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Managing the Risk of Subsurface Conditions

Key Points

- Owners are best capable of assuming the risk of unknown subsurface conditions.
- Strong benefits occur to owners who use Differing Site Conditions (DSC) clauses on their construction projects.
- It is difficult for an owner to transfer differing site conditions risks through exculpatory clauses.
- Owners should make all information available regarding subsurface conditions to bidders during procurement.
- Owners should consider using project delivery methods such as construction management at risk and progressive design-build, where subsurface risk can be assigned through negotiation before the final construction price is established.

Introduction

The concern of encountering unanticipated subsurface conditions is present on virtually every construction project. When the project involves a facility built on a fenced-in site, the risk may be mitigated through a robust preconstruction geotechnical assessment. On these types of projects, the contractor will eventually work above ground, and the geotechnical risk will pass. Many civil projects, however, find it difficult to conduct a thorough geotechnical assessment and the risk of geotechnical surprises never ends.[1] Consider, for example, the geotechnical challenges associated with highway, tunnel, and dredging projects.

When contractors experience a site condition that is materially different from what they anticipated, the consequences can be significant. Unexpected conditions almost always have an undesirable financial impact, frequently adversely affect the project schedule, and can even require a change in a project's design. This often leads to major conflicts as to whom should bear the impact of the problem.[2] Contractors may assert that the owner provided subsurface information that was wrong or misleading,

[1] Lopez del Puerto, C., Gransberg, D.D., and Loulakis, M.C., "Contractual Approaches to Address Geotechnical Uncertainty in Design-Build Projects," *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction,* 10.1061/(ASCE) LA.1943-4170.0000202, 04516010, 2016.

[2] Loulakis, M.C., Smith, N., and Gransberg, D.D., "Geotechnical Risk in Design-Build Projects: What Does the Case Law Say?" GEOSTRATA, ASCE Geo-Institute, 2016, pp.38-43.

or that it simply would be unfair for the contractor to bear the loss. Owners may argue that the contract shifts the risk of unexpected site conditions to the contractor, or that the contractor did not properly investigate the site to assess conditions in formulating its bid.

This Executive Insight provides insight into how owners can effectively manage subsurface risk. It starts with a discussion about managing risk through the use of a Differing Site Conditions clause in construction contracts. It will then identify some other contractual and planning tools that owners can use to better understand what site conditions are to be expected and how to best communicate those expected conditions to their contracting parties.

The Differing Site Conditions (DSC) Clause[3]

If contractors are required to take the contractual risk of unforeseen subsurface conditions, they will either choose not to bid on the project or include whatever contingencies they view as necessary in their bid prices to cover the risk.[4] Conducting their own investigation is generally not a realistic option. Little time is available during the bidding phase to conduct extensive subsurface exploration. Also, no assurance exists that spending the money to do so would be prudent, as there is no assurance the contractor will win the job if it has more information. As a result, for those contractors that decide to bid the project, they will generally make educated (and sometimes uneducated) guesses about what conditions will be found and price the risks accordingly. History shows that this strategy has led to artificially higher bid prices. History also shows that if an adverse unknown condition is encountered, the contractor is more than likely to file a claim, regardless of what the contract says—using legal theories such as mutual mistake, misrepresentation, or defective specifications.

In 1926, the federal government recognized this problem, and created a contract provision setting forth the conditions under which it would compensate contractors encountering unknown or unexpected subsurface conditions. Originally entitled the "Changed Conditions" clause, this provision was intended to eliminate the contingency factors in bidding, to place the risk of unexpected site conditions on the federal government, and to reduce the prices for construction work. This provision was eventually renamed the "Differing Site Conditions" (DSC) clause, and currently reads as follows:[5]

> (a) The contractor shall promptly, and before such conditions are disturbed, give a written notice to the Contracting Officer of: *(1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site of an unusual nature, which differ*

[3] Readers should note that much of the discussion in this section on the Differing Site Conditions clause is derived from Shannon J. Briglia and Michael C. Loulakis, "Geotechnical Risk Allocation on Design-Build Construction Projects: The Apple Doesn't Fall Far from the Tree," *Journal of the American College of Construction Lawyers*, Vol. 11, No.2 (Summer 2017), Thomson Reuters.

[4] McLain K., Gransberg, D.D., and Loulakis, M.C. "Design-Build Geotechnical Risk Mitigation Tools," *Australasian Journal of Construction Economics and Building*, Vol.14, No. 12, 2014, pp. 1-19.

[5] Federal Acquisition Regulation ("FAR") §52.236-2.

