

COMMONWEALTH OF PENNSYLVANIA

JOSEPH B. FAY CO./NORWIN : BEFORE THE BOARD OF CLAIMS
CONSTRUCTION COMPANY, A :
JOINT VENTURE :
 :
 :
VS. :
 :
COMMONWEALTH OF PENNSYLVANIA, :
PENNSYLVANIA TURNPIKE COMMISSION : DOCKET NO. 3949

FINDINGS OF FACT

Parties and Procedural History

1. Joseph B. Fay Co. (“Fay”), is a registered Pennsylvania Corporation. (Amended Statement of Claim at ¶ 1 and Answer at ¶ 1; N.T. 26; Board Finding).
2. The Pennsylvania Turnpike Commission (“PTC”) is an agency of the Commonwealth of Pennsylvania. (Amended Statement of Claim at ¶ 2 and Answer at ¶ 2).
3. Fay and PTC entered into a contract (“Contract”) for the reconstruction and widening of approximately 7.5 miles of roadway and associated bridge work on the Pennsylvania Turnpike mainline, stretching roughly from mileposts 2 through 10 in Lawrence and Beaver Counties (“Project” or “MP 2-10 Project”).¹ (Ex. J-9).
4. Fay seeks payment under the differing site condition provision in the Contract for excessive subgrade stabilization work needed to complete the Project. Fay’s claim asserts, inter alia, that it encountered a far greater quantity of unstable subgrade on the Project than it could reasonably have expected when it was preparing its bid. (Amended Statement of Claim; Claimant’s Post-Hearing Brief).
5. Fay submitted an initial administrative claim with the contracting officer by letter dated February 4, 2008. This initial claim was denied by letter dated February 14, 2008 from the construction manager. (Amended Joint Stipulations and Exhibit List at Joint Stipulation C; N.T. 129-130, 143-145; Exs. J-10, J-13).
6. After the initial rejection of Fay’s administrative claim, the parties continued to negotiate. These negotiations included discussions of nonbinding arbitration. When PTC rejected nonbinding arbitration, Fay submitted a second letter on August 13, 2008, documenting

¹ Fay and Norwin Construction Company, as a joint venture, actually entered into the Contract with the PTC for the Project as a whole. However, because it is only Fay’s portion of the work here at issue we will refer to the Plaintiff herein simply as “Fay.”

its claim in order to protect its rights to further pursue its claim. There is an apparent agreement between the parties that during the foregoing exchanges between the parties Fay preserved its rights for purposes of filing a claim with the Board of Claims (“Board”). (Amended Statement of Claim and Answer and New Matter at ¶¶ 31, 34; N.T. 146-151; Exs. J-22, J-34).

7. An administrative hearing on Fay’s claim was held by the PTC on October 30, 2008. On or about December 10, 2008, the PTC issued a decision denying Fay’s claim. (Amended Statement of Claim and Answer and New Matter at ¶¶ 35-36; N.T. 151, 153, 169; Ex. J-22).

8. On December 24, 2008, Fay initiated this proceeding by filing a statement of claim against PTC with the Board in the amount of \$7,188,843.92. (Statement of Claim; B.O.C. Docket No. 3949).

9. On April 23, 2009, after the Board had granted a preliminary objection to the initial statement of claim for insufficient specificity, Fay filed an amended statement of claim, again seeking \$7,188,843.92. (Amended Statement of Claim; B.O.C. Docket No. 3949).

10. On May 26, 2009, the PTC filed an answer to the amended claim with new matter. (Answer and New Matter to Amended Statement of Claim; B.O.C. Docket No. 3949).

11. On June 4, 2009, Fay filed its reply to PTC’s new matter, at which point the Board directed the parties to commence with discovery. (Reply to New Matter; Board letter of June 4, 2009; B.O.C. Docket No. 3949).

12. The Board conducted a hearing on the merits. Both parties appeared, had representation of counsel, and presented testimony and documentary evidence. (N.T. 1-1464).

General Chronology of Events

13. On June 9, 2006, PTC and Fay entered into Contract 00-002-RCD1-C, titled “Design/Build Roadway and Bridge Reconstruction, MP 1.85 to MP 9.29 in Lawrence and Beaver Counties.” The Contract covered reconstruction and widening of approximately 7.5 miles of the Pennsylvania Turnpike main line, both eastbound and westbound, between the referenced mileposts. (N.T. 33; Ex. J-9).

14. Prior to the Project, the relevant portion of the Turnpike totaled 82 feet in width, with two traffic lanes, an outside shoulder, and a partial median shoulder in each direction (eastbound and westbound). The Contract called for the existing highway’s replacement with a new roadway comprised of three lanes, a full outside shoulder and a full median shoulder in each direction, totaling 122 feet in width. (N.T. 62-63, 107-108, 754-55; Ex. P-1).

15. The Project work was to be staged in two phases so that traffic could continue to pass during construction. During Phase I, Fay was to demolish 4/5 of both existing outside shoulders, expand the width of the roadway on both sides and construct a new outside shoulder, the new additional travel lane and a portion of the new middle travel lane on each side. The

expansion would encompass adjacent land on either side of the existing outside shoulders (“roadway expansion area”), with requisite cuts and fills to bring the roadway expansion area to grade (“Phase I work areas”). During Phase I, traffic was to continue to pass both eastbound and westbound in the middle, on the existing travel lanes and partial median shoulder. (N.T. 107-111, 163, 484-485; Exs. J-9, Ex. P-1).

16. During Phase II, Fay was to demolish the remainder of the existing roadway in both directions, and to construct a full size median shoulder, a new inside travel lane and the remaining portion of the new middle travel lane in both directions (collectively referred to as the eastbound and westbound “Phase II work areas”), with eastbound and westbound traffic passing on the newly widened areas built during Phase I. (N.T. 114-118, 485; Exs. J-9, Ex. P-1).

17. Performance of the Contract required Fay to provide a stable subgrade upon which to build the reconstructed and widened roadway. Subgrade is a layer of soil or other fill material underlying the subbase and the road surface. Excavated subgrade was deemed unstable if it rutted when a loaded tri-axle truck with a 75,000 pound gross vehicle weight was run over it. (N.T. at 39, 43, 123-126, 178-179, 242, 487-488; Exs. J-9 at SP F-19, P-3)².

18. If found unstable, performance of the Contract required the subgrade to be stabilized. As a practical matter, stabilization of subgrade can be accomplished through one of two methods, chemical stabilization or undercutting and backfilling. (N.T. at 126-127, 218-222, 638-641, 1148-1157; Ex. J-9 at SP F-19; Board Finding).

19. Although the Contract did not specify the method of stabilization to be used, Fay determined that the most reliable and cost effective method for this Project would be to undercut the unstable material and backfill that area with appropriate rock at an average thickness of two feet. Fay opted not to use chemical stabilization. (N.T. 126-129, 218-222, 231-232, 257-259, 502-503, 561-562, 575, 654-655).

20. The Contract (as drafted by the PTC) was “design/build” in nature: that is, PTC did not provide a complete design or estimated quantities of work in the bid specifications for the Project (as opposed to a “design/bid/build” contract, where a complete design and estimated quantities, among other information, would be provided by PTC to bidding contractors). The Project specifications did not identify a specific quantity of unstable subgrade requiring stabilization or a method for determining the quantity of same prior to commencement of the Project. (N.T. 27-29, 794-796, 801, 817-818, 830, 866-867; Ex. J-9).

21. Fay did anticipate that it would encounter some unstable subgrade on the Project and a consequent need to stabilize it as part of its Contract performance. (N.T. 77-82, 95-98, 101-102, 112, 212-213, 242-247, 256-257, 689-691, 710-714, 1016-1018, 1095-1096; Exs. J-1, J-9, J-21).

² Among other items, the Contract incorporated provisions of Pennsylvania Department of Transportation Publication 408/2003 as amended through Change No. 4, effective October 3, 2005 (“Pub. 408/2003”). See Ex. J-9 at SPF-19 and Section 210.3 of Pub. 408/2003.

22. Fay estimated that 70,000 cubic yards (“CY”) of unstable subgrade would need to be undercut and backfilled for the Project. That amount of undercutting and backfill which Fay anticipated represented its estimate that approximately 30% of the subgrade beneath the existing roadway (i.e., existing travel lanes, existing outside shoulders, and existing median shoulders) would require stabilization. Fay did not anticipate that any of the areas beneath the roadway expansion area would require stabilization. (N.T. 82, 95-96, 101-102, 111-114, 246-247, 256-257, 262-263, 689-691, 710-714).

23. Fay’s estimate of subgrade undercut and backfill quantities was not a separate item listed in its bid, but was instead included as part of a lump sum bid for Fay to “construct full depth roadway.” (N.T. 135-138, 212, 260; Ex. J-160).

24. Undercutting and backfilling is a process by which unstable subgrade is removed and replaced with rock fill. Although the process is referred to as “Class 1A excavation” at several points in the record, this term technically refers to such excavation in areas of eight feet or less in width. Inasmuch as the areas being undercut and backfilled here were typically wider than eight feet (in some cases much wider), the Board will refer to this work simply as undercutting and backfill. (N.T. at 81-82; Ex. P-1; Section 203.1(b) of Pub. 408/2003 (relating to definition of Class 1A excavation); Board Finding).

25. After a year of design and permitting work, Fay began construction on Phase I of the Project in late 2007. Fay encountered unstable subgrade almost immediately upon its commencement of Phase I work at the Project site. (N.T. 106, 122).

26. While working on Phase I, it became clear to Fay that the quantity of undercutting and backfill it had estimated for the entire Project would be insufficient given the quantity of unstable subgrade it was encountering. In fact, during Phase I, Fay found it necessary to stabilize substantially all of the subgrade under the roadway expansion area (including cut and fill areas) and under the portion of the existing shoulder being removed. This more than exhausted the 70,000 CY of undercutting and backfill that Fay had estimated for the entire Project. (N.T. 129-134, 139-143, 157-163; Exs. J-10, J-94; Findings of Fact (“F.O.F.”) 21-22).

27. Among other things, Fay found that cut and fill areas in the roadway expansion area, for which Fay had not included any estimated quantity of unstable subgrade in its bid, required a great deal of subgrade stabilization. Among other problems presented, water from the subsurface would “wick” to the subgrade level, destabilizing the relevant areas. (N.T. 111-114, 609-610, 617-620, 648-649, 658, 666-667; F.O.F. 22, 26).

28. At the point Fay realized that it would exhaust its estimated quantity of undercutting and backfill for the Project, Fay sent a letter to the PTC seeking additional compensation and indicating that further work would require a greater quantity of undercutting and backfill. Fay’s request for additional compensation was brought pursuant to the Contract’s “differing site conditions” provision. (Amended Joint Stipulations and Exhibit List at Joint Stipulation C; N.T. 129-134; Ex. J-10; F.O.F. 26-27).

29. PTC refused Fay’s request for an adjustment in the Contract price (both initially and, eventually, following a claim hearing through a formal denial of Fay’s administrative claim) for additional compensation. (Amended Joint Stipulations and Exhibit List at Joint Stipulation C; N.T. 143-154, 169; Exs. J-13, J-22).

30. Fay would eventually perform 126,639 CY of undercutting and backfill in the roadway expansion area and another 269,298 CY of undercutting and backfill under the existing roadway.³ (N.T. 153, 157-163, 509-511; Ex. J-94).

31. The quantities of undercutting and backfill performed are not in dispute. Moreover, the need to perform this undercut and backfill (as opposed to chemical stabilization) on the Project is also without serious dispute.⁴ Accordingly, we find the amount of undercutting and backfill performed on the Project by Fay (as identified in the immediately preceding paragraph) was necessary and reasonable to complete the Project. (Amended Joint Stipulations and Exhibit List at Stipulation A; N.T. 126-129, 218-222, 231-232, 256-259, 502-503, 561-562, 575, 654-655, 712-713; 1119-1120, 1258-1259; F.O.F. 30; Board Finding).

32. Fay completed the Project and pursued the instant claim. (N.T. 575; Amended Statement of Claim; Board of Claims Docket at No. 3949).

Nature of Claims and Positions of the Parties

33. Fay contends that it is entitled under the Contract’s differing site condition provision to payment for the unexpected quantity of undercut and backfill needed to correct the excessive quantity of unsuitable subgrade actually encountered on the Project. It asserts, inter alia, that the extreme amount of unstable subgrade on the Project was an unknown physical condition of an unusual nature, which differed materially from those conditions ordinarily encountered and generally recognized as inherent in roadway construction and widening work. (Claimant’s Post-Hearing Brief).

³ The Board notes that Fay—without objection from the PTC—breaks its quantities of undercutting and backfill into the categories “under the pre-existing roadway” and “outside the pre-existing roadway” for the purpose of presenting its damages claim. These categories do not correspond exactly to the Phase I and Phase II work designations, as demolition and reconstruction of 4/5 of the existing shoulder (part of the “pre-existing roadway”) was undertaken as part of Phase I. Accordingly, when we address the work being done we will speak in terms of Phase I and Phase II, but will address damage calculations in terms of “under” and “outside” the existing roadway. (Compare Exs. J-94, P-1)

⁴ During the hearing, the PTC appeared to suggest that an alternative method of subgrade stabilization known as “chemical stabilization,” could have, or should have, been used on this Project. Chemical stabilization is a method by which lime pozzolon, calciment or similar substance is added to soil to solidify it. The Contract permitted chemical stabilization to be used for stabilization assuming the subgrade had a California Bearing Ratio (“CBR”) of 5 or higher. Fay, however, presented persuasive testimony that it rejected the use of chemical stabilization for the Project because of its higher cost and lower reliability for warranty purposes. The PTC did not present any credible evidence that the use of undercutting and backfill was inappropriate on this Project and, in its post-hearing brief, seems to have abandoned the argument that Fay should have used chemical stabilization in place of undercut and backfill. Certainly, there is no evidence that the Turnpike is dissatisfied with the undercutting and backfill work that Fay actually performed. The Board sees no reason to doubt that undercutting and backfill was the appropriate means to stabilize the subgrade on this Project. (N.T. 126-128, 218-222, 231-232, 257-259, 502-503, 575, 634-655, 750-759, 763-764, 774-777, 1119-1120, 1135-1145, 1147-1162, 1258-1259, 1285; Ex. J-9; Board Finding).

34. PTC asserts that there was no differing site condition and that the soils were exactly as Fay should have expected to find them. Among other things, PTC contends that core boring logs distributed to bidders on the Project correctly disclosed the type and nature of the soils that would be encountered on the Project, but that Fay disregarded this information. PTC also argues that Fay failed to heed its own institutional knowledge about the subsurface conditions and amount of unstable subgrade likely to be encountered which it should have garnered from its earlier experience with the Turnpike reconstruction project between mile posts 0 and 2.25 (“MP 0-2 Project”) and from the early action bridge work Fay did between Miles 1.86 and 9.29 prior to the start of the MP 2-10 Project. (Respondent’s Post-Hearing Brief).

35. The PTC further suggests that Fay contributed to the problem of unstable subgrade by opening up to the elements (i.e. weather conditions) too large an area of subgrade for too long a period of time while performing its work. (Respondent’s Post-Hearing Brief).

36. Finally, PTC contends that because the Contract was design/build in nature (with no quantities of work or material specified by PTC), Fay should be unable to recover for any increased quantities of work no matter how extreme. (Respondent’s Post-Hearing Brief).

Differing Site Conditions Issue

37. The differing site conditions provision of the Contract under which Fay seeks extra compensation provides, in pertinent part, as follows:

110.02. Differing Site Conditions

(a) Differing Site Conditions. If unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work, are encountered at the site, the party discovering such conditions is responsible for promptly notifying the other party, in writing, of the specific differing conditions, before the site is disturbed and before the affected work is performed.

Upon written notification, the Commission will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made. The Commission will notify the Contractor of the determination of whether or not an adjustment of the contract is warranted.

No contract adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

No contract adjustment will be allowed under this section for any effects cause on unchanged work. * * *

(N.T. 101; Ex. J-9 at CS 110.02(a)).

38. Fay's primary argument is that it encountered significantly more unstable subgrade that could have been (or was) reasonably anticipated by the parties. (Claimant's Post-Hearing Brief).

39. On this point, Fay's evidence establishes that it was necessary to undercut and backfill over 96% of the length of the Project. Rounded to the nearest percent, Fay encountered unstable subgrade in, and needed to undercut and backfill: 100% of the length of the new Eastbound Phase I travel lane and outside shoulder area; 87% of the new Westbound Phase I travel lane and outside shoulder area; 100% of the new Eastbound Phase II travel lane area (excluding the median shoulder); 95% of the new Westbound Phase II travel lane area (excluding the median shoulder); and 99% of the new Phase II median shoulder work area. This averages out to a total of 96.2% of the entire length of the Project needing some amount of undercut and backfill.⁵ (N.T. 129, 152-166, 509-511; Exs. J-9, J-94, P-1, D-3; Board Finding).

40. Prior to bidding, at the suggestion of its engineering consultants, Fay reached an estimate of 30% undercut and backfill (i.e. 30% of the area underneath the existing roadway) for this Project by undertaking a review of publicly available bid specifications for other PTC road reconstruction contracts for which estimated quantities of undercutting and backfill were available. Fay used the information gleaned from these other contracts and from its own general roadway construction experience to estimate the proportion of undercutting and backfill to be expected on the MP 2-10 Project. (N.T. 77-82, 96-97, 112, 205-208, 250-252, 262-263, 686-691).

41. Although the specific projects reviewed by Fay in reaching its "typical" 30% estimate were not identified, the Board notes that the 30% estimate derived by Fay matches the "typical" proportion of undercutting and backfill required on PTC roadway reconstruction projects, as expressed in one of the PTC's own training presentations on subgrade stabilization. (N.T. 78, 82, 205-206, 250-252, 262-263, 367-378, 1157-1158; Ex. J-24).

42. Fay's witnesses also testified that Fay had considered other information in reaching its 30% estimate for undercutting and backfill. According to them, Fay had performed a reconstruction of the nearby Gateway toll plaza in 2001-2002, and found that only minimal undercutting and backfill were needed there. Additionally, Fay had previously replaced two "early action" overhead bridges in the Project area and found that the soil outside the roadway in those locations was sufficiently stable such that the bridges did not need to be constructed on deep pilings. (N.T. 22-24, 49-55, 82-96, 170-175, 182, 248-251).

43. Fay had also bid on (and won) the MP 0-2 Project, which involved further modification of the Gateway toll plaza and reconstruction of the initial 2-mile stretch of the Turnpike roadway (traveling eastward from Ohio) and which was adjacent to the MP 2-10 Project. (N.T. 84-86, 172-173; Ex. J-192).

⁵ Although the depth and width of undercut and backfill needed along the length of the Project varied, the actual quantity of this work was equivalent to performing undercut and backfill for the entire paved area beneath both the original and expanded portions of the Project roadway at an average depth of 2.23 feet. (Exs. J-9, J-94, P-1, D-3; F.O.F. 30; Board Finding).

44. According to Fay, its experience on the MP 0-2 Project as of the time it bid on the MP 2-10 Project (i.e. May 3, 2006 or approximately six months into the MP 0-2 Project) served only to reinforce Fay's bid-time estimate of a need to undercut and backfill approximately 30% of the MP 2-10 Project roadway. (N.T. 33, 82-96, 248-256; Exs. J-9, J-39, J-192).

45. Finally, Fay asserts that it did not expect the need to undercut and backfill the subgrade under the pavement in the roadway expansion areas because most of this work would be in areas where Fay would be cutting or filling-in the surrounding terrain. Although not well explained, it appears that Fay expected that the cut areas would have been naturally protected from instability by the overburden of soil above it and that fill areas, as constructed by Fay, would be sufficiently stable without undercut and backfill. (Claimant's Post-Hearing Brief; see also, N.T. 96, 111-114, 636, 689-691, 710-711).

46. For all the foregoing reasons, Fay contends that its estimate that approximately 30% of the area beneath the existing roadway on the MP 2-10 Project would require stabilization (i.e. undercut and backfill) was reasonable and appropriate and that the need, instead, to stabilize nearly 100% of the new roadway (including expansion areas) was extreme and constituted an unknown physical condition of an unusual nature, which differed materially from those conditions ordinarily encountered and generally recognized as inherent in roadway construction and widening work. (Claimant's Post-Hearing Brief; F.O.F. 21-22, 26-30, 37-45).

47. The PTC responds, inter alia, by asserting that the site conditions on the MP 2-10 Project, in terms of the nature and quality of the soils found by Fay, were exactly as should have been expected pursuant to the core boring logs supplied to all bidders, including Fay. (Respondent's Post-Hearing Brief).

48. These core boring logs recorded soil composition and, to a limited extent, moisture conditions in borings taken at and around the Project site. (N.T. 1167-1168, 1179-1180, 1185-1189; Exs. J-180, J-180A; Board Finding).

49. Specifically, PTC contends that the information it provided in the bid documents by way of the core boring logs accurately identified the nature of the soil underlying the Project as consisting primarily of glacial till. (Respondent's Post-Hearing Brief).

50. Glacial till is glacially deposited soil with round, fine grained particles and significant percentages of silt, which is notable for its property of retaining moisture and lacking cohesion and internal friction. Glacial till has a significant potential for becoming unstable when exposed to a sufficient amount of moisture. Glacial till is found under the first 10 miles or so of the Turnpike mainline (traveling east from Ohio) and not thereafter in meaningful amount. (N.T. 1132-1133, 1174-1175, 1178-1180, 1185-1186, 1268-1269, 1385-1390; Exs. J-100, J-180, J-180A; F.O.F. 48-50; Board Finding).

51. Based on the foregoing characteristics of glacial till and the evidence which (says the PTC) shows this to be exactly the problem with the subgrade encountered by Fay, the PTC argues that there was no differing site condition present on the Project. (Respondent's Post-Hearing Brief).

52. The PTC also faults Fay's initial estimate of the amount of subgrade stabilization to be expected on the Project (i.e. 30% of the area beneath the existing roadway) for several additional reasons. These include the PTC's assertions that:

A) the bid documents permitted bidders to physically inspect the actual boring samples represented in the logs and to conduct their own geotechnical investigation of the Project area prior to bidding, but Fay did not avail itself of these opportunities;

B) Fay, by its own admission, disregarded (PTC's characterization) or "discounted" (Fay's characterization) the core boring logs, making Fay's estimate of 30% undercut and backfill for the Project not only inaccurate but unreasonable as well;

C) Fay failed to take into account its own work experience on the adjacent and overlapping MP 0-2 Project which was underway at the time Fay bid on the MP 2-10 Project and which was also underlain by glacial till (therefore providing a much more appropriate basis to estimate the undercut and backfill percentages to be expected on the MP 2-10 Project, rather than a compilation of other Turnpike reconstruction projects which were not in glacial till areas); and

D) Fay was remiss in not expecting the need to stabilize the subgrade in the roadway expansion areas.

(Respondent's Post-Hearing Brief; Claimant's Post-Hearing Brief and Reply Brief).

53. Fay says it did not physically inspect the actual core borings because they were over six years old at the time the MP 2-10 Project was put out for bid and did not undertake its own additional geotechnical investigation of the Project area because the restrictions placed on the scope of this investigation in the bid documents were so significant as to make such additional investigations impractical and of little to no use. (Respondent's Post-Hearing Brief; Claimant's Post-Hearing Brief and Reply Brief; N.T. 44-45, 55-70, 195-198, 1166-1172; Exs. J-9 at F 43.00 and 44.00, J-180, J-180A)

54. No other bidders physically examined the core borings or performed an additional geotechnical investigation of the Project site. (N.T. 788, 946-969, 1172)

55. Although bid document provisions permitted additional geotechnical investigation by bidders, other provisions significantly limited the usefulness of such further geotechnical investigation by, inter alia, making much of the Project site unavailable for investigation through imposition of a 30 foot "clear zone" where boring or other sampling was prohibited (including underneath the existing roadway and most of the expansion area where new roadway was to be built) and by limiting access to areas adjacent to the roadway so that it became inaccessible as a

practical matter. (N.T. 58-70, 192-193, 253-254, 787-788, 946-969, 1169-1172, 1256-1257; Exs. J-9 at SP F 44.00, J-94, P-1, D-3; F.O.F. 53; Board Finding).

56. Based on the reasons stated by Fay and the evidence noted above in Paragraphs 53 to 55, including the age of the actual core borings; the significant restrictions placed on the opportunity for bidders to conduct their own geotechnical investigation; and credible testimony by the PTC's own witness that the spacing of the core borings done by the PTC were reasonable and additional borings would not have shown anything significantly different, we find no material fault on Fay's part for its failure to conduct such an inspection and/or additional geotechnical investigation. (N.T. 1398-1399; Exs. J-180, J-180A; F.O.F. 53-55; Board Finding).

57. As noted earlier, Fay says it did take into account its actual work experience on the MP 0-2 Project in formulating its bid time estimate of undercut and backfill needed for the MP 2-10 Project. (F.O.F. 42-44).

58. The Board agrees with the PTC that Fay's actual work experience on the adjoining MP 0-2 Project would have been highly relevant in forming a proper estimate of the quantity of undercut and backfill necessary for the MP 2-10 Project because it was a similar roadway reconstruction project, in similar soil and water conditions (i.e. glacial till punctuated by areas of dry, moist and wet soils). However, the evidence presented at hearing leaves it unclear as to the extent of the roadway reconstruction work actually performed on the MP 0-2 Project at the time of Fay's bid on the MP 2-10 Project. (N.T. 23-24, 33, 83-84, 95, 204-205, 601-602, 1083-1084; Exs. J-8, J-9, J-39, J-100, J-192; F.O.F. 34, 43-44, 48-50, 57, 59-63, 64-65, 82; Board Finding).

59. The notice to begin operations on the MP 0-2 Project was issued November 15, 2005, with bid documents for the instant MP 2-10 Project released in early March 2006 and bids due May 3, 2006. Fay would have been working one MP 0-2 Project for less than six months at the time bidding closed on the MP 2-10 Project. (N.T. 33, 83-84; Exs. J-9, J-39, J-192).

60. Thomas Westrom, President of Fay, testified that only "spot undercuts" had been necessary on the MP 0-2 Project at the time Fay bid for the MP 2-10 Project, with a "guess" of 25-30% of the roadway requiring undercut and backfill. However, a witness for PTC testified that only minimal roadway excavation on the MP 0-2 Project had been done at the time bids were due on the MP 2-10 Project. (N.T. 83-84, 95, 1083-1084).

61. Work on the MP 0-2 Project included renovating/reworking the Gateway Toll Plaza as well as initial reconstruction of the approximate two mile stretch of roadway adjoining the Ohio border. However, this toll plaza had recently been reconstructed in 2000-2001 (by Fay) and consequently required little in the way of further subgrade stabilization. Accordingly, it is unclear how much of the actual roadway construction (as opposed to toll plaza rework, or other

work prefatory to construction) had been done in the first 5 ½ months of the 21 month MP 0-2 Project. (N.T. 23-24, 83-84, 172-175, 601-602; Ex. J-192; F.O.F. 57-60; Board Finding).

62. The importance of this uncertainty as to work sequence and timing on the MP 0-2 Project is highlighted by recognition that assistant superintendent for the MP 0-2 Project, Richie Kuhns-Schoedel (addressed as “Mr. Schoedel”), testified “pretty much all” of the roadway (except the toll plaza) on the MP 0-2 Project was, eventually, found to need undercut and backfill. (N.T. 598-602; Exs. J-39, J-192).

63. The Board is unable to determine from the evidence presented whether the dearth of undercut on the MP 0-2 Project noted by Mr. Westrom as of the bid date for the MP 2-10 Project was because Fay had encountered only a small amount of unstable subgrade in some substantial portion of roadway work or because Fay had simply not yet commenced substantial roadway construction work at that point. (N.T. 23-24, 33, 83-84, 95, 172-175, 601-602, 1083-1084; Exs. J-39, J-192; F.O.F. 57-62; Board Finding).

64. Fay says it “discounted” the core boring logs because the core borings were taken in 2000 (six years before the bid date) and because of the lack of an accompanying geotechnical engineering report to elucidate same. (Respondent’s Post-Hearing Brief; Claimant’s Post-Hearing Brief and Reply Brief; N.T. 44-45, 55-56, 70-78, 97, 195-198, 214, 216; Exs. J-180, J-180A).

65. It was not reasonable for Fay to either disregard or “discount” the core boring logs in arriving at its estimate of the amount of undercut and backfill which would be required for subgrade stabilization on the Project. The core boring logs indicated the predominance of glacial till soil underlying the Project. This presence of glacial till distinguishes the MP 2-10 Project from the other Turnpike projects (except the MP 0-2 Project) and Fay’s own general roadway work experience which Fay used to arrive at its undercut and backfill quantity estimate of 30%. (N.T. 1132-1133, 1174-1180, 1232, 1268-1269, 1450-1452; Exs. J-180, J-180A; F.O.F. 40, 47-51, 66-73; Board Finding).

66. The presence of glacial till on the Project also makes the information contained in the core boring logs even more significant because glacial till is not necessarily unstable but is only subject to degradation when exposed to a sufficient amount of moisture. (N.T. 198-199, 265, 434, 972-974, 1031-1032, 1159-1162, 1167-1168, 1244-1245, 1274-1276, 1282-1290, 1404-1416; Exs. J-180, J-180A; Board Finding).

67. The PTC’s own witnesses acknowledged that not all subgrade in an area characterized by glacial till would typically require stabilization and that the presence of groundwater (in addition to rainwater) could explain some of the instability and degradation of the subgrade on the Project. They also acknowledged that they would not have expected nearly 100% of the subgrade underlying the Project to require stabilization. These witnesses testified

further that whether subgrade stabilization would be necessary depended on other factors in addition to the identity of the soil as glacial till. Such other factors focus primarily on the proximity of water to the area excavated and include capillary action of water rising to the excavation surface once the ground above it is removed and migration of water from adjacent areas, as well as the way a project is designed and staged. (N.T. 198-199, 265, 434, 972-974, 1031-1032, 1159-1162, 1167-1168, 1244-1245, 1274-1276, 1282-1290, 1404-1416, 1435-1436; Exs. J-180, J-180A; Board Finding).

68. The core boring logs for the Project denoted soils as “dry,” “moist,” or “wet,” with most soils being characterized as “moist” (apparent moisture without visible water). Notations that soils are “moist” on the core boring logs are of limited usefulness in determining the quantity of moisture present in the soil at the site of the borings, because “moist” may represent a broad range of soil moisture conditions however the “wet” designation indicates a significant ground water presence. (N.T. 745-747, 981-982, 1167-1168, 1281-1282, 1415-1416; Exs. J-180, J-180A; Board Finding).

69. Almost all soils, particularly those directly underneath a sealed roadway, are expected to be moist when sampled in a core boring. (N.T. 1178, 1415-1416).

70. Because soils are often at their “optimum” strength when some degree of moisture is present, a notation of “moist” by itself on a core boring log does not indicate instability of the soil at the site of the core borings. (N.T. 1139-1144, 1282, 1393-1395, 1415-1416, 1454; Exs. J-180, J-180A; F.O.F. 66-69; Board Finding).

71. The core borings done beneath the existing roadway of the Project frequently identified the soils beneath as “moist” but did not provide any information on the groundwater table depth (presumably because they were bored and regouted before an accurate groundwater table level could be determined). However, core borings done outside the existing roadway but in the expansion areas and surrounds often identified soils as “wet” (visible water present) at some depth of the boring and frequently identified a groundwater table elevation. (N.T. 740-747, 1277-1279; Exs. J-9, J-180, J-180A, P-1, D-3; Board Finding).

72. Given the indications of “wet” soils and/or groundwater tables in the core boring logs outside the existing roadway at or near proposed subgrade elevations for the reconstructed and expanded roadway, and the presence of wetlands in the roadway expansion area, Fay’s failure to anticipate any undercut and backfill in the roadway expansion area was unreasonable. (Exs. J-9, J-180, J-180A; Ex. P-1; Ex. D-3; F.O.F. 65-71; Board Finding).

73. Because the core boring logs for the Project identified not only the types of soil encountered, but also provided some (albeit limited) information regarding associated moisture content and/or water tables in the surrounding soils, and because each of these borings could be located along the Project plans (which included topographical mapping and existing roadway

elevations),⁶ a careful review of these logs and the Project plans (noting, inter alia, areas where “wet” soil or a groundwater table was relatively close to the proposed roadway subgrade elevation) would have served to identify potential areas of unstable subgrade in a much more project-specific manner than would general reference to “other” roadway construction projects with different soil and water factors. (N.T. 45-49, 894-940, 990-999, 1167-1168, 1175-1183, 1233-1235, 1390-1395, 1450-1452; Exs. J-9, J-180, J-180A, P-1, D-3; F.O.F. 65-72; Board Finding).

74. Nevertheless, this same careful review of the core boring logs together with the Project plans and topographical mapping available at bid time would also have fallen far short of suggesting that Fay would encounter unstable subgrade over anywhere near the entire length and breadth of the Project and require the amount of undercut and backfill actually experienced on this Project. (N.T. 45-49, 198-199, 265, 434, 894-940, 972-974, 990-999, 1031-1032, 1159-1162, 1167-1168, 1175-1183, 1233-1235, 1244-1245, 1274-1276, 1282-1290, 1390-1395, 1404-1416, 1435-1436, 1450-1452; Exs. J-9, J-94, J-180, J-180A, P-1, D-3; F.O.F. 30-31, 39, 65-73, 75-77; Board Finding).

75. To the contrary, a review of the core boring logs, together with Project plans and associated topographical mapping would have caused a reasonable party to expect that substantially less than the entire Project would present the unfortunate combination of glacial till and sufficient moisture near enough to the roadway’s subgrade elevations so as to anticipate the need to stabilize the subgrade in nearly all areas of the Project. (N.T. 45-49, 198-199, 265, 434, 894-940, 972-974, 990-999, 1031-1032, 1159-1162, 1167-1168, 1175-1183, 1233-1235, 1244-1245, 1274-1276, 1282-1290, 1390-1395, 1404-1416, 1435-1436, 1450-1452; Exs. J-9, J-94, J-180, J-180A, P-1, D-3; F.O.F. 30-31, 39, 65-73, 75-77; Board Finding).

76. The Board’s own review of the core boring logs, together with the Project plans and topographical mapping available at the time of the bid, suggests to the Board a potential need to stabilize somewhere around 50% of the Project roadway (under both existing and expanded areas) rather than a need to stabilize the subgrade in nearly all areas. (N.T. 1233-1235; Exs. J-9, J-180, J-180A, P-1, D-3; Board Finding).

⁶ Exhibit D-3 provides an example of the type of Project plans and topographical mapping available to Fay and others at bid time even though this particular exhibit was not created until shortly before presentation at hearing. Specifically, Exhibit D-3 is composed of the basic topographical mapping of the existing Turnpike roadway (which was provided to contractors at bid time) with the locations of all the Project’s core borings (among other things) superimposed thereon for presentation to the Board. However, the specific location of these core borings in and around the existing Project roadway was also ascertainable at bid time from the core boring logs themselves, so both these elements were available for review before bids were due. Additionally, existing roadway elevations minus the depth of the new roadway construction materials (subbase through wearing course) would then approximate the proposed subgrade elevation for the reconstructed and expanded roadway. (N.T. 35-38, 44-49, 896-931; Ex. D-3; Board Finding).

77. Independent of Fay, but prior to awarding a contract on the MP 2-10 Project, a design consultant for PTC (who had access not only to the core boring logs but also the resulting geotechnical engineering report commissioned by PTC and not provided to bidders) prepared an “engineer’s estimate” for undercutting and backfill needed for reconstruction of the Turnpike from Milepost 0 to 10 (which included all of the Project here at issue). This consultant stated to the PTC:

We understand that the limited design and plan information in the design build documents makes it difficult for the bidders to fully know the extent of unsuitable materials to be remediated until construction begins. Our previous geotechnical exploration, testing and design efforts documented very little in the way of potential unsuitable material save for topsoil. However, we could envision a premium to our roadway construction cost estimate associated with the remediation for excavation of unsuitable materials. In our estimate, we conservatively estimated that 50% of the entire pavement area at a 2 ft depth for Class 1A excavation. Based on the specifications, and while no special rock or subbase is required for backfill, suitable backfill material costs could add an additional \$2-3M to the roadway construction cost. [emphasis supplied].

(N.T. 1010 -1022, 1212; Ex. J-18).

78. Although the Board found the evidence insufficient to determine whether or not Fay’s actual work experience on the MP 0-2 Project was sufficiently advanced to have informed Fay’s bid on the MP 2-10 Project, the bid documents and specifications provided at the start of the MP 0-2 Project did provide timely and highly relevant guidance as to what amount of undercut and backfill work Fay might reasonably have expected on the MP 2-10 Project. (N.T. 84-95, 183-190, 199-205, 232-236, 248-250, 1084-1088; Exs. J-9, J-100, J-192; F.O.F. 42-44, 52, 57-63, 79-83; Board Finding).

79. The MP 0-2 Project was a design/bid/build project in which the PTC had first commissioned the design plans and work specifications before putting the contract out to bid. These project design plans and specifications included estimated quantities for various work items developed by PTC, including an estimate of the quantity of undercut and backfill stabilization work anticipated on that project. (N.T. 185-186; Ex. J-192; F.O.F. 78).

80. In the contract for the MP 0-2 Project, the PTC estimated 45,000 CY of undercutting and backfilling work in its bid solicitation materials. The PTC also specified 122,842 square yards (SY) of subbase material. Because all paved area must be constructed on subbase, this measurement is a proxy for the overall paved surface area. The 122,842 SY is equal to 1,105,578 square feet (122,842 SY x 9 SF/SY = 1,105,578 SF). To undercut and backfill 1,105,578 square feet (the entire paved project area) to a depth of two feet (the typical depth of an undercut and backfill) would require 2,211,156 cubic feet of material (1,105,578 SF x 2 Ft (depth) = 2,211,156 CF). The 2,211,156 CF is equal to 81,895 CY (2,211,156 CF x 1 CY / 27 CF = 81,895 CY). The 45,000 CY of undercutting and backfilling identified by the PTC in

its bid materials represents approximately 55% of the 81,895 CY that would have been required to undercut the entire paved area of the MP 0-2 Project to a depth of two feet. (N.T. 84-95, 183-190, 232-236, 248-250, 1084-1088, 1112-1114; Ex. J-192; Board Finding).

81. Contrary to Fay's assertion, it did not have good reason to believe that the PTC expected less undercutting and backfill than 45,000 CY on the MP 0-2 Project because of the PTC's apparently accidental omission of a quantity of 2A rock (necessary to perform backfilling) on the MP 0-2 Project bid specifications. The PTC indicated the quantity of undercutting and backfilling estimated for the project and there is no indication that the erroneous omission reflected an intent by the PTC not to undercut and backfill less than 45,000 CY. Furthermore, by the time MP 2-10 Project was bid, the PTC had already informed Fay that the omission of the 2A rock quantity on the MP 0-2 Project was an error and agreed to a price for the rock needed for backfilling the anticipated undercut. (N.T. N.T. 84-95, 183-190, 232-236, 248-250, 1069-1070, 1075-1076, 1084-1088, 1112-1114; Exs. J-192, D-4; Board Finding).

82. The MP 0-2 Project was built on glacial till soil and constituted the only other portion of the Turnpike mainline besides the area covered by the MP 2-10 Project that was characterized by glacial till. (N.T. 1132-1133, 1175, 1232; Exs. J-9, J-100, J-192; F.O.F. 57-65; Board Finding).

83. Because of the proximity of the MP 0-2 Project, the similar glacial till soils and water conditions on that project's site, and the PTC's greater familiarity with the geology of the surrounding area,⁷ the 55% proportion of undercut and backfill to paved area anticipated by the PTC's specifications for the MP 0-2 Project would have been, in the Board's view, a much more reasonable and reliable basis from which to estimate undercut and backfill needed for the MP 2-10 Project available to Fay at the time it bid the MP 2-10 Project than the "other" PTC roadway projects and the "general experience" Fay utilized. (Exs. J-9, J-100, J-192; F.O.F. 43-44, 48-50, 58-65, 78-82; Board Finding).

84. Moreover, when one considers the 55% estimate for the adjacent MP 0-2 Project in conjunction with the information provided by the core boring logs, plans and topographical mapping for the MP 2-10 Project (taken together the best and most reliable indicators of Project specific subgrade stabilization needs available at bid time), the substantial weight of evidence leads the Board to find that a reasonable estimate for the amount of undercut and backfill needed on the MP 2-10 Project would approximate 55% of the entire paved Project area (i.e. under both the reconstructed and the expansion areas of the new roadway). (Exs. J-9, J-100, J-180, J-180A, J-192; F.O.F. 43-76, 78-83; Board Finding).

⁷ Not only had the PTC built the existing roadway, but (as Fay would reasonably have expected at the time) the PTC would have had a full geotechnical engineering report covering at least the MP 0-2 Project in order to formulate the design and specifications for that project. (N.T. 751-763, 784-786, 803-805, 837-838, 871-872, 1040-1044, 1047-1052, 1133-1135; Exs. J-100, J-192; Board Finding)

85. Because the Board finds that a reasonable bidder would not have anticipated the need to undercut and backfill 96.2% of the Project (by length) and nearly 100% of the MP 2-10 Project area under pavement, which we find to be an unexpected and extraordinarily high percentage considering the information available to potential bidders at the time of bid; because no lay or expert witness testified that anywhere near a 100% undercut and backfill ratio would be normal or expected on this Project;⁸ because the PTC's own estimate for the adjacent and closely similar MP 0-2 Project reflects an approximate 55% undercut and backfill expectation; because a careful review of the core boring logs, plans and topographical mapping for the MP 2-10 Project provided by PTC to bidders does not suggest that the combination of glacial till and water in sufficient amount and proximity to the proposed subgrade elevation was present under nearly all the Project (but rather indicates the potential for unstable subgrade in the area of approximately 50% of the Project); and because a PTC internal (consulting engineer's) estimate anticipated the need for up to 50% undercut and backfill for reconstruction of the Turnpike roadway between Milepost 0 to 10, we find that Fay did, in fact, encounter an unknown physical condition of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work which was to be performed under the Contract when it was required to undercut and backfill nearly 100% of the paved area under the reconstructed and expanded Project roadway. (N.T. 672-673; Exs. J-9, J-94, J-180, J-180A, P-1, D-3; F.O.F. 30-31, 39-41, 58, 65-84; Board Finding).

86. Because the differing site condition clause in the Contract identifies an objective (not subjective) standard to be utilized to determine what constitutes an unknown physical condition of an unusual nature, which differed materially from those conditions ordinarily encountered and generally recognized as inherent in roadway construction and widening work; and because we find that Fay's original undercut and backfill estimate of only 30% under the existing roadway to be unreasonable, but instead find an undercut and backfill estimate of 55% of the entire reconstructed roadway area (as expanded) to be the most reasonable and appropriate estimate to be derived from the information available to Fay at the time it bid the MP 2-10 Project, we find the need to undercut and backfill substantially all of the roadway reconstruction and expansion work on this Project in excess of 55% of this newly reconstructed roadway constitutes such a condition. (Exs. J-9, J-180, J-180A, P-1, D-3; F.O.F. 37, 40-46, 65-76, 78-85; Board Finding).

⁸ Although Mr. Heirendt testified that the PTC (and the Kimball Report) contemplated chemical stabilization of the entire stretch of roadway between MP-0 to MP-10, he repeatedly declined to equate this to a determination that all or nearly all of the subgrade beneath this stretch of roadway would be found unstable and require undercut and backfill (if chemical stabilization was not employed). No other evidence or testimony offered suggested the Project would encounter unstable subgrade in excess of 55 percent. (N.T. 253, 319, 343-345, 365-366, 672-673, 981, 1034-1035, 1038, 1309-1314, 1404-1421; Exs. J-9, J-94, J-180, J-180A, P-1, D-3; F.O.F. 30-31, 39-41, 58, 65-84; Board Finding).

87. Because glacial till is not necessarily unstable but becomes so only when exposed to a sufficient amount of moisture, and because the core boring logs and other information available to Fay at the time it bid the MP 2-10 Project indicates only somewhere in the vicinity of 50-55% of the Project might experience unstable subgrade due to the combination of glacial till and sufficient moisture, the Board rejects PTC's contention that the correct identification of the soil type alone beneath the Project as glacial till precludes a finding of a differing site condition. (Exs. J-9, J-180, J-180A, P-1, D-3; F.O.F. 37, 40-46, 65-76, 78-86; Board Finding).

88. As set forth in our damages calculation below, we adjust our award to recognize the more appropriate and reasonable 55% baseline estimate for undercut and backfill on the MP 2-10 Project derived from the best information available to Fay at the time of the bid (i.e. the core boring logs, Project plans and topographical mapping provided by the PTC and the PTC's undercut and backfill estimate on the MP 0-2 Project). (Exs. J-9, J-180, J-180A, P-1, D-3; F.O.F. 37, 40-46, 65-76, 78-87; Board Finding).

89. The bid documents for the MP 2-10 Project did not include (or offer access to) the geotechnical engineering report commissioned by the PTC in tandem with the taking of core borings (the so-called "Kimball Report").⁹ The logs provided to bidders are a subset of the information obtained in the preparation of that report. The Kimball Report was generated by an earlier proposal to reconstruct the Turnpike roadway between mileposts 0.0 and 10.0 as a single design/bid/build project. (N.T. 44-45, 56, 71-74, 329-330, 751-764, 871-873, 943-944, 1134-1135; Ex. J-100).

90. The PTC held internal discussions and entertained differing opinions about whether or not to release the Kimball Report to bidders on the MP 2-10 Project before deciding not to do so. The primary reason for withholding this report repeated by most of the PTC's witnesses was to avoid giving bidders what PTC considered "opinion" as opposed to the "factual" information represented by the core boring logs alone. Some also noted a desire not to influence the design that the design/build bidder would choose and/or because providing the report might be potentially "adverse" to the PTC in a future warranty dispute. (N.T. 803-805, 835-839, 871-874, 943-944, 976-977, 982, 1014-1015, 1040-1047, 1133-1134, 1302-1309).

91. The Board agrees that the core boring logs comprise factual data relevant to the Project but regards the reasons offered by the PTC's witnesses for not providing the Kimball Report in full to bidders as highly dubious and less than persuasive. Contrary to the assertions offered by these witnesses, the Kimball Report contained additional and significant "factual" data that was not presented in, or ascertainable from, the core boring logs (or from inspection of

⁹ Two versions of the so-called "Kimball Report" appear in the record. (Exs. J-8 and J-100). For purposes of the Board's findings, we refer to the revised draft, prepared in 2002. The Kimball Report was prepared based upon an earlier idea for reconstruction of the area encompassing both the MP 0-2 Project and MP 2-10 Project as a single project. (N.T. 731-734, 1048-1050, 1135; Exs. J-8, J-100)

six year old core boring samples). Such meaningful and material fact information included California Bearing Ratio (“CBR”) test results on fresh soil samples (providing insight into the weight bearing capability of the soil underlying the Project) and In-Situ Moisture Content measurements for these samples (expressed as a percentage of water content by volume).¹⁰ (N.T. 71-74, 944-946, 1137-1141, 1302-1309, 1393-1395, 1415-1418, 1452-1454; Ex. J-100; F.O.F. 88-90, 92; Board Finding).

92. The PTC’s own geotechnical expert witness testified that “laboratory data” like that described in the preceding paragraph would be “factual data that would provide additional characterization of the soils.” (N.T. 1452-1454; Board Finding).

93. The Kimball Report also contains historical information on early roadway construction at the site and suggests that chemical stabilization be considered for the entire length of the Project. While the Board would agree with the PTC’s view that the suggestion of chemical stabilization along the full length of the Project is in the nature of “opinion” as opposed to “fact” (and does not necessarily mean the entirety of the Project was so unstable as to require undercut and backfill), the Board cannot help but also think that such an “opinion” from a qualified geotechnical engineering firm studying the fresh core boring samples, the logs, and accompanying laboratory test results, might have caused Fay to think twice about its “typical” 30% undercut and backfill estimate for the Project. (N.T. 71-74, 1133-1136; Ex. J-100; F.O.F. 40-41, 91-92; Board Finding).

94. The next lowest bidder on the Project, Trumbull Corporation (or its consultant HDR), somehow acquired most (if not all) of the Kimball Report prior to the bid date. While acknowledging that we have been provided with no details or particulars to why the difference between their respective bids, we do note that Trumbull’s bid was approximately \$10 million higher than Fay’s. (N.T. 379-380; Ex. J-2; Board Finding).

Fay’s Construction Methods

95. Instability of subgrade made up of glacial till soils depends largely on the surrounding geological conditions, particularly the proximity and amount of water in the area. It can also be affected by the contractor’s means and methods of constructing the highway

¹⁰ In layman’s terms, soil attains maximum cohesion for its soil type at its optimum moisture content level. Moisture content higher than optimum degrades the soil cohesion and can be indicative of an unstable combination of moisture and soil type in the sampled area. Accordingly, by comparing the in situ moisture content of the core boring samples to optimum moisture content for that particular type of soil, Fay would have been able to determine whether or not the actual moisture level was or was not sufficiently high to degrade the cohesion of the soil represented by the sample. (N.T. 1137-1141, 1282, 1393-1395, 1415-1418, 1454; F.O.F. 66-70; Board Finding)

including whether or not proper precautions are taken to protect the subgrade soils from infiltration by water. (N.T. 972-974, 1024-1026, 1290, 1404, 1434-1435, 1455-1456; F.O.F. 30, 66-67, 100-102, 107-108; Board Finding).

96. The PTC's support for its contention that Fay exposed subgrade to the elements for too long and caused or contributed to the amount of unstable subgrade experienced on the Project comes from the testimony of Tom Collella. Mr. Collella was a quality control inspector on the Project employed by McTish Kunkel, a design consultant for Fay that handled quality assurance. (N.T. 1323-1325, 1336-1370; Ex. J-190).

97. Mr. Collella testified as to what he recalled to be Fay's excavation practices on the Project site. Although Mr. Collella's testimony was often less than clear, he basically testified that Fay's excavation practices (including use of a "guillotine truck" to break-up existing concrete pavement during Phase I and Phase II) exposed fresh subgrade to the weather elements far ahead (i.e. up to seven working days ahead) of any subsequent excavation activities. (N.T. 1327-1330, 1336-1370; Ex. J-190).

98. With the possible exception of three instances in the Fall of 2008, the PTC presented little to no credible evidence to correlate the days it alleges excessive lengths of subgrade on the Project were left exposed to the elements to the days of rain or other inclement weather events experienced on the Project site.¹¹ (N.T. 1346-1356, 1371-1372; Ex. J-190; Board Finding).

99. On the subject of its excavation procedures, Fay presented testimony from its superintendent on the Project, Richie Kuhns-Schoedel (hereinafter addressed as "Mr. Schoedel"). (N.T. 603-605, 610-618, 621-28, 638-643, 652-653, 658-660, 670-672).

100. Mr. Schoedel testified as to the means and methods Fay employed to construct the roadway, including its efforts to protect the roadway subgrade during excavation and construction activities. While it is clear that work on the Project required excavation of the roadway down to subgrade and travel thereon by trucks and equipment for a period of time, Mr. Schoedel testified that Fay took care not to expose subgrade (the actual layer beneath the roadway subbase) to weather elements for any longer than necessary. (N.T. 605-626, 658-662, 670-672; F.O.F. 13-19, 101-108; Board Finding).

¹¹ Read favorably to the PTC, Exhibit J-190 indicates that up to a combined total of 1655 feet of subgrade was exposed to rainy conditions on three different days in the Fall of 2008 during Phase II. 1655 lineal feet of single lane undercut is less than 1% of the total lineal footage of the newly reconstructed six lane roadway and a far smaller percentage of the total roadway area. We do not consider it a material factor. (N.T. 1346-1356, 1371-1372; Ex. J-9, J-94, J-190, P-1, D-3; F.O.F. 39; Board Finding).

101. Mr. Schoedel testified that during Phase I, as a general rule, segments of approximately one-half mile of the roadway expansion area at a time would be excavated roughly to the level of the existing roadway prior to the subgrade being exposed. Following this, only 400 lineal feet or so of the roadway expansion area and shoulder would typically be taken to subgrade level at any one time. It was done this way so that this 400 foot long area could be excavated down to subgrade level, tested and, if necessary, undercut and backfilled in a single day (a day shift and a night shift). According to Mr. Schoedel, this limitation on the area excavated to subgrade level at one time served to minimize the exposure of subgrade to the elements while progressing the grading and excavation work as necessary ahead of the paving work. (N.T. 605-626, 642-643).

102. Mr. Schoedel testified that between completion of rough cuts and fills in the roadway expansion areas and excavation to the proper subgrade level, Fay purposely left the intervening few feet of soil “overburden” on top of these areas to protect the subgrade until it was excavated to the proper level for roadway construction. In other words, Mr. Schoedel testified that subgrade was generally not left open and exposed to the elements during excavation for any significant period of time. (N.T. 611-613, 616-624).

103. Mr. Schoedel acknowledged a few exceptions to the typical “half-mile rough cut/400 foot subgrade” limitations described above recalling that one stretch of approximately two miles long was taken to existing roadway level at one time between Mileposts 4 to 6, but did not indicate that this stretch was taken to subgrade level in anything other than the typical 400 lineal foot segments designed to minimize exposure of raw subgrade to the elements. Mr. Schoedel also identified an approximate 2000 foot stretch of roadway taken to subgrade at one time in a cut area of solid subgrade material. (N.T. 614, 651-652; F.O.F. 101-102).

104. Mr. Schoedel also testified that the only pavement broken-up during Phase I was asphalt on the outside shoulder, which was broken-up and removed without the use of a guillotine truck. (N.T. 607-608).

105. Mr. Schoedel testified that the process for excavating the existing travel lanes and remaining portions of the shoulders in Phase II was generally similar. Although a substantial length of concrete roadway may have been broken-up at one time by the guillotine truck in Phase II, only sections of approximately 400 feet of the old roadway were typically removed to subgrade level at one time to limit the period that the subgrade would be fully opened and exposed to the elements. (N.T. 641-643, 651).

106. Although not expressly pointed out by the parties, the Board does note that the excavation processes described by Mr. Schoedel would leave stretches of “finished” or prepared subgrade (i.e. subgrade which had already been undercut, backfilled and stabilized trailing the

active excavation segments) of lengths longer than 400 feet exposed for a period of time until the paving machines were brought in to begin laying subbase and subsequent roadway layers. While this may explain some of the discrepancy between the testimony of Mr. Collella and Mr. Schoedel, the Board does not consider the exposure of “finished” or prepared subgrade to the elements to be inappropriate given the need to deploy the follow-up paving machines in a reasonably effective manner. Nor does this practice appear to have been a significant contributor to the subgrade problems encountered since the evidence does not show that any significant or material amount of this “finished” subgrade needed to be re-stabilized.¹² (N.T. 605-626, 644-646, 670-672, 1350-1355, 1365-1367; Ex. J-190; Board Finding).

107. Mr. Schoedel testified that Fay would cease work when rain was expected, and that Fay took steps to protect any exposed ground (including subgrade) from weather elements by compacting it to limit water infiltration and by installing drainage channels to direct excess water away from the work area when and where possible. (N.T. 625-628, 652-654, 658-660).

108. The precautions described by Mr. Schoedel are similar to those recommended by the PTC’s own geotechnical expert. (N.T. 1404, 1434-1435, 1455-1456; F.O.F. 107; Board Finding).

109. Mr. Schoedel testified convincingly that groundwater, rather than rain, was the primary source of moisture causing subgrade destabilization on the Project. (N.T. 626-627, 636-639, 648-649, 657-660).

110. With the exception noted at Findings of Fact 98, to the extent that Mr. Schoedel’s testimony and Mr. Collella’s testimony contradict, the Board finds Mr. Schoedel’s testimony more credible. (F.O.F. 96-109; Board Finding).

111. Because it was necessary to perform rough cut excavation in the expansion areas prior to bringing them to subgrade level, demolish the existing roadway ahead of excavation and to excavate to subgrade level, test and remediate same as needed far enough ahead so as to provide stable subgrade of sufficient length prior to the arrival of the paving crews to a particular section of roadway, we find, with minor exceptions which we do not consider material, that Fay did not leave subgrade on the Project exposed to rain or other inclement weather events for any longer than was reasonably necessary to prosecute its work on the Project. Moreover, we find Fay’s construction means and methods on this Project to be reasonable and appropriate. (F.O.F. 95-110; Board Finding).

¹² The only specific instances of re-stabilizing subgrade (i.e. repeat undercutting) on the Project provided to the Board were the three instances itemized in Exhibit J-190 for a combined total of 1655 lineal feet. See Footnote 11, supra. We consider this amount to be immaterial to the Project as a whole.

112. Based on the foregoing, the Board finds that Fay did not materially contribute to the amount of unstable subgrade encountered on the Project by way of faulty or inappropriate construction means or methods. (F.O.F. 95-111; Board Finding).

The Design/Build Issue

113. Despite the Contract being design/build in nature, thus requiring Fay to design and construct a full depth roadway without a specified design or estimated quantities for any type of work being supplied in the bid documents, the PTC included the differing site condition provision (set forth above) in the Contract. (Ex. J-9 at CS 110.02(a); Board Finding).

114. The language of the differing site condition provision placed in the Contract by the PTC does not explicitly limit its application to variations of soil type or quality alone, nor does this provision or any other provision in the Contract expressly exclude a significant variation in the quantity of unstable subsurface material from being considered a differing site condition. (Ex. J-9; Board Finding).

115. The PTC was (or should have been) aware at the time it drafted the Contract for this Project that the Board considered “differing site condition” provisions of the type present in this Contract to encompass a “quantity” as well as a “quality” component since the PTC had earlier been a beneficiary of such an analysis. Compare Angelo Iafrate Construction Co., Inc. v. Pa. Turnpike Commission, Docket No. 3654 B.O.C. Amended Opinion and Order, pp. 67-68 and n.12 (Pa. Bd. Cl., July 27, 2006) (finding unanticipated subsurface rock encountered on project was too small to constitute a differing site condition), aff’d by, Angelo Iafrate Construction Co. v. Pa. Turnpike Commission, Docket No. 1632 C.D. 2006, slip op. (Pa. Cmwlth May 16, 2007).

116. When viewed in a manner most favorable to the PTC, the differing site condition provision in the Contract is, at best, ambiguous as to whether or not it includes or excludes a significant and material variation in the quantity of unsuitable subsurface material from its scope. (Ex. J-9 at CS 110.02(a); Board Finding).

117. Because the PTC’s own witnesses acknowledged that the glacial till identified in the core boring logs and encountered on the Project was not necessarily unstable, but became so only when subjected to sufficient moisture; and because the core boring logs, plans and topographical mapping for the Project provided to bidders did not identify such a sufficient and proximate presence of moisture along the entire length and width of the Project roadway, the deviation between the subsurface conditions actually encountered on the Project and those which might have reasonably been anticipated from the bid documents was not solely one of quantity, but of quality as well (i.e. dry or moist (but stable) glacial till versus wet or saturated (and unstable) glacial till). (N.T. 46-49, 896-897, 899-904, 909-940, 972-974, 990-991, 1167-1168,

1178-1183, 1233-1235, 1244, 1285-1286, 1289-1290, 1316, 1390, 1392, 1406-1412, 1435-1436, 1446-1447, 1450-1452, 1455; Exs. J-9, J-100, J-180, J-180A, P-1, D-3; F.O.F. 66-76, 85-87; Board Finding).

Damages

118. Fay seeks compensation for the difference between the quantity of undercut and backfill actually done on the Project and the amount it originally estimated when preparing its bid (70,000 CY) which Fay considered equivalent to undercutting and backfilling beneath 30% of the existing roadway area. (Claimant's Post-Hearing Brief).

119. In addition to its denial throughout the proceeding that Fay is entitled to any additional compensation whatsoever, the PTC also pointed out several faults with Fay's original 30% estimate. (Respondent's Post-Hearing Brief).

120. First and foremost among the flaws we find in Fay's original estimate was its "discounting" of the core boring logs provided by PTC as part of the bid materials. These logs clearly disclosed the predominance of glacial till punctuated by areas of dry, moist and wet soils beneath the Project, and this fact alone should have been sufficient to inform Fay that its reliance on "typical" undercut and backfill percentages for "other" Turnpike projects (without glacial till) was unreasonable. (F.O.F. 52-59; Board Finding).

121. Another aspect contributing to an unreasonably low estimate of undercutting and backfill was Fay's failure to utilize the information on the soil type and groundwater levels (albeit limited) in the boring logs and match this data to topographical information and subgrade elevation along the roadway (as an aid to ascertaining areas of potential unstable subgrade). (F.O.F. 59-62; Board Finding).

122. Fay's failure to consider the potential need to stabilize subgrade under the roadway expansion areas also shows a lack of prudent consideration. (F.O.F. 39-42, 69-74; Board Finding).

123. Finally, the Board finds no good reason for Fay to opt for the "typical" 30% undercut and backfill expectation from "other" projects when it was well aware, as the winning bidder on the MP 0-2 Project, that the PTC itself estimated a 55% ratio of undercut to paved area on that project, which was both an immediately adjacent and substantially similar roadway reconstruction project. (F.O.F. 39-42, 69-74; Board Finding).

124. The area roughly encompassed by the MP 2-10 Project and the adjoining MP 0-2 Project are the only ones on the Turnpike mainline built predominantly on glacial till soil. (N.T. 1132-1133, 1232; Ex. 100).

125. Because of the flaws in Fay's original "30% estimate" for undercut and backfill on this Project as noted, among other places, at Findings of Fact Paragraphs 118 through 124 and our Findings of Fact at Paragraphs 58-63, 78-86 and 88, we agree with the PTC that this initial estimate used by Fay was faulty. Accordingly, we adjust our damage award calculation to include the amount of undercut and backfill actually performed by Fay on this Project in excess of 55% of the total Project area under pavement (as reconstructed and expanded) at the rates specified by the parties. (F.O.F. 58-63, 78-86, 88; Board Finding).

126. The parties stipulated prior to hearing that the per-cubic-yard rates that Fay used to calculate the amount of its claim were commercially reasonable. These rates used by Fay to compute its claim were \$18.87 per cubic yard for work performed under the existing roadway and \$27.07 per yard for work performed under the roadway expansion areas. (Amended Joint Stipulations and Exhibit List; Amended Statement of Claim at ¶¶ 13 and 18; N.T. 668-670).

127. Multiplying the 39,283 linear feet ("LF") length of the project (7.44 miles ("MI") x 5,280 LF / MI = 39,283 LF) by the 82 LF width of the existing roadway (including travel lanes, shoulder and median) yields a total surface area of the existing roadway area of 3,221,206 square feet ("SF"). A 100% estimate of undercutting and backfill of that area to an average depth of two feet ("FT") would yield an estimate of 6,442,412 cubic feet (CF) (3,221,206 SF x 2 FT = 6,442,412 CF) or 238,608 cubic yards ("CY") (6,442,412 CF ÷ 27 CF / 1 CY = 238,608 CY). (Exs. J-9, P-1, D-3; Board Finding).

128. Fifty-five percent undercutting and backfill of the area under the existing roadway to an average depth of two feet ("FT") yields an estimate of 131,234 CY (238,608 CY x .55 = 131,234 CY). (Exs. J-9, P-1, D-3; Board Finding).

129. Fay performed a total of 269,298 CY of undercutting and backfilling under the area of the existing roadway (travel lanes, median, and shoulders). The difference between the actual quantity of undercutting and backfilling performed by Fay (269,298 CY) and a reasonable 55% estimate is 138,064 CY (269,298 CY – 131,234 CY = 138,064 CY). (Amended Joint Stipulations and Exhibit List at Stipulation A; N.T. 162-163; Ex. J-94; F.O.F. 83-88, 118-128; Board Finding).

130. The value of the quantity of undercutting and backfilling performed by Fay underneath the existing roadway in excess of a reasonable 55% estimate, at the stipulated cost of

\$18.87 per CY, is \$2,605,268 (138,064 CY x \$18.87 / CY = \$2,605,268). (F.O.F. 83-88, 118-129; Board Finding).

131. Subtracting the width of the existing roadway (82 LF) from the total width of the new roadway (122 LF) leaves a difference of 40 LF, which represents the width of the roadway expansion area (the newly constructed paved portion outside the width of the existing roadway). Multiplying the roadway expansion width of 40 LF by the Project length of 39,283 LF yields an area of 1,571,320 SF. A 100% undercutting and backfill of this area at an average depth of two feet yields an estimate of 3,142,640 CF (1,571,320 SF x 2 FT = 3,142,640 CF) or 116,394 CY (3,142,640 CF ÷ 27 CF / 1 CY = 116,394 CY). (Exs. J-9, P-1, D-3; F.O.F. 127; Board Finding).

132. Fifty-five percent undercutting and backfill of this roadway expansion area at an average depth of two feet yields an estimate of 64,017 CY (116,394 CY x 0.55 = 64,017 CY). (Exs. J-9, P-1, D-3; Board Finding).

133. Fay performed a total of 126,639 CY undercutting and backfilling in the roadway expansion area. The difference between the total quantity of undercutting and backfilling actually performed and the reasonable 55% estimate of 64,017 CY is 62,622 CY. (Amended Joint Stipulations and Exhibit List at Stipulation A; N.T. 166; Ex. J-94; F.O.F. 83-88, 118-132; Board Finding).

134. The value of the quantity of undercutting and backfilling performed by Fay in the roadway expansion area in excess of a reasonable 55% estimate, at the stipulated cost of \$27.07 is \$1,695,178. (F.O.F. 83-88, 118-133; Board Finding).

135. The total value of the undercutting and backfilling performed by Fay beyond a reasonable 55% estimate of the paved roadway Project area and (including reconstructed and expanded areas) is \$4,300,466. (F.O.F. 83-88, 118-134; Board Finding).

136. The total pre-judgment interest amount at the rate of 6% per annum for the period from February 4, 2008 (the date on Fay's initial administrative claim) to July 21, 2014 is \$1,666,237. (F.O.F. 5, 135; Board Finding).

CONCLUSIONS OF LAW

1. Because this matter is a claim arising from a Contract entered into by a Commonwealth agency in accordance with the Procurement Code, 62 Pa.C.S. § 101-4604, and has been filed with the Board in accordance with Section 1712.1 of the Procurement Code, 62 Pa.C.S. § 1712.1 (relating to contract controversies), the Board of Claims (Board) has jurisdiction over the parties and the subject matter of this dispute. 62 Pa.C.S. §§ 1712.1, 1724(a); (Findings of Fact (“F.O.F.”) 1-12, 28-29, 32).

2. In asserting a claim for recovery on a breach of contract, it is the asserting party’s burden to show that the facts exist to support the requested recovery. Paliotta v. Dep’t of Transp., 750 A.2d 388, 390 n.2 (Pa. Cmwlth. 1999).

3. Under Pennsylvania law, in order to recover on a breach of contract claim, the plaintiff must prove by a preponderance of the evidence: (1) the existence of a valid and binding contract to which plaintiff and defendant were parties; (2) the essential terms of the contract; (3) that plaintiff complied in all material respects with the contract’s terms; (4) that the defendant breached a duty imposed by the contract; and (5) that damages resulted from the breach. Technology Based Solutions, Inc. v. Elecs. Coll., Inc., 168 F. Supp. 2d 375, 381 (E.D.Pa. 2001); A.G. Cullen Constr. Co., Inc. v. State Syst. of Higher Ed., 898 A.2d, 1145, 1161 (Pa. Cmwlth. 2006).

4. As the finder of fact, the Board is charged with the duty of determining the credibility of evidence and resolving conflicting testimony. It may believe all, or part, or none of the testimony of any witness. The Board’s findings need not be supported by uncontradicted evidence, so long as they are supported by substantial evidence. Wayne Knorr, Inc. v. Dep’t of Transp., 973 A.2d 1061, 1078 (Pa. Cmwlth. 2009); Dep’t of Gen. Servs. v. Pittsburgh Bldg. Co., 920 A.2d 973, 989 (Pa. Cmwlth. 2007); A.G. Cullen Constr. Co., Inc. v. State Sys. of Higher Educ., 898 A.2d 1145, 1155 (Pa. Cmwlth. 2006); Com. v. Holtzapfel, 895 A.2d 1284, 1249 (Pa. Cmwlth. 2006); Miller v. C.P. Centers, Inc., 483 A.2d 912, 915 (Pa. Super. 1984).

5. The Board is the ultimate finder of fact and is charged with determining the credibility and persuasiveness of witness testimony, including that of expert witnesses. James Corp. v. North Allegheny School District, 938 A.2d 474, 495 n.21 (Pa. Cmwlth. 2007). The Board may properly give more weight to some items of evidence than to others, including the testimony of an expert witness. See, Masalehdan v. Allegheny County Bd. of Prop. Assessment, 931 A.2d 122, 128 n.7 (Pa. Cmwlth. 2007).

6. It is undisputed that a Contract for the reconstruction and widening of a portion of the Pennsylvania Turnpike existed to which PTC and Fay were parties. The Contract required

Fay to provide a stable subgrade upon which to build the reconstructed and widened roadway. (Ex. J-9; F.O.F. 3, 13-19).

7. It is also undisputed that there was a differing site condition provision in the Contract, which provided, in relevant part, as follows:

110.02 DIFFERING SITE CONDITIONS

If unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work, are encountered at the site, the party discovering such conditions is responsible for promptly notifying the other party, in writing, of the specific differing conditions, before the site is disturbed and before the affected work is performed.

Upon written notification, the Commission will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time require for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits will be made. The Commission will notify the Contractor of the determination whether or not an adjustment of the Contract is warranted.

No contract adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

No contract adjustment will be allowed under this section for any effects caused on unchanged work.

(Ex. J-9 at Section 110.02 (emphasis supplied); F.O.F. 37).

8. PTC and Fay dispute whether the amount of unstable subgrade Fay was required to remediate through undercutting and backfill constituted a differing site condition, and, more specifically, whether Fay should have expected the type and quantity of unstable subgrade conditions found on the Project because of information contained in geotechnical data given to bidders (i.e. the core boring logs) and institutional knowledge Fay would have gleaned from previous work in the same geographical area as the Project (particularly the MP 0-2 Project). (F.O.F. 33-34).

9. Persuasive federal case law on differing site condition clauses similar to the one in this Contract holds that a differing site condition may be found where anticipated materials appear in higher proportions or degrees than reasonably expected. Servidone Constr. Corp. v. U.S., 19 Cl. Ct. 346, 370 (1990), aff'd 931 F.2d 860 (Fed. Cir. 1991).

10. Although not the subject of explicit focus in prior Pennsylvania cases, the Board's own holdings and Pennsylvania appellate cases are in accord with Servidone's analysis that the

quantity as well as the quality of unsuitable subsurface materials encountered is a factor in determining the presence of a differing site condition on a jobsite. Compare Angelo Iafrate Construction Co., Inc. v. Pa. Turnpike Commission, Docket No. 3654 B.O.C. Amended Opinion and Order, pp. 67-68 and n.12 (Pa. Bd. Cl., July 27, 2006) (finding unanticipated subsurface rock encountered on project was too small to constitute a differing site condition), aff'd by, Angelo Iafrate Construction Co. v. Pa. Turnpike Commission, Docket No. 1632 C.D. 2006, slip op. (Pa. Cmwlth May 16, 2007) to Pittsburgh Bldg. Co. v. Dep't of Gen. Servs., B.O.C. Opinion, Docket No. 3717 (Pa. Bd. Cl. September 8, 2006) (contractor not put on notice of extent of unsuitable subsurface materials entitled to relief), aff'd by Pittsburgh Building Co. v. Dep't Gen. Servs., 920 A.2d 973 (Pa.Cmwlth. 2007), app. den., 939 A.2d 890 (Pa. 2007).

11. Because the Board found, as a matter of fact, that Fay did encounter an unknown physical condition of an unusual nature, differing materially from those encountered and generally recognized as inherent in the work which was to be performed when it encountered unstable subgrade (and was required to undercut and backfill same) under nearly 100% of the reconstructed and expanded Project area under pavement, we conclude that Fay encountered a differing site condition on the Project within the plain terms of the Contract. (C.O.L. 6-10; F.O.F. 85).

12. Also in dispute is whether Fay contributed to the quantity of unstable subgrade encountered on the Project through inappropriate construction means and methods. (F.O.F. 35)

13. Because the Board found, inter alia: that Fay did not leave freshly excavated subgrade exposed to rain or other inclement weather events for any longer than was reasonably necessary to prosecute its work on the Project; that Fay's construction means and methods on this Project were reasonable and appropriate; and that Fay did not materially contribute to the amount of unstable subgrade encountered on the Project by way of faulty or inappropriate construction means or methods, there is no factual basis to support the PTC's argument that any award to Fay should be reduced because Fay caused or materially contributed to the excessive quantity of unstable subgrade that it encountered on the Project. (F.O.F. 111-112; C.O.L. 3-4).

14. PTC asserts that because the Contract was a design build contract, for which PTC provided neither a design nor specified quantities of materials (and which required Fay to perform all design and construction work for the bid price), that it cannot be held liable for the excessive quantity of undercutting and backfill Fay was required to perform. (F.O.F. 36).

15. Despite its current argument (summarized in the immediately preceding paragraph) the PTC included the differing site condition clause here at issue in its Contract, which clause, by its plain language, does not explicitly limit its application to variations of soil type or quality alone, nor does it expressly exclude a significant variation in the quantity of

unstable subsurface material from being considered a differing site condition. (Ex. J-9; C.O.L. 7).

16. The PTC was (or should have been) aware at the time it drafted the Contract for this Project, that the Board considered “differing site condition” provisions of the type present in this Contract to encompass a “quantity” as well as a “quality” component as the PTC had earlier been a beneficiary of such an analysis. See Angelo Iafrate Construction Co., Inc. v. Pa. Turnpike Commission, Docket No. 3654 B.O.C. Amended Opinion and Order, pp. 67-68 and n.12 (Pa. Bd. Cl., July 27, 2006) (finding unanticipated subsurface rock encountered on project was too small to constitute a differing site condition), aff’d by, Angelo Iafrate Construction Co. v. Pa. Turnpike Commission, Docket No. 1632 C.D. 2006, slip op. (Pa. Cmwltth May 16, 2007).

17. The fundamental rule in interpreting the meaning of a contract is to ascertain and give effect to the intent of the contracting parties. Where the contract is free from ambiguity, the parties’ intent is to be determined from the express language of the contract. LJL Transp., Inc. v. Pilot Air Freight Corp., 962 A.2d 639, 647 (Pa. 2009); Chester Upland Sch. Dist. v. Edward J. Meloney, Inc., 901 A.2d 1055, 1059 (Pa. Super. 2006).

18. A written instrument is ambiguous if it is reasonably or fairly susceptible of more than one construction. When a contract is ambiguous, the rule of contra proferentem requires the language to be construed against the drafter and in favor of the other party if the latter’s interpretation is reasonable. State Pub. Sch. Bldg. Auth. v. Noble C. Quandel Co., 585 A.2d 1136, 1144 (Pa. Cmwltth. 1991); see also, Dep’t of Transp. v. Semanderes, 531 A.2d 815, 818 (Pa. Cmwltth. 1987).

19. The United States Court of Claims has stated as follows:

The purpose of the changed conditions clause is thus to take away at least some of the gamble of 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.

Foster Constr. C.A. & Williams Bros. Co. v. U.S., 435 F.2d 873, 887 (Ct. Cl. 1970).

20. Both federal and Pennsylvania appellate courts, as well as this Board, have rejected attempts by owners to limit the effect of differing site conditions clauses when faced with conflicting contract provisions. Those courts and this Board have resolved contractual

ambiguity created by conflicting contractual clauses against the drafting agency and in favor of the contractor seeking recovery under the differing site condition. Id.; Pittsburgh Bldg. Co. v. Dep't of Gen. Servs., B.O.C. Opinion, Docket No. 3717 (Pa. Bd. Cl. September 8, 2006), aff'd by Pittsburgh Building Co. v. Dep't Gen. Servs., 920 A.2d 973, 989 (Pa.Cmwlth. 2007), app. den., 939 A.2d 890 (Pa. 2007).

21. For all the reasons discussed above in Conclusions of Law 15 through 20, the Board concludes that Fay is entitled to compensation for the excessive amount of undercut and backfill it was required to perform on the Project under the differing site condition provision of the Contract, irrespective of the design/build nature of the Contract and the exculpatory provisions cited by the PTC.¹³ (C.O.L. 7, 11, 14-19).

22. The plaintiff bears the burden of proof as to damages. The determination of damages is a factual question to be decided by the Board as factfinder. The Board must assess the testimony by weighing the evidence and determining its credibility, and by accepting or rejecting the estimates of the damages given by the witnesses. Although the Board may not render a verdict based on sheer conjecture or guesswork, it may use a measure of speculation in estimating damages. The Board may make a just and reasonable estimate of the damage based on relevant data, and, in such circumstances, may act on probable, inferential, as well as direct and positive proof. Clairton Slag, Inc. v. Dep't of Gen. Servs., 2 A.3d 765, 776 (Pa. Commw. Ct. 2010).

23. Damages need not be proved with mathematical certainty. Rather, a contractor need only provide evidence that affords a sufficient basis for calculating damages with reasonable certainty. Acchione v. Canuso, Inc. v. Dep't of Transp., 461 A.2d 765, 769 (Pa. 1983); Dep't of Transp. V. James D. Morrissey, Inc., 682 A.2d 9, 16 (Pa.Cmwlth. 1996).

24. The United States Court of Claims, facing a situation similar to the case here at hand in Servidone, stated that: "the adequacy of ... site investigation must be measured against what a reasonable, intelligent contractor, experienced in the particular field of work, would discover." The Court went on further to state that even though Servidone had acted unreasonably in its bid preparation, the "standard of reasonable anticipation does not require a contractor to expect the worst. Indeed, this would be contrary to the purpose of the differing site condition clause." The Court also held that Servidone was thus "entitled to recover damages to

¹³ As we have previously noted, there are no provisions in the Contract which expressly exclude a significant variation in the quantity of unstable subsurface material from being considered a differing site condition. Moreover, the Contract provisions which the PTC cites in its post-hearing brief (and which we describe as "exculpatory") all relate to the PTC's position that it cannot be held responsible for any reliance Fay might place on the core boring logs provided by the PTC. We find the PTC's reference to these provisions curious in that they do not preclude our factual finding that Fay encountered a differing site condition on the Project and, if anything, would tend to strengthen Fay's argument that it was right to "discount" the core boring logs and support its contention that its "30% estimate" was justified. (Ex. J-9).

the extent the condition it encountered could not have been reasonably anticipated.” Servidone, 19 Cl. Ct. at 373-374.

25. The Board finds the reasoning of Servidone persuasive, in that it both avoids the consequence of a windfall and is consistent with the policy behind differing site condition provisions generally. See, Foster Constr., 435 F.2d at 887; (C.O.L. 21-24).

26. Fay’s failure to make a reasonable estimate of the unstable subgrade it would encounter does not serve to defeat its claim entirely insofar as the Board has found that Fay should reasonably have anticipated some, but not all, of the unstable subgrade it encountered on the Project. (F.O.F. 83-85).

27. Because the differing site condition clause in the Contract identifies an objective (not subjective) standard to be utilized to determine what constitutes an unknown physical condition of an unusual nature, which differed materially from those conditions ordinarily encountered and generally recognized as inherent in roadway construction and widening work; and because the Board found that Fay’s original undercut and backfill estimate of only 30% under the existing roadway to be unreasonable, but instead found an undercut and backfill estimate of 55% of the entire reconstructed roadway area (as expanded) to be the most reasonable and appropriate estimate to be derived from the information available to Fay at the time it bid the MP 2-10 Project, the Board concludes that the need to undercut and backfill substantially all of the paved area under the reconstructed and expanded roadway on this Project in excess of 55% of this newly reconstructed roadway constitutes such a condition and is eligible for additional compensation under the Contract. (Ex. J-9; C.O.L. 7, 9-11, 21-26).

28. Because the Board has found that the need to undercut and backfill substantially all of the roadway reconstruction and expansion work on this Project in excess of 55% of this newly reconstructed roadway constitutes a differing site condition under the terms of the Contract; and because the Board has determined that the value of the work actually performed by Fay to undercut and backfill nearly 100% of the Project area and what a reasonable bidder would have estimated (undercut and backfill of 55% of the Project area) totals \$4,300,466, the Board concludes that PTC is liable to Fay for this principal amount pursuant to the terms of the Contract. (Ex. J-9; C.O.L. 7, 9-11, 21-27).

29. Fay is also entitled to pre-judgment interest at the legal rate of 6 percent per annum applicable to the foregoing principal amount from the date this claim was filed with the contracting officer. 62 Pa.C.S. § 1751 and 41 P.S. § 202.

30. Fay is further entitled to post-judgment interest at the legal rate of 6 percent per annum on the outstanding amount of this judgment until paid. 62 Pa.C.S. § 1751 and 41 P.S. § 202.

OPINION

INTRODUCTION

Joseph B. Fay Co./Norwin Construction Company, a Joint Venture (“Fay”) and the Pennsylvania Turnpike Commission (“PTC”) entered into Contract 00-002-RCD1-C in early 2006 for the reconstruction and widening of approximately 7.5 miles of roadway and bridges on the Turnpike mainline (hereinafter the “Contract”). The work to be performed under the Contract stretched, roughly, between Mileposts 2 through Mileposts 10 in Lawrence and Beaver Counties (hereinafter the “Project” or “MP 2-10 Project”).

Fay here seeks payment under the differing site condition provision of the Contract for excessive subgrade stabilization work required to complete the Project. Specifically, Fay asserts that it encountered a far greater quantity of unstable subgrade on the Project than could reasonably have been expected when it was preparing its bid. Fay contends that this unexpected need to undercut and backfill the subgrade for nearly 100% of the Project area gives rise to a claim for extra compensation under the Contract’s differing site condition provision.

For its part, the PTC denies that Fay encountered a differing site condition on the Project. PTC instead accuses Fay of simply underbidding in order to secure the Contract and then trying to obtain, through the claims process, what it should have asked for in its bid in the first place. In particular, the PTC asserts that Fay inappropriately disregarded pertinent geotechnical information provided by the PTC for the Project and prior experience on a similar adjacent project in estimating the amount of unstable subgrade when forming its bid on this Project; that Fay contributed to the amount of unstable subgrade by performing excavation so as to expose unprotected subgrade to the elements for longer than necessary; and that Fay is not entitled to

compensation for any increase in quantities of work because the contract was a “design/build” contract, which required Fay to design the road and calculate all quantities of work on its own.

After careful consideration of the testimony and documentation presented at hearing in this matter, the Board finds merit in Fay’s differing site condition claim. Specifically, the Board finds, as a matter of fact, that the amount of unstable subgrade encountered on the Project was at an extreme and constituted an unknown physical condition of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work which was to be performed under the Contract. The Board also finds that Fay’s practices utilized to excavate the existing roadway were not improper and did not unduly contribute to the amount of subgrade stabilization work required on the Project. Moreover, the Board does not see the design/build nature of the Contract as precluding an award of damages under the differing site condition provision which the PTC itself placed in the Contract.

Although the Board finds that Fay encountered far more unstable subgrade on the Project site than reasonably would have been expected from the information available to contractors at the time of bid, we do agree with the PTC that Fay’s initial quantity estimate for the undercutting and backfill work needed to stabilize the subgrade was flawed. Thus, the Board does not award Fay compensation for the difference between its original estimate of undercutting and backfill work and the amount Fay ultimately performed. Instead, the Board adjusts its award to cover only the difference between what a bidder would reasonably have expected to encounter in terms of undercutting and backfill and the amount of this work ultimately performed. As a result, we award Fay compensation in the amount of \$4,300,466, plus pre- and post-judgment interest.

OVERVIEW

The Contract called for Fay to reconstruct and widen the Turnpike roadway between Mile 1.85 and Mile 9.29 so that there would be three travel lanes (up from two) both eastbound and westbound, with full shoulders on both the outside and the median side of the travel lanes in both directions. The work was to be staged in two phases so that traffic could continue to pass during construction. During Phase I, Fay was to demolish most of the existing shoulders and expand the width of the roadway to accommodate the additional travel lanes as well as the new and expanded shoulders while traffic continued to pass both eastbound and westbound in the middle (on the existing travel lanes). During Phase II, Fay was to reconstruct the middle of the existing roadway in both directions, with eastbound and westbound traffic passing on the newly widened areas built during Phase I.

Performance of the Contract work required Fay to provide a stable subgrade upon which to build the widened and reconstructed roadway. Although the Contract did not specify the method to be used to stabilize subgrade found to be unstable, Fay determined that the most reliable and cost effective method would be to undercut the unstable material and backfill that area with appropriate rock at an average thickness of approximately two feet. No specific quantity of unstable subgrade, or method for determining the quantity of undercut and backfill required, was set forth in the bid specifications.

In preparing its bid, Fay did anticipate that it would encounter some unstable subgrade and a consequent need for undercutting and backfilling. Specifically, Fay estimated that 70,000 cubic yards (“CY”) of unstable subgrade material would need to be undercut and backfilled for

the Project.¹⁴ The amount of undercutting and backfilling Fay anticipated represented its estimate that approximately 30% of the subgrade beneath the existing roadway (i.e., the existing travel lanes, existing outside shoulders, and existing median shoulders, but not including areas beneath the roadway expansion) would need to be undercut and backfilled. Fay did not include in its estimate any allowance for undercut and backfill in expansion areas outside the existing roadway.

Construction on the Project began in late 2007. Phase I work included excavation of 4/5 of the existing outside shoulders and the additional roadway expansion area on each side together with construction of a new additional travel lane, a portion of a new middle travel lane and a new outside shoulder in both directions. Phase II work included excavation under the existing travel lanes, 1/5 of the existing outside shoulder and the existing median shoulder together with construction of a new inside travel lane, the remaining portion of the new middle travel lane and a newly widened median shoulder in both directions.

However, while working on Phase I, it became clear to Fay that the quantity of undercutting and backfill it estimated for the entire Project would be insufficient given the quantity of unstable subgrade it was encountering. In fact, during Phase I, Fay found it necessary to stabilize substantially all of the subgrade under the new travel lanes in the roadway expansion areas (including cut and fill areas) and under the new shoulder which it constructed in this phase. This more than exhausted the 70,000 CY of undercutting and backfill Fay had estimated. At this

¹⁴The Board notes that, in the record, stabilization by use of undercutting and backfilling is often referred to as “Class 1A excavation.” “Class 1A excavation” is “Excavation for the removal of unsuitable material below subgrade having a bottom width of less than 2.5 m (8 feet)...” See, § 203.1(b) of the Pennsylvania Department of Transportation Publication 408/2003, Change 4, Effective October 2, 2005 (emphasis supplied). Insofar as much of the area being undercut and backfilled was wider than 8 feet (in some cases much wider), the Board will refer to this work simply as undercut and backfill.

point, Fay sent a letter to PTC seeking additional compensation and indicating that Phase II work would require a much greater quantity of undercutting and backfill.

Fay would eventually perform 126,000 CY of undercutting and backfill to complete work on areas outside the existing roadway and another 270,000 CY of undercutting and backfill to complete work on areas covered by the existing roadway. These quantities of undercut and backfill are not in dispute. Moreover, the need to perform this undercut and backfill in order to complete the Project is also without serious dispute.¹⁵

ISSUES PRESENTED

Fay contends that it is entitled under the Contract's differing site condition clause to payment for the unexpected quantity of undercut and backfill needed to correct the excessive amount of unsuitable subgrade actually encountered on the Project. It argues that the extreme amount of unstable subgrade on this Project was an unknown physical condition of an unusual nature, which differed materially from those conditions ordinarily encountered and generally recognized as inherent in roadway construction and widening work.

The PTC asserts that there was no differing site condition and that the soils underlying the Project were exactly as Fay should have expected to find them. Among other things, the PTC contends that core boring logs distributed to bidders on the Project correctly disclosed the

¹⁵During the hearing, the PTC appeared to suggest that an alternative method of subgrade stabilization known as "chemical stabilization," could have, or should have, been used. Chemical stabilization is a method by which lime pozzolon, calciment or similar substance is added to soil to solidify it. The Contract permitted chemical stabilization to be used for stabilization assuming the subgrade had a California Bearing Ratio ("CBR") of 5 or higher. Fay, however, presented persuasive testimony that it rejected the use of chemical stabilization for the Project because of its higher cost and lower reliability for warranty purposes. The PTC did not present any credible evidence that the use of undercutting and backfill was inappropriate on this Project and, in its post-hearing brief, seems to have abandoned the argument that Fay should have used chemical stabilization in place of undercut and backfill. Certainly, there is no evidence that the Turnpike is dissatisfied with the undercutting and backfilling work that Fay actually performed. The Board sees no reason to doubt that undercutting and backfill was the appropriate means to stabilize the subgrade on this Project.

type and nature of the soils to be encountered on the Project but that Fay disregarded this information. The PTC also argues that Fay failed to heed its own institutional knowledge about the subsurface conditions and amount of unstable subgrade likely to be encountered which it should have garnered from its earlier experience with the Turnpike reconstruction project between Miles 0 and 2.25 (i.e., the “MP 0-2 Project”) and from the early action bridge work it did between Miles 1.85 and 9.29 prior to the start of the MP 2-10 Project.¹⁶ PTC further suggests that Fay contributed to the problem of unstable subgrade by opening up to the elements (i.e. weather conditions) too large an area of subgrade for longer than necessary when performing its work. Finally, the PTC contends that because the Contract was design/build in nature (with no quantities of work or material specified by PTC), Fay should be unable to recover for increased quantities of work.

DISCUSSION AND ANALYSIS

The Differing Site Condition Issue

The Board first considers whether the unstable subgrade encountered by Fay constituted a differing site condition under the terms of the Contract. The provision of the Contract under which Fay seeks extra compensation states, in pertinent part, as follows:

110.02. Differing Site Conditions

(a) Differing Site Conditions. If unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work, are encountered at the site, the party discovering such conditions is responsible for promptly notifying the other party, in writing, of the specific differing conditions, before the site is disturbed and before the affected work is performed.

¹⁶ There was no explanation given for the apparent overlap of the MP 0-2 Project (described as between Mileposts 0-2.25) and the MP 2-10 Project (described as between Mileposts 1.85-9.29) other than to recognize that the work and tie-ins between the two would need to be coordinated.

Upon written notification, the Commission will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made. The Commission will notify the Contractor of the determination of whether or not an adjustment of the contract is warranted.

No contract adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

No contract adjustment will be allowed under this section for any effects cause on unchanged work. * * *

(Ex. J-9)

Fay's primary argument is that it encountered significantly more unstable subgrade than could have been (or was) reasonably anticipated by any of the parties. On this point, Fay's evidence establishes that it was necessary to undercut and backfill over 96% of the entire Project. Rounded to the nearest percent, Fay encountered unstable subgrade and needed to undercut and backfill 100% of the length of the Eastbound Phase I travel lane and shoulder area; 87 % of the Westbound Phase I travel lane and shoulder area; 100% of the Eastbound Phase II travel lane area (excluding median shoulder); 95% of the Westbound Phase II travel lane area (excluding median shoulder); and 99% of the Phase II median shoulder work area.

In total, 96.2% of the entire Project (by length) needed undercut and backfill. Moreover, while the depth and width of undercut and backfill needed along the length of the Project varied, the actual quantity of this work was equivalent to performing undercut and backfill for the entire paved area beneath the reconstructed and expanded roadway at an average depth of 2.23 feet. Fay then compares this to the typical proportion of undercut/backfill encountered on other Turnpike reconstruction projects and to its own experience in roadway construction (which it pegged at 30% of the existing roadway only) as direct evidence of the unusual nature of the site conditions encountered on this Project.

Fay had reached its bid estimate of 30% undercut and backfill for this Project, at the suggestion of Fay's engineering consultants, by undertaking a review of other publicly available PTC road reconstruction contracts for which estimated quantities of undercutting and backfill were available. Fay used the information gleaned from these other contracts and from its own roadway construction experience to determine the typical proportion of undercutting and backfill to be expected on reconstruction projects it believed similar to the Project here at issue. Based on the evidence presented, Fay's conclusion that 30% of the roadway would require undercutting and backfill is consistent with its sampling of Turnpike reconstruction projects.

Fay also maintains that it considered other information in reaching its 30% estimate for undercutting and backfill. Specifically, Fay had performed a reconstruction of the nearby Gateway toll plaza in 2001-2002, and found that only "minimal" undercutting and backfilling were needed there.¹⁷ Additionally, Fay had previously replaced two "early action" overhead bridges in the Project area and found that the soil outside the roadway in those locations was sufficiently stable such that the bridges did not need to be constructed on deep pilings. Fay had also bid on (and won) the MP 0-2 Project which involved a second reworking of a portion of the Gateway toll plaza and an initial reconstruction of the first 2 miles or so of the existing Turnpike roadway (traveling eastward from the Ohio border). According to Fay, its experience on the MP 0-2 Project at the time it bid on the MP 2-10 Project only served to reinforce Fay's bid time estimate of a requirement to undercut and backfill approximately 30% of the roadway.

Finally, Fay asserts that it did not expect the need to undercut and backfill the subgrade under the new pavement in the roadway expansion areas because most of this work would be in

¹⁷ The Gateway toll plaza is located approximately 1.2 miles east of the Ohio-Pennsylvania border. However, testimony at hearing indicated that the toll plaza itself was only about 600 feet on either side of the toll booths.

areas where it would be cutting or filling-in the surrounding terrain. Here, it appears that Fay expected that the cut areas would have been naturally protected from instability by the overburden of soil and that fill areas, as constructed by Fay, would be sufficiently above existing undisturbed ground to provide a stable subgrade as well.

The PTC responds, inter alia, by asserting that the site conditions, in terms of the nature and quality of the soils found by Fay, were exactly as should have been expected pursuant to the core boring logs supplied to all bidders. Specifically, the PTC argues that information it provided to bidders by way of the core boring logs accurately identified the nature of the soil underlying the Project as glacial till; that glacial till is a glacially deposited soil existing under the first 10 miles or so of the Turnpike (traveling east from Ohio) and not in any meaningful amount thereafter; that glacial till contains significant percentages of silt and is notable for its quality of retaining moisture; and that this type of soil has a significant potential for becoming unstable when exposed to a sufficient amount of moisture. Based on the foregoing and the evidence which (says the PTC) shows this to be exactly the problem encountered by Fay, the PTC argues that there is no differing site condition present on this Project. It further notes that Fay, by its own admission, disregarded or “discounted” these core boring logs, making Fay’s estimate of 30% undercut and backfill for the Project not only inaccurate but unreasonable as well.

In addition to undermining Fay’s reliance on undercut/backfill percentages from other Turnpike reconstruction projects (and Fay’s other roadway work experiences) because of the unique presence of glacial till under this Project, the PTC also faults Fay’s low bid estimate of the subgrade stabilization required here for failure to take into account Fay’s own work experience on the adjacent MP 0-2 Project. On this point, the PTC argues that the MP 0-2

Project (which was underway at the time of the MP 2-10 Project bid and was also underlain by glacial till), rather than a compilation of other Turnpike reconstruction projects (which had no glacial till), provided a much more appropriate basis to estimate the undercut and backfill percentages to be expected on the MP 2-10 Project now in dispute.

We first note our agreement with the PTC that it was not appropriate for Fay to disregard or “discount”¹⁸ the core boring logs in arriving at an estimate of the amount of undercut and backfill which would be required for subgrade stabilization on the Project. Importantly, the core boring logs identified the predominance of glacial till under the Project. This distinguishes it from the other Turnpike reconstruction projects and Fay’s own general roadway work experience which Fay used to arrive at its undercut/backfill quantity estimate of 30 percent.

This presence of glacial till under the Project also made the information contained in these logs even more significant because glacial till is not necessarily unstable but is only subject to degradation and instability when exposed to a sufficient amount of moisture. Accordingly, because these core boring logs identified not only the types of soil encountered, but also provided some (albeit limited) information regarding associated water tables and moisture content in these surrounding soils, and because each of these borings could be located along the Project plans (which included topographical mapping), a careful review of these logs and the Project plans would have served to identify potential areas of unstable subgrade in a much more project specific manner than would general reference to “other” projects with different soil and water factors. Such a review would also have shown that Fay’s failure to anticipate any undercut/backfill work in the roadway expansion area was faulty as well.

¹⁸ PTC and Fay differ slightly in their characterization of Fay’s treatment of the core boring logs. PTC accuses Fay of “disregarding” the information, while Fay says it merely “discounted” the core boring logs because of their age (the core borings were taken in 2001) and did not inspect the actual core borings (i.e., the physical borings) for this same reason. The word used by Fay’s president was, in fact, “discounted.”

All that said, this same review of the core boring logs together with the Project plans and topographical mapping available at bid time would also have fallen far short of suggesting that anywhere near the entire length and breadth of the Project would encounter unstable subgrade and require the amount of undercut and backfill actually experienced on this Project. To the contrary, a review of the core boring logs, together with Project plans and associated topographical mapping would have caused a reasonable party to expect that substantially less than the entire Project would encounter the unfortunate combination of glacial till and sufficient moisture near enough to the roadway's subgrade elevations so as to anticipate the need to stabilize the subgrade in nearly all areas. Indeed, our own review of these materials alone suggests to the Board a potential need to stabilize somewhere around 50% of the Project roadway (under both existing and expanded areas).

The PTC also suggests that Fay improperly disregarded its own institutional knowledge obtained through bidding and working on the MP 0-2 Project in estimating the quantity of undercut and backfill for the MP 2-10 Project. Here again we agree in part and disagree in part with the PTC.

We agree that Fay's actual work experience on the MP 0-2 Project (which was a similar reconstruction project in similar glacial till soil and water conditions) would be highly relevant. However, the evidence that was presented at hearing leaves it unclear as to the extent of the roadway work (and amount of undercut) actually performed on the MP 0-2 Project at the time Fay bid the MP 2-10 Project.

The notice to begin operations on the MP 0-2 Project was issued November 15, 2005. Bid documents for the instant MP 2-10 Project were released in early March 2006 and bids were

due on May 3, 2006. Fay would have been working on the MP 0-2 Project for less than six months at the time bidding closed on the instant MP 2-10 Project. Evidence presented at hearing suggests that Fay had not needed to perform extensive undercut and backfill work on the MP 0-2 Project prior to the MP 2-10 Project bid date. However, we are unable to determine from this evidence whether this dearth of undercut at the time was because Fay had encountered only a small amount of unstable subgrade in its roadway work or because it had not yet commenced substantial roadway reconstruction work at this point.¹⁹

However, the bid documents and specifications for the MP 0-2 Project provided at the start of that project by the PTC did, in our view, provide timely and highly relevant guidance as to what amount of undercut and backfill work Fay might reasonably have expected on the MP 2-10 Project. Specifically, the MP 0-2 Project was a design/bid/build project in which the PTC had first commissioned the design plans and specifications before putting that contract out for bid. These project design plans and specifications included estimated quantities for various work items developed by the PTC, including an estimate for the quantity of undercut stabilization work anticipated on that project. On the MP 0-2 Project, the PTC itself estimated that approximately 55% of the project's paved area would need undercut and backfill stabilization.²⁰

¹⁹ Work on the MP 0-2 Project included renovating/reworking the Gateway toll plaza as well as initial reconstruction of the approximate 2 miles of roadway from the Ohio border. However, this toll plaza had been recently reconstructed (in 2001-02) and consequently required little in regard to further subgrade stabilization. Accordingly, it is unclear how much actual roadway reconstruction (as opposed to toll plaza rework) had been done 5 ½ months into the 21 month MP 0-2 Project. The importance of this uncertainty as to work sequence and timing is highlighted by recognition that Fay's own witness testified that nearly all of the roadway (as opposed to the toll plaza) in the MP 0-2 Project was, eventually, found to need undercut and backfill. N.T. 601-602; Exs. J-39, J-192.

²⁰ In the Contract for the MP 0-2 Project, PTC specified 122,842 square yards of subbase material. Because all paved area must be constructed on subbase, this measurement is a proxy for the overall surface area. The 122,842 square yards is equal to 1,105,578 square feet ($122,842 \text{ SY} \times 9 \text{ SF} / \text{SY} = 1,105,578 \text{ SF}$). To undercut 1,105,578 square feet (the entire paved project area) to a depth of two feet would require 2,211,156 cubic feet of material ($1,105,578 \text{ SF} \times 2 \text{ FT} = 2,211,156 \text{ CF}$). The 2,211,156 cubic feet is equal to 81,895 CY ($2,211,156 \text{ CF} \times 1 \text{ CY} / 27 \text{ CF} = 81,895$). The 45,050 CY of undercutting excavation identified by the PTC in its bid materials for the MP 0-2 Project represents approximately 55% of the 81,895 CY that would have been required to undercut that entire paved project area to a depth of two feet.

Given the proximity of the MP 0-2 Project, the similar glacial till soil and water conditions on that project's site, and the PTC's greater familiarity with the area surrounding its roadway,²¹ the 55% proportion of undercut and backfill to paved area anticipated by the PTC's specifications for the MP 0-2 Project would have been, in our view, the most reasonable and reliable basis from which to estimate the undercut and backfill needed for the MP 2-10 Project available to Fay at the time it bid the MP 2-10 Project. Moreover, when one considers this estimate of undercut and backfill by the PTC for the adjacent MP 0-2 Project in conjunction with the information provided by the core boring logs plans and topographical mapping for the MP 2-10 Project (all together the best and most reliable indicators of Project specific subgrade stabilization needs available at bid time), the substantial weight of evidence leads the Board to find that a reasonable estimate for the quantity of undercut and backfill needed on the MP 2-10 Project at the time of bid would approximate 55% of the paved area underneath both the reconstructed and expanded Project roadway (not the 30% under the existing roadway only used by Fay).

Because the Board finds that a reasonable bidder would not have anticipated the need to undercut and backfill 96.2% of the Project (by length) and nearly 100% of the MP 2-10 Project area under pavement, which we find to be an unexpected and extraordinarily high percentage considering the information available to potential bidders at the time of bid; because no lay or expert witness testified that anywhere near a 100% undercut and backfill ratio would be normal or expected on this Project; because the PTC's own estimate for the adjacent and closely similar MP 0-2 Project reflects an approximate 55% undercut and backfill expectation; because a careful

²¹ Not only had the PTC built the existing roadway, but (as Fay would reasonably have expected at the time) the PTC would have had a full geotechnical engineering report covering at least the MP 0-2 Project in order to formulate the design and specifications for that project. (F.O.F. 83).

review of the core boring logs, plans and topographical mapping for the MP 2-10 Project provided by PTC to bidders does not suggest that the combination of glacial till and water in sufficient amount and proximity to the proposed subgrade elevation was present under nearly all the Project (but rather indicates the potential for unstable subgrade in the area of approximately 50% of the Project); and because a PTC internal (consulting engineer's) estimate anticipated the need for up to 50% undercut and backfill for reconstruction of the Turnpike roadway between Milepost 0 to 10, we find that Fay did, in fact, encounter an unknown physical condition of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work which was to be performed under the Contract when it was required to undercut and backfill nearly 100% of the paved area under the reconstructed and expanded Project roadway. However, because the differing site condition clause in the Contract requires an objective (not subjective) standard be utilized to determine what constitutes an unknown physical condition of an unusual nature, which differed materially from those conditions ordinarily encountered and generally recognized as inherent in roadway construction and widening work, we further find Fay entitled only to the cost of the undercut and backfill work it actually performed on the Project in excess of 55% of the entire reconstructed and expanded paved Project area, the amount of undercut and backfill which could reasonably have been anticipated at the time of bid.

We, of course, recognize that the PTC would prefer to address the differing site condition issue as one solely relating to the type of subsurface soil encountered, while Fay's argument here focuses primarily on the excessive quantity of unstable subgrade actually encountered due to the combination of glacial till and water present on the Project. Upon consideration of several factors, the Board believes Fay to have the more persuasive argument.

To begin here, we note that, as asserted by several witnesses (including some from the PTC), glacial till by itself is not necessarily unstable but becomes so only when combined with a sufficient degree of moisture. Therefore, accurately indentifying the type of subsurface soil as glacial till alone does not fully describe the quality of the subsurface conditions to be encountered. Moreover, it does not implicate that nearly all the Project would require undercut and backfill. This is particularly so in this case because the core boring logs did not identify the presence of water to mix with the glacial till in adequate quantity and sufficient proximity to subgrade elevations so as to indicate that substantially all the Project would need to be undercut and backfilled.

Additionally, the Board believes (and has maintained consistently over the years) that one must consider not only the general nature and quality of the subsurface materials encountered but also the quantity of unstable or unsuitable material incurred on a project to determine whether or not a differing site condition is encountered by the contractor on a project such as this. We base this belief on both practical considerations and what we find to be the most persuasive case law extant on this issue.

Frankly, we find the practical considerations overwhelming. One need only contemplate the difference between discovering a damp floor in one's basement and finding 5 feet of water in that same basement to appreciate the fact that quantity as well as quality matters in these circumstances. Water is water, but the latter circumstance is a definitively different site condition than the former requiring a substantially different amount of work, time and effort to remediate.

Persuasive federal case law on this issue also supports our view of differing site condition factors. See e.g. Servidone Construction Corporation v. United States, 19 Cl. Ct. 346, 370 (1990) (differing site conditions have been found where anticipated materials have appeared in higher proportions or degrees than reasonably anticipated). Though not necessarily the primary topic addressed, the Board's own holdings and Pennsylvania appellate cases are in accord with this analysis. For instance, in the case of Angelo Iafrate Construction Company, Inc., v. Pennsylvania Turnpike Commission, cited by the PTC, we specifically noted quantity as a factor in determining the presence of a differing site condition. There we found that the amount of unanticipated subsurface rock encountered on the project was simply too small to constitute a differing site condition and denied relief. Angelo Iafrate Construction Co., Inc. v. Pa. Turnpike Commission, Docket No. 3654 B.O.C. Amended Opinion and Order, pp. 67-68 and n.12 (Pa. Bd. Cl., July 27, 2006) (finding unanticipated subsurface rock encountered on project was too small to constitute a differing site condition), aff'd by, Angelo Iafrate Construction Co. v. Pa. Turnpike Commission, Docket No. 1632 C.D. 2006, slip op. (Pa. Cmwlth May 16, 2007). However, in the Pittsburgh Building case, the Board found the occurrence of unexpected subsurface conditions in sufficient quantity to award such relief. See Pittsburgh Building Co. v. Dep't Gen. Servs., BOC Opinion, Docket 3717, dated September 8, 2006, aff'd 920 A.2d 973 (Pa. Cmwlth. 2007), *app den.* 595 Pa. 712, 939 A.2d 890 (Pa. 2007).

To summarize our holding on this first issue, the Board finds itself in agreement with the PTC on several points relating to the deficiency of Fay's initial estimate of undercut and backfill to be required on the Project. However, we disagree with the PTC that any reasonable bidder would have anticipated the need to undercut and backfill substantially all of the Project (96.2% by length and nearly 100% by area) which we found to be an unexpected and extraordinarily

high percentage considering the information available at the time of bid. Insofar as no lay or expert witness testified that anywhere near 100% undercut and backfill would be normal or expected on this Project; our finding that a careful review of the core boring logs, plans and topographical mapping provided indicates the potential for unstable subgrade in the area of approximately 50% of the Project; the additional fact that and PTC itself internally acquired a consulting engineer's estimate that up to 50% of this area of roadway could require undercut for reconstruction in April of 2006; and the fact that the PTC's own estimate for the adjacent and closely similar MP 0-2 Project reflected an approximate 55% undercut expectation; we find that Fay did, in fact, encounter an unknown physical condition of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work which was to be performed under the Contract when it was required to undercut and backfill nearly 100% of the reconstructed and expanded paved area of the Project.

Having found a differing site condition on the Project, we will, however, adjust our award to recognize a more appropriate and "reasonable" baseline estimate of the undercut and backfill work needed for the Project than was utilized by Fay. Specifically, we have found that, based on the best information available to Fay at the time of bid (i.e. the core boring logs, plans and topographical mapping, together with the PTC's undercut estimate for the MP 0-2 Project), a reasonable estimate for the undercut and backfill needed for the MP 2-10 Project would be 55% of the reconstructed and expanded paved Project area, not the "typical" 30% (under the existing roadway only) used by Fay.

Although not part of, or essential to, our holding on this differing site condition issue, we do wish to address the PTC's decision in this case to provide bidders on the Project with the core boring logs but to withhold the geotechnical report(s) generated for the PTC from these core

borings and related geotechnical study. Specifically, we want to express our disapproval of this decision.

The Turnpike had, in its possession, a geotechnical engineering report covering both the instant Project and the MP 0-2 Project which had been generated by an earlier proposal to reconstruct the Turnpike roadway between Miles 0.0 to 10.0 as a single design/bid/build project. The two versions of this report were included in our hearing record as Exhibits J-8 and J-100, the first being for a pre-final design submitted March 30, 2001, and the second being a revised version submitted on March 15, 2002. For the sake of discussion we will refer to the revised version herein and identify it as the “Kimball Report.”

Based on the testimony at hearing, it appears the PTC held internal discussions and entertained differing opinions about whether or not to release the Kimball Report to bidders on this MP 2-10 Project before deciding, ultimately, not to do so. Several PTC witnesses provided various explanations for this withholding of the Kimball Report. The primary reason repeated by most of these witnesses was to provide only “factual” information which they identified as the core boring logs (and core borings themselves) while avoiding the presentation of “opinion” which they identified as the recommendations and conclusions in the report (or as the report itself). Some also noted a desire not to influence the design that the design/build bidder would choose and/or indicated that “other than the core boring logs, which were provided as information, any other information or reports or testing was deemed to be potentially adverse to the warranty requirements stipulated in the contract documents and correspondingly could provide a loophole for the bidders to utilize in any future warranty dispute.”

The Board regards the reasons expressed above by the PTC for withholding the geotechnical report as highly dubious and far less than persuasive. Most significantly, we

strongly disagree with the PTC's contention that all the relevant "factual" data sufficient for bidders to reach their own conclusions regarding subsurface conditions to be encountered on the Project was represented by provision of the core boring logs alone and that withholding of the Kimball Report merely eliminated the "opinions" of the PTC's geotechnical consultants.

It is true that the Kimball Report tabulated the raw data contained in the core boring logs and included conclusions and recommendations (i.e. "opinions") regarding the subsurface soil conditions on the MP 2-10 Project (as well as on the MP 0-2 Project). However, the report also contained additional factual information which the Board considers meaningful and material to the Project and which could not be ascertained from the core boring logs alone (or from inspection of six year old samples).

Additional factual information available from the Kimball Report (based, inter alia, on prompt laboratory testing of the core boring samples from the site) included California Bearing Ratio test results and In-Situ Moisture Content readings for these soil samples from under and around the Project roadway. The California Bearing Ratio tests for the samples provides additional factual insight into the weight bearing capability of the soil underlying the Project. Additionally, the In-Situ Moisture Content of the samples (expressed as a percentage water content by volume), when compared to the optimum moisture content percentage for such soil types, would indicate whether or not the actual moisture level in the particular type of soil was or was not sufficiently high to degrade the cohesion of the soil.²² In contrast, the designation of "moist" as used in the core boring logs to describe ground conditions between "dry" and "wet" is

²² In layman's terms, soil attains maximum cohesion for its soil type at its Optimum Moisture Content level (expressed as a percentage water content by volume). Moisture content higher than this optimum percent degrades the soil cohesion and can be indicative of an unstable combination of moisture and soil type in the area sampled. (N.T. 1137-1141, 1282, 1393-1395, 1415-1418, 1454; F.O.F. 66-70; Board Finding).

so inexact as to be virtually useless in any attempt to determine whether or not the moisture found was or was not sufficient to degrade the soil cohesion in the area of the sample taken.

The Kimball Report also contains some historical information on earlier roadway construction and suggests that chemical stabilization be considered for the entire length of the Project. While the Board would agree with the PTC's view that the suggestion of chemical stabilization along the full length of the Project is in the nature of "opinion" as opposed to "fact" (and does not necessarily mean the entire stretch of subgrade under the road was so unstable as to require undercut and backfill), we cannot help but think the knowledge of such an "opinion" from a qualified geotechnical engineering firm studying these core boring samples, logs and accompanying laboratory test results for the PTC may have at least caused Fay to think twice about using its "typical" 30% undercut and backfill estimate for this Project.

The points we wish to make here with this additional discussion are several. First, even after eliminating the conclusions, recommendations and/or "opinions" in this report, the Kimball Report most definitely contained additional and material factual information highly relevant to assessment of the subsurface conditions beneath the MP 2-10 Project. Second, the Board's experience suggests that the withholding of relevant information on subsurface conditions by an owner on a construction project (particularly information which contemplates more difficult subsurface conditions than are apparent from the information that is provided) invites the possibility that active interference and/or constructive fraud may be found.²³ Contrary to the approach taken here by the PTC, it appears to this Board that the avoidance of owner liability for

²³ Indeed, a cynical view of the circumstances of this case might contemplate that withholding the Kimball Report by the PTC was done to encourage lower bids for the Project than would have been received had the report been provided, particularly when done in a design/build format. For instance, Mr. Seigworth (Fay's expert) testified credibly that the next lowest bidder on the Project, Trumbull Corporation (or its consultant HDR), somehow acquired most (if not all) of the Kimball Report prior to its bid. While acknowledging that we have been provided with no details or particulars as to why the difference, we do note that Trumbull's bid was approximately \$10 million dollars higher than Fay's. (N.T. 379-380; Ex. J-2).

unanticipated subsurface conditions is best accomplished by placing emphasis on obtaining (and then providing to all bidders) a comprehensive and accurate geotechnical investigation and report for the project that is prepared and written for distribution to these bidders.

Fay's Construction Methods Issue

The PTC also contends that Fay caused (or at least contributed to) the quantity of unstable subgrade encountered by exposing too large an area of the subgrade to outside weather elements for longer than necessary, with this leading to water-saturated subgrade and the need to undercut and backfill. On this issue, the PTC presented the testimony of Tom Collella. Mr. Collella was a quality control inspector on the instant Project employed by McTish Kunkel, a design consultant for Fay that handled quality assurance. Mr. Collella testified as to what he recalled to be Fay's excavation practices on the Project site. Most significantly, Mr. Collella testified that Fay's excavation practices (including its use of a "guillotine truck" to break-up existing concrete pavement during Phase I and Phase II) exposed the subgrade far ahead (i.e. up to seven days ahead) of subsequent excavation activities. The PTC asserts that this process improperly exposed the subgrade to weather elements for longer than necessary and caused or contributed to the amount of unstable subgrade that Fay needed to undercut and backfill on the Project.

On the subject of its excavation procedures, Fay presented testimony from its superintendent for the Project, Richie Kuhns-Schoedel (addressed as "Mr. Schoedel"). Mr. Schoedel testified on the means and methods Fay employed to construct the roadway, including its efforts to protect the subgrade. Specifically, he testified that Fay took care not to

expose subgrade (the actual layer lying beneath the subbase and roadway) to weather elements for any longer than necessary.

With regard to Phase I, Mr. Schoedel testified that, prior to the subgrade being exposed, expansion areas adjacent to the existing shoulders on both sides needed to be cut and filled. According to Mr. Schoedel, Fay's general practice on the Project was to excavate roughly one-half mile of the expansion areas at a time to approximate roadway level (i.e., the level of the existing roadway), but only 400 lineal feet or so of the roadway expansion area and shoulder would typically be taken to subgrade level at any one time (i.e., only so much as could be excavated, undercut and backfilled in one day shift and one night shift). Between completion of the rough cuts and fills in the expansion areas and subsequent excavation to the proper subgrade level, Fay purposely left the intervening few feet of soil "overburden" on top of these rough cut areas to protect the subgrade. In other words, Mr. Schoedel testified that the subgrade was generally not left open and exposed to the elements during excavation for any significant period of time. Furthermore, Mr. Schoedel credibly testified that the only pavement broken-up during Phase I was asphalt on the outside shoulder, which was broken-up and removed without the use of a guillotine truck.

Mr. Schoedel also testified that the process for excavating the existing travel lanes and remaining portions of shoulder in Phase II was similar. Although a substantial length of concrete roadway may have been broken-up at a time by the "guillotine truck" in Phase II, only sections of approximately 400 feet of the old roadway was typically removed at any one time to limit the time fresh subgrade would be fully opened and exposed to the elements. These 400 foot sections were again calculated to allow Fay to excavate the relevant section of roadway to subgrade-level, test it and then undercut and backfill same (if necessary) so as to complete the entire operation

within a single day (a day shift and a night shift). Mr. Schoedel also testified that this general practice of performing rough cut excavation to existing level in half mile lengths and the approximate 400 foot limitation on areas excavated to subgrade level at one time served to minimize the exposure of subgrade to the elements while progressing the grading and excavation work as necessary ahead of the paving work.²⁴ He further testified that Fay would cease work when rain was expected, and that Fay took steps to protect any exposed subgrade from the elements, which included compacting it to limit water infiltration and installing drainage channels to direct excess water away from the work area when and where possible. Mr. Schoedel also testified convincingly that groundwater, rather than rain, was the primary cause of subgrade destabilization on the Project.

Some of the particulars of the testimony of Mr. Collella and Mr. Schoedel may be harmonized with the understanding that what Mr. Collella perceived as exposing subgrade during Phase I might well have been Fay performing excavation (cuts and fills in the expansion area)—which was indisputably necessary—without realizing that Fay was leaving an overburden to protect the subgrade from the elements. Mr. Collella’s testimony, however, was less than clear on several points. Accordingly, to the extent Mr. Schoedel’s and Mr. Collella’s testimony contradict, the Board generally found Mr. Schoedel’s to be more credible.

There is insufficient evidence to find that Fay did anything improper in its construction methods to materially contribute to the degree of unstable subgrade found at the Project site.

²⁴ Mr. Schoedel did acknowledge some exceptions to this general rule which we consider to be minor and of no adverse material consequence. The method described by Mr. Schoedel would have exposed trailing portions of subgrade (which had already been undercut and stabilized) for a longer period as half-mile or longer stretches of finished (stabilized) subgrade was necessary for efficient use of the paving machines to lay down subsequent roadway layers. We do not find this exposure of already stabilized subgrade to weather elements to be inappropriate and, once again, the evidence presented did not show that these trailing stretches of subgrade needed to be re-done in any material quantity. (Ex. J-190; F.O.F. 96-112; Board Finding).

Inasmuch as it was necessary to perform rough cut excavation in the expansion areas prior to bringing them to subgrade, demolish the existing roadway ahead of excavation and to excavate to subgrade level, test and remediate same as needed far enough ahead so as to provide stable subgrade of sufficient length prior to the arrival of paving crews on a particular section of roadway, we find, with minor exceptions which we do not consider material, that Fay did not leave subgrade on the Project exposed to rain or other inclement weather events for any longer than was reasonably necessary to prosecute its work on the Project. Moreover, we find Fay's construction means and methods on this Project to be reasonable and appropriate.

Based on the evidence presented, it does not appear to the Board that Fay exposed fresh subgrade to weather elements for any longer than reasonably necessary prior to testing it and then completing undercut and backfill as needed, or that it failed to take reasonable precautions to deal with inclement weather. Accordingly, we do not agree with the PTC that Fay materially contributed to the amount of unstable subgrade encountered on the Project by way of faulty or inappropriate construction means or methods.

The Design/Build Issue

Finally, the Board addresses the PTC's contention that Fay cannot recover for the extraordinary quantity of undercut and backfill required on this Project because the Contract was design/build in nature. Specifically, the PTC contends that because Fay was to design and construct the full depth roadway; and because there was no design and no quantities for any type of work specified by PTC, Fay is not entitled to recover here under the differing site condition clause no matter how unusual or excessive the quantity of unstable subgrade encountered. We disagree.

To begin with, the deviation between the subsurface conditions actually encountered on the Project and those reasonably anticipated was not one solely of quantity but of quality as well. As noted above, the PTC's own witness acknowledged that the glacial till indentified in the core boring logs and encountered on the Project, while unique in Pennsylvania to this area of the Turnpike, was not inherently unstable, but became so only when subjected to sufficient moisture. Therefore, because the core boring logs themselves, when viewed in conjunction with the plans and topographical mapping for the Project, did not identify such a sufficient presence of moisture near enough to the subgrade elevations along the entire length of roadway to suggest instability for this entire length, the quality of the subsurface (determined by the proximity of glacial till to sufficient moisture) actually encountered on the Project differed materially from the geotechnical information provided at bid.

Also, as explained above, the language of the differing site condition clause (which language the Board and leading federal courts have previously read to include a quantity factor as well as a quality component) was placed in this Contract by the PTC itself without any express limitation to soil quality variations alone. As such, the literal language of the differing site condition clause in this Contract does not lend itself to such a narrow reading as the PTC desires. That is to say, as drafter of the Contract, it was up to the PTC to expressly exclude extraordinary variations in the quantity of unsuitable subsurface conditions from application of the differing site condition language if such was its intent rather than expect this limitation to be somehow "inferred" because of the "design/build" nature of the Contract.²⁵

²⁵ We believe the language of the differing site condition clause in the Contract clearly allows us to consider such an extreme variation in the quantity of unsuitable materials as was encountered here as well as a variation in the quality of the subsurface material. Moreover, to the extent there is any ambiguity as to whether the differing site condition clause in the Contract precludes consideration of extreme quantity discrepancies as differing site conditions, the

We also find the foregoing argument offered here by the PTC to highlight the inherent contradiction and hypocrisy all too frequently exhibited to the Board by Commonwealth agencies in these circumstances. We are referring to the agency practice of providing some (often limited) geotechnical information to bidders and including a relatively standard differing site condition clause in its contract/bid documents (knowing full well that the bidding contractors will, in fact, rely on both these aspects of the offering documents) and expecting thereby to get the lowest bids possible for the work to be done. Then, when issues do arise regarding alleged differing subsurface conditions, reverting to other boilerplate language buried in the bid documents which seeks to disclaim or limit any contractor reliance on the geotechnical information provided and/or to preclude application of the differing site condition clause.

To explain why the Board often finds this tactic unpersuasive, we refer to an observation contained in one of the leading federal cases interpreting differing site condition clauses and the policy behind same. The court observed:

The starting point of the policy expressed in the changed conditions clause is this great risk, for bidders on construction projects, of adverse subsurface conditions: “No one can ever know with certainty what will be found during subsurface operations.” Whenever dependable information on the subsurface is unavailable, bidders will make their own borings or, more likely, include in their bids a contingency element to cover the risk. Either alternative inflates the cost to the Government. The Government therefore often makes such borings and provides them for the use of bidders, as part of the contract containing the standard change conditions clause.

Bidders are thereby given information on which they may rely in making their bids, and are at the same time promised an equitable adjustment under the changed conditions clause, if subsurface conditions turn out to be materially different than those indicated in the logs. The two elements work together; the presence of the changed conditions clause works to reassure bidders that they may confidently rely on the logs and need not include a contingency element in their bids. Reliance is affirmatively desired by the

Board must resolve such ambiguity against the PTC. Department of Gen. Servs. v. Pittsburgh Bldg. Co., 920 A.2d 973, 989 (Pa. Cmwlth. 2007); see also Dep’t of Transp. v. Semanderes, 531 A.2d 815, 818 (Pa. Cmwlth. 1987).

Government, for if bidders feel they cannot rely, they will revert to the practice of increasing their bids.

The purpose of the changed site 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. All this is long-standing, deliberately adopted procurement policy, expressed in the standard mandatory changed conditions clause and enforced by the courts and the administrative authorities on many occasions.

Foster Constr. C. A. Williams Bros. Co. v. U.S., 435 F.2d 873, 887 (U.S. Ct. Cl. 1970) (citation omitted).

Although mandatory federal procurement policies and practices are clearly not required in the cases we view, the Board believes the differing site condition clause and practice of providing geotechnical information on state construction projects is similarly aimed at protecting the Commonwealth from bids inflated by contingency elements necessary to cover the risk of finding unexpected subsurface conditions. Seemingly, the PTC here wishes to enjoy the benefits of the bidders' reliance on the limited geotechnical information supplied and the presence of a differing site condition clause in the proffered design/build contract during the bid stage, yet eschew their effect when subsurface issues later arise. It is this approach we find unappealing.

For all the reasons stated above, the Board concludes that the Contract permits recovery under its differing site condition clause where, as here, the contractor encounters such an extraordinary quantity of undercut and backfill as was necessary to complete this Project even

where the contract is design/build in nature.²⁶ Accordingly, we must now turn to the appropriate measure of damages to be awarded under this provision.

Damages

Having established that it encountered an unknown physical condition of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work, Fay contends that it is entitled to compensation for the difference between the quantity of undercut and backfill actually done on the Project and the amount it originally estimated when preparing its bid. In addition to its denial throughout the proceeding that Fay is entitled to anything on the grounds that the subsurface conditions Fay encountered were exactly as should have been expected from the geotechnical information provided, the PTC has also pointed out several faults with Fay's original 30% estimate. We agree with the PTC on this latter point and will adjust our damage award to Fay accordingly.

Damages are not recoverable if they are too speculative, vague, or contingent to be ascertained with reasonable certainty. Spang & Co. v. U.S. Steel Corp., 545 A.2d 861, 866 (Pa. 1988). However, damages need not be determined with mathematical certainty, but only with reasonable certainty. A.G. Cullen Constr., Inc. v. State Syst. of Higher Ed., 898 A.2d 1145, 1174 (Pa.Cmwlth. 2006). Evidence of damages may consist of probabilities and inferences. Id.

²⁶ Our holding here should not be mis-interpreted to suggest that an owner/agency cannot successfully shift the risk of unanticipated subsurface conditions to the contractor, but only to suggest that the Board does not look favorably upon ambiguous, contradictory and/or opaque language (often embedded in discrete locations throughout 800 plus pages of specifications) designed to get the lowest bids upfront yet deny price adjustments for such unanticipated conditions later. For instance, had the PTC provided its bidders with a comprehensive and accurate geotechnical investigation and report for this project that was prepared and written for distribution to its bidders (along with any other material information in its possession relative to the underlying subsurface condition) and instead of a differing site condition clause, included in its bid documents a bold and prominent statement to be signed or initialed by the contractor expressly stating that the contractor assumes the risk and cost to remediate any and all anticipated or unanticipated subsurface conditions encountered, the Board would be hard pressed to find liability for same on the agency's part. Higher bids upfront, however, would seem likely as contractors would include a premium for undertaking such risk.

Sufficient facts must be introduced to allow a court to arrive at an intelligent estimate without conjecture. Id.

In a differing site conditions case, a contractor is entitled to recover damages to the extent the condition it encountered could not have been reasonably anticipated. Servidone, 19 Cl. Ct. 346 at 374. Under the law of differing site condition clauses, the relevant inquiry is not whether Fay made a flawless estimate, but “how greater caution should have been reflected” in Fay’s bid. Servidone, at 374. The standard of reasonable anticipation “does not require a contractor to expect the worst.” Id. Even when a contractor has “acted unreasonably in preparing its bid, it would constitute a windfall to defendant to hold that fact precluded a finding of a differing site condition.” Id. In sum, an award pursuant to a differing site condition clause is to be measured against what a reasonable, intelligent contractor, experienced in the particular field of work, would have anticipated. Servidone at 373.

As we stated above, the Board agrees that Fay’s original estimate of a need to undercut and backfill approximately 30% of the length of the existing roadway (i.e. existing travel lanes and shoulder only) was significantly flawed. First and foremost of these flaws was its “discounting” of the core boring logs supplied by the PTC. These logs clearly disclosed the predominance of glacial till punctuated by areas of dry, moist and wet soils beneath the Project, and this fact alone should have been sufficient to inform Fay that its reliance on the “typical” undercut and backfill percentage on “other” Turnpike projects (with no glacial till) was not reasonable. Moreover, Fay’s failure to utilize the information on the soil type and groundwater levels in the boring logs (albeit limited) and match this data to the topographical information and subgrade elevations along the roadway (as an aid to ascertaining areas of potentially unstable subgrade) exhibits a lack of thoroughness in forming its undercut estimate. We also find Fay’s

failure to consider the need to stabilize the areas under the expanded roadway (new travel lane and shoulders) to again show a lack of prudent consideration. Finally, we find no good reason for Fay to opt for the “typical” 30% undercut and backfill expectation from “other” projects when it was well aware that the PTC itself estimated a 55% ratio of undercut on the immediately adjacent and substantially similar MP 0-2 Project.

In contrast to the rather cavalier approach taken by Fay to estimating the need for undercut and backfill, we find that the most reasonable basis to estimate the quantity of unstable subgrade on the MP 2-10 Project was to be gleaned from careful consideration of the boring logs, topographical information and subgrade elevations provided for the MP 2-10 Project in combination with the PTC’s estimate for undercutting and backfill on the MP 0-2 Project, which had been aided by a full geological engineering report, and which estimated 55% undercut for the entire paved project area. Thus, the Board determines that the measure of damages objectively determined under the differing site condition clause in this Contract is the difference between what Fay should reasonably have expected to undercut and backfill (55% of the entire paved area of the newly reconstructed and widened roadway) and what it actually did undercut and backfill on the Project.

For the area under the existing roadway, the Board finds that it was reasonable for Fay to expect that 131,234 CY²⁷ of undercutting and backfill would be necessary to remediate unstable subgrade. The amount of undercutting and backfill actually required beneath the existing

²⁷ Multiplying the 39,283 linear feet (“LF”) length of the project (7.44 miles (“MI”) x 5,280 LF / MI = 39,283 LF) by the 82 LF width of the existing roadway, including travel lanes, shoulder and median, yields a total surface area of the existing roadway area of 3,221,206 square feet (“SF”). A 100% estimate of undercutting and backfill at two feet (“FT”) of that area would yield an estimate of 6,442,412 cubic feet (CF) (3,221,206 SF x 2 FT = 6,442,412 CF) or 238,608 cubic yards (“CY”) (6,442,412 CF ÷ 27 CF / 1 CY = 238,608 CY). (Ex. J-9; Ex. P-1; F.O.F. 3-4; Board finding). Fifty-five percent undercutting and backfill of the area under the existing roadway yields an estimate of 131,234 CY (238,608 CY x .55 = 131,234 CY). (Board Finding).

roadway was 269,298 CY. The difference between the 269,298 CY of undercutting and backfill actually required and the “reasonable bidder” figure of 131,234 CY is 138,064 CY. At the stipulated cost of \$18.87 per CY for undercutting and backfill under the existing roadway, this yields a principal damage amount of \$2,605,268 (138,064 CY x \$18.87 / CY=\$2,605,268).

For the area outside the existing roadway, the Board finds that a reasonable estimate of the amount of undercutting and backfill necessary to remediate unstable subgrade in this area under the new roadway to be 64,017 CY.²⁸ The difference between the 126,639 CY of undercutting and backfill that Fay actually performed and the “reasonable bidder” figure of 64,017 CY is 62,622 CY. At the stipulated cost of \$27.07 per CY for undercutting and backfill outside the existing roadway, the principal damage amount for this work is \$1,695,178 (62,622 CY x \$27.07/CY = \$1,695,178).

The total principal amount owed by PTC to Fay under the differing site condition clause of the Contract is \$4,300,446 (\$2,605,268 + \$1,695,178 = \$4,300,446). To this we must add \$1,666,237 as prejudgment interest at the legal rate of six percent per annum running from February 4, 2008 (the date of Fay’s initial administrative claim in this matter with the PTC) to the date of this Order. 62 Pa.C.S. § 1751. This brings the total award amount to \$5,966,683. Thus, the Board enters the following Order:

²⁸ Subtracting the width of the existing roadway (82 LF) from the total width of the new roadway’s section (122 LF) leaves a difference of 40 LF, which represents the width of the roadway expansion area (the newly constructed portion outside the width of the existing roadway). Multiplying the roadway expansion width of 40 LF by the Project length of 39,283 LF yields an area of 1,571,320 SF. A 100% undercutting and backfill at a depth of two feet yields an estimate of 3,142,640 CF (1,571,320 SF x 2 FT = 3,142,640 CF), or 116,394 CY (3,142,640 CF ÷ 27 CF / 1 CY = 116,394 CY). (Exs. J-9, P-1; F.O.F. 3-4; Board Finding). Fifty-five percent undercutting and backfill at two feet of the roadway expansion area yields an estimate of 64,017 CY (116,394 CY x 0.55 = 64,017 CY). (Board Finding).

ORDER

AND NOW, this 21st day of July, 2014, it is **ORDERED** and **DECREED** that judgment is entered against the Commonwealth of Pennsylvania, Pennsylvania Turnpike Commission and in favor of Joseph B. Fay Co./Norwin Construction Company, a Joint Venture, in the amount of \$5,966,683, comprised of the principal amount of \$4,300,446 plus prejudgment interest of \$1,666,237. Joseph B. Fay Co./Norwin Construction Company, a Joint Venture, is further awarded post-judgment interest at the legal rate of 6% per annum on the outstanding amount of this judgment until paid.

BOARD OF CLAIMