTUCKY TRANSPORTATION CABINET GEOTECHNICAL GUIDANCE MANUAL (2005). For city example, see, e.g., DALLAS WATER AND WASTEWATER PROCEDURES AND DESIGN MANUAL (2015).**

CONSEQUENCES OF INADEQUATE SUBGRADE INVESTIGATION

DIFFERING SITE CONDITIONS

- **“Type I DSC claims usually occur when the Agency [Owner] does not conduct an adequate subgrade investigation and prepares plans based on assumptions as to the nature of the subsurface conditions.” See GEOTECHNICAL ENGINEERING NOTEBOOK GEOTECHNICAL GUIDELINE No. 15, “GEOTECHNICAL DIFFERING SITE CONDITIONS” (1996) at 7.**

PROJECT DELAY

- **Trying and failing to perform the work as anticipated**
- **Investigating whether there is a DSC v. the contractor not properly performing the work**
- **Decisions being made on how to proceed/potential different trenchless method/how to pay for work**
- **Demobilizing equipment for *planned subgrade conditions*/mobilizing equipment for *actual conditions***
- **Relocation of utilities**
- **Repairing damaged utilities/adjacent above-grade structures**

PROJECT EXTRA COSTS

- **Costs for all of the above “delay,” including idle equipment**
- **Legal fees**
- **Investigation (sometimes by both engineer and contractor)**
- **Performing work on a T & M basis v. unit price**
- **Repairing damage to adjacent structures/utilities**
- **Impact to public re: loss of use**

HOW MUCH CAN A CONTRACTOR RELY
UPON INACCURATE SUBGRADE
INFORMATION TO ASSERT A DSC CLAIM?

DISCLAIMERS

- **Very often, engineers include “disclaimers” in contract which purport to “bar” the contractor from “relying” upon the subgrade information**
 - **“The site conditions may vary”**
 - **The subgrade data is “for information only”**
 - **The owner does not “warrant or guarantee the accuracy” of the subgrade information**
 - **The contractor is “responsible for the conclusions to be drawn” from the subgrade information**

ENFORCEABILITY

- **“Borings are considered the most reliable reflection of subsurface conditions.”** *North Slope Technical Ltd, Inc. v. U.S.*, 14 Cl. Ct. 22, 255 (1988).
- **“Particular protection is given by the courts to the right of bidders to rely upon drill hole data in the contract data.”** *Foster Const. C.A. & Williams Bros. Co. v. U.S.*, 435 F.2d 873, 888 (Ct. Cl. 1970).
- **“When contract representations are in the form of soil logs or borings, the Government is assumed to have provided the information to assist prospective bidders in preparing their bids. Broad exculpatory provisions . . . will not defeat an otherwise valid differing site condition claim.”** *One Way Construction, Inc.*, 94-3 BCA ¶ 27,275, AGBCA No. 93-1931, 1994 WL 612249 (1993).

CONCLUSION

- **The most effective means to protect against differing site condition claims is by conducting an *adequate subgrade investigation*. And, with such an investigation conducted, a *baseline* is established on *what constitutes differing site conditions* if such are alleged to have been encountered. Owner, engineers and contractors should also seek guidance on *how* differing site condition claims *should be resolved* based on *applicable law*. This will help ensure that claims are cooperatively and fairly resolved on the jobsite, not in a courtroom.**

QUESTIONS?



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