> *materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract.* [Emphasis added]
>
> (b) The Contracting Officer shall investigate the site conditions after receiving the written notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or of the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

Purpose of the DSC Clause

The DSC clause has been the subject of substantial case law, articles, and treatises. One of the most often-cited cases addressing its purpose is *Foster Construction v. United States:*[6]

> The purpose of the changed conditions clause is thus to take at least some of the gamble on subsurface conditions out of bidding. Bidders need not weigh the cost and ease of making their own borings against the risk of encountering an adverse subsurface, and they need not consider how large a contingency should be added to the bid to cover the risk. They will have no windfalls and no disasters. The Government benefits from more accurate bidding, without inflation for risks which may not eventuate. It pays for difficult subsurface work only when it is encountered and was not indicated in the logs.[7]

The principles expressed in *Foster* are as important today as they were in 1926. The clause gives the owner the benefit of paying only for the actual costs incurred when the DSC actually arises—as opposed to paying up front for a problem that may never surface. It also helps to avoid the acrimony that can occur as the parties fight over who bears the risk of unexpected site conditions.

Following the lead of the federal government, most other public and private owners use a DSC clause for the same reasons as expressed in *Foster*. In fact, it appears in industry standard form construction and design-build contracts published by, among others, the American Institute of Architects (AIA), the Design-Build Institute of America (DBIA), and the Engineers Joint Contract Documents Committee (EJCDC).

What Constitutes a DSC?

The federal clause, as well as those used throughout the industry, addresses two types of DSCs—commonly known as "Type 1" and "Type 2" conditions. A Type 1 DSC is triggered by a "physical condition differing materially from those conditions indicated in the contract documents." This is a fairly objective standard, addressing conditions that differ from those indicated in the contract documents. By

[6] 435 F.2d 873 (Ct. Cl. 1970).
[7] Foster, 435 F.2d at 887.

contrast, a Type 2 DSC is independent from what is contained in the contract documents. Instead, it targets those physical conditions that are unknown and unusual in nature, which a reasonable bidder would not reasonably expect.

While Type 1 and Type 2 conditions have different standards and are intended to cover different situations, they share common elements. In particular, both Type 1 and Type 2 DSCs involve "physical conditions" that are "at the site" of the work.

The "physical condition" requirement is generally easy to satisfy. The most common physical conditions involve soil characteristics, presence of rocks with different qualities or in different quantities, subsurface water, and a variety of artificial and manmade objects, such as pipelines, artifacts, or debris. Some contractors have tried to expand the scope of the DSC clause beyond physical conditions to include problems that increase the contractor's costs, such as the general unavailability of a work site, material and labor cost increases, and political, legal, or governmental circumstances. Courts routinely reject extending the definition of DSC to these types of problems as they do not satisfy the test of being "physical" conditions.

The "at the site" requirement suggests that the project location is the only place where a DSC can occur. This raises the question, however, of how to handle claims impacting the project work arising in areas that are technically "off-site," such as borrow pits, quarries, and access roads. The few cases addressing this issue suggest that such off-site areas can be subject to a DSC remedy if their use was so integral to a contractor's performance that the owner should be responsible for the conditions encountered off-site.

To recover for either a Type 1 or Type 2 DSC, a contractor must prove that the condition found "differs materially" from what was indicated in the contract (Type 1) or what reasonably could have been expected (Type 2). This test is relatively easy for a Type 1 claim, where the contract documents contain specific representations of site conditions, like the elevation of rock. The test for Type 2 is more difficult. As one court decision stated, this is "because, unlike a Type [1] case, in which the contract provides the basis of comparison, 'there is no clear written point of reference.'"[8] When the contractor must make increased effort and incur additional costs in dealing with an unforeseen site condition, however, it generally can show a material difference and obtain an equitable adjustment.

Unique Type 1 and Type 2 Requirements

To establish entitlement for a Type 1 claim, the contractor must show the physical conditions actually encountered differed materially from the conditions "indicated in the contract documents." Because this establishes the contract documents as the baseline, a dispute sometimes arises over what constitutes a "contract document." In addition to contract drawings and specifications, the "contract documents" are often defined to include geotechnical reports and other bidding documents. Courts generally have taken a liberal view of what constitutes a "contract document," as they will look at the purpose of the DSC clause (as articulated in the *Foster* decision) and assess whether the owner should have expected the contractor would use the data in developing its bid.

[8] Tucci & Sons, Inc. v. Dept. of Transp., CBCA 4779, 2016 WL 7407800 (Dec. 20, 2016) (quoting Servidone Constr. Corp. v. United States, 19 Cl. Ct. 346, 360 (1990), *aff'd*, 931 F.2d 860 (Fed. Cir. 1991)).

The other important point to remember is the clause uses the term "indicated" in the in the contract documents. For a typical Type 1 DSC claim, this is not an issue, as the physical conditions are often explicitly stated—such as geotechnical reports that state affirmatively: "no rock is expected." Many of the cases, however, discuss non-explicit "indications," and confirm that all that is required to prove a Type 1 DSC is enough of an indication in the contract documents for a bidder to form a reasonable understanding of what site conditions should be expected. For example, Type 1 DSCs were allowed when:

- The contractor encountered French drains instead of solid pipes. It submitted evidence that industry practice was to describe and label perforated French drains, and that the owner's failure to do so in the plans constituted an implied representation that the pipe was solid.
- The contractor encountered wet instead of dry conditions. It assumed it would encounter dry conditions during excavation because the contract required that the concrete be poured in the dry and made no mention of the necessity of a special seal prior to pouring concrete.

Finally, to win on a Type 1 DSC claim, contractors have to prove the site conditions they encountered were unforeseeable to a reasonable and prudent contractor. In determining this, courts generally look to all the information available to the contractor, as well as to any information that would have been discovered on a reasonable visual inspection of the site. As a result, if the actual site conditions were foreseeable based on the contract or information obtained or that could have been obtained during a reasonable site inspection, the contractor will not recover. It is important to remember that if a contractor has actual knowledge the conditions are other than those indicated in the contract documents, it will lose on the "foreseeability" standard, even though another bidder might be able to prevail.

Unlike a Type 1 DSC, a Type 2 DSC does not use the contract as a baseline. Instead, Type 2 DSCs arise where the contractor discovered a physical condition that was unknown or unusual and could not reasonably be anticipated by the contractor based on its inspection of the site and its general experience in the area of the project. Because this is a more subjective standard than that for Type 1 DSCs (which rely on the contract indications), contractors have a heavier burden of proving these claims. Contractors who have won these claims have done so based on the same types of physical conditions found to constitute Type 1 DSCs, such as unanticipated rock and stone, unstable soil conditions, artificial debris, and old railroad timbers. They have also recovered when geotechnical properties behave differently than anticipated—such as rock not fracturing as expected or soil not compacting as expected. The keys for the contractor are to show both the norm for the area and that other contractors have not encountered such material in similar work.

DSC Claims and Site Inspection

To win on a DSC claim, contractors have to demonstrate that they could not have discovered the condition through a reasonable site inspection. As discussed above on foreseeability, one needs to remember that if a contractor learns the information provided by an owner is incorrect as a result of

that contractor's pre-bid investigation, it will not be entitled to claim a DSC. It cannot satisfy the test that it reasonably relied upon the owner-supplied information.

The level of investigation required of the contractor in a pre-bid inspection is not excessively burdensome. The contractor is not required to discover latent conditions by performing an investigation that would require more time or expertise than that possessed by a reasonable contractor. It is also important to remember that even though most construction contracts require bidders to investigate the site, their failure to do so will not bar its recovery for a DSC claim if a reasonable site investigation would not have disclosed the condition. For example, if a contractor flew over the site but did not make an on-site inspection, it would likely still win its DSC claim if the on-site inspection would not have disclosed the condition on the project.

The limited nature of the contractor's duty to investigate site conditions goes back to the holding in *Foster*, where the court found the duty to investigate the site must be balanced against the contractor's right to rely on government provided site information:

> Faithful execution of the policy requires that the promise in the changed conditions clause not be frustrated by an expansive concept of the duty of bidders to investigate the site. That duty, if not carefully limited, could force bidders to rely on their own investigations, lessen their reliance on logs in the contract, and reintroduce the practice sought to be eradicated—the computation of bids on the basis of the bidders' own investigations, with contingency elements often substituting for investigation.[9]

Without such a balance, the DSC clause would have no effect and contractors would be forced once again to include contingencies for site conditions in their bids. Consequently, the contractor's duty is generally interpreted as being to make a reasonable inspection in light of all the circumstances.

Notice and Procedural Requirements

Virtually all DSC clauses require that the contractor provide some form of notice to the owner upon discovery of the condition. The notice requirement gives the owner an opportunity not only to visually observe the condition, but also to determine how to mitigate the problem. Compliance with the DSC specific notice provision, as contrasted with a general notice provision for extra work claims or changes, usually suffices. In some states, failure to comply may fully bar a contractor's recovery, even though the owner was not prejudiced. Therefore, it is critical to follow these requirements.

Disclaimers and Exculpatory Clauses

Even though the policy behind using a DSC clause is clear, many owners want to have it both ways. They use DSC clauses, but then attempt to escape liability for DSC claims through disclaimers or exculpatory

[9] Foster, 435 F.2d 873, 887 (Ct. Cl. 1970).

clauses. Generally, these attempts have been unsuccessful—particularly when the exculpatory language is in direct conflict with the purpose and broad language of the DSC clause, which expressly puts the risk of unforeseen conditions on the owner.

This subject was directly addressed in *Foster*, which stated:

> Even unmistakable contract language in which the government seeks to disclaim responsibility for drill hole data does not lessen the right of reliance. The decisions reject, as in conflict with the changed conditions clause, a 'standard mandatory clause of broad application,' the variety of such disclaimers of responsibility—that the logs are not guaranteed, not representations, that the bidder is urged to draw their own conclusions.[10]

Given the strong public policy reasons behind DSC clauses, most courts have been reluctant to enforce disclaimers. Allowing the owner to disclaim validity of its pre-bid information would essentially render the DSC clause meaningless. Given this, a variety of cases have found disclaimers as invalid when they use clauses stating that: (a) geotechnical data is general information and that the contractor has responsibility to conduct its own investigation; and (b) the contractor may encounter poor conditions.

Despite the traditional reluctance of courts to enforce disclaimer language and the strong policy inherent in the DSC clause, some cases do enforce disclaimers. Generally, these situations occur where the disclaimer is very limited and addressing specific and narrow physical conditions, such as rock hardness, rock quality, or water table elevation. The key is that if the disclaimer would substantially erode the contractor's DSC remedy, courts will not enforce it.

Other Contractual Approaches to Address Site Condition Risk

While the standard DSC clause is the most common way to contractually address the risk of unknown subsurface conditions, several other avenues are available to do so. This section will address some of the more common ones currently in use.

DSC Deductibles

Experience has shown that on large, complex design-build projects, owners sometimes attempt to limit their exposure under the DSC clause by having the design-builder bear the first dollars of DSC impact. For example, on the SR 520 Pontoon Construction design-build project in Aberdeen, Washington, the Washington State Department of Transportation (WSDOT) used the following language in its DSC clause to accomplish this risk shift:

> Notwithstanding the above, the Design-Builder shall be entitled to equitable adjustment adjusting the Contract Price only for the actual, reasonable cost increase resulting from Differing Site Conditions, which in the aggregate exceeds $10,000,000.00. The responsibility for the first

[10] Foster, 435 F.2d 873 at 888.

> $10,000,000.00 worth of Differing Site Conditions shall rest solely with the Design-Builder.[11]

Likewise, the Dulles Corridor Metrorail Project (Silver Line), developed by the Metropolitan Washington Airports Authority, used a similar approach to create a "deductible" for DSC risk. While DSC clauses were used, it required that the design-builder bear the first dollar of risk for these conditions (ranging from $2 million to $3 million for the respective contracts). From the authors' perspective, this approach has good and bad features. While it shifts the risk of losses above the deductible amount to the owner, it does force the bidding contractors to assess how much of the deductible it should bid. In this regard, it goes back to the reasons that DSC clauses were developed in the first place.

Scope Validation

Some public owners on design-build projects have used a process called "scope validation." The Virginia Department of Transportation (VDOT) started this process and has had strong success with its use. VDOT establishes a period of time ("scope validation period") wherein the design-builder can, during the design development process, present claims that relate to deficiencies in owner-furnished information, including DSCs. The scope validation period is generally 120 days after contract award, although this has been adjusted for more complicated projects or in areas where the site is not available for inspection. After the expiration of the scope validation period, the design-builder's claim rights are waived for items not previously raised.

Geotechnical Baseline Reports (GBRs)

Geotechnical Baseline Reports (GBRs) are documents developed to define the baseline conditions on which contractors will base their bids and select their means, methods, and equipment, and that will be used as a basis for determining the merits of contractor claims for DSCs. They are widely used on civil projects, particularly in the tunneling sector. GBRs often contain information about: (a) the amounts and distribution of different materials along the selected alignment; (b) description, strength, compressibility, grain size, and permeability of the existing materials; and (c) groundwater levels and expected groundwater conditions. The benefit of a GBR is that it takes geotechnical data and then converts it to expected behavior and design assumptions, as opposed to leaving such data open for interpretation among the parties. This is an excellent way for the owner to define baselines for bidding and have those baselines be used to assess DSC claims.

Dispute Review Boards (DRBs)

Dispute Review Boards (DRBs) are used as a matter of course on many civil projects throughout the U.S. Simply stated, the DRB is a group of three experts appointed at the outset of the project to consider disputes that the parties may present to them and then to provide recommendations for resolution.

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[11] Douglas D. Gransberg and Michael C. Loulakis, *Geotechnical Information Practices in Design-Build Projects*, 12; National Cooperative Highway Research Program Synthesis 429 (2012) (citing SR 520 Pontoon Construction Design-Build Project Request for Proposals, Volume 1: General Provisions 194, Washington State Dept. of Transportation (2009)).

DRBs are highly regarded for many reasons, particularly for their ability to provide the parties with real-time assessments of their positions and allow the projects to move forward based on those assessments. DRBs can provide an effective way to resolve DSC issues in a cost-effective and timely manner.

Procurement and Planning Approaches to Managing Subsurface Risk

The focus of this Executive Insight at this point has been on contractual ways to manage subsurface risk. Other non-contractual steps are available, however, for an owner that desires to reduce the risk of unknown geotechnical conditions.

In the early stages of the project, owners should conduct due diligence research on available geotechnical, underground utility, and other subsurface information. This will help inform the owner's team about what information is in hand, how reliable it is, and what additional information needs to be obtained for the project. The owner also should consider conducting a risk workshop focused on subsurface conditions and what can be done to reduce the project risk and overall construction risk.

Another important step for the owner is to select a project delivery method that focuses on the subsurface uncertainty demonstrated in the existing record and how to best mitigate this. Depending on the level of risk, it may be advantageous to bring the contractor to the project early through a construction management at-risk (CMAR) or progressive design-build (PDB) process. Under both approaches, the contractor will provide preconstruction services that will help define, among other things, project risks and constructability approaches.
These two particular approaches offer several advantages to the owner. First, they can help the owner determine the extent of the geotechnical investigation that should be performed before the construction/design-build price is determined. Second, the parties are able to address contingencies for geotechnical risk in a transparent way during negotiations for the construction phase of the project. For example, they could jointly agree on a GBR that will govern geotechnical assumptions. Finally, because of the flexibility of these processes, the owner and the contractor/design-builder can jointly determine what foundation designs make the most sense during the design development stage.

If the owner elects to use a competitive procurement process under design-bid-build or traditional design-build, certain steps should be considered during procurement to manage subsurface risk. Consistent with the philosophy of the DSC clause, the owner should: (a) provide all available subsurface information to the bidders during the procurement process; and (b) not use exculpatory clauses. Depending on the nature of the project and importance of subsurface conditions (such as highway projects), the owner also should consider discussing known geotechnical information at the pre-bid conference and entertain allowing bidders to conduct supplementary subsurface exploration at their own expense, even though this option may not be exercised. Finally, where permitted, owners should also solicit alternative technical concepts that provide options to reduce subsurface risk and/or share it until it can be retired.

Summary and Recommendations

Owners are the parties that are best capable of assuming the risk of unknown geotechnical conditions. They own the project site. They also should be interested in having a biddable project where contractors are not including contingencies for circumstances that may not materialize. The DSC clause is the most effective contractual way to accomplish this.

The standard DSC clause identifies two discrete types of physical conditions that give remedies to the contractor. Type 1 DSCs address conditions that are materially different from what is implied by the contract documents. Type 2 DSCs address conditions that are unknown or unusual and that differ materially from what a reasonable bidder would ordinarily expect on the project. To prevail under the DSC clause, the contractor must demonstrate the condition could not have been identified during a reasonable site inspection and that it complied with the contract's notice requirements. Importantly, owners should not use a DSC clause and then try to disclaim the accuracy of the information it gives to the contractor. This is an ineffective practice, and the case law does not support that the exculpatory clause will be enforced.

Aside from using a DSC clause, other approaches can help manage the risk of unknown geotechnical conditions. The contract can include a limitation on how much money the contractor can obtain under a DSC remedy (although the authors do not recommend this as it defeats some of the purpose of the DSC clause). The contract can also include scope validation processes, GBRs to explain how geotechnical data should be interpreted, and dispute review boards to help resolve disputes during construction. The owner can also reduce geotechnical risks during the planning and procurement process by: (a) bringing the contractor to the project early through CMAR or PDB; and (b) using alternative technical concepts.

The authors also recommend that the owner conduct a thorough assessment of what geotechnical information is available before the project starts. This information should be provided to the bidders and supplemented by such additional information as can be reasonably obtained. This will help everyone better understand what conditions are expected before construction starts. Coupled with the DSC clause, this information will serve as a baseline for what will constitute a DSC during construction.

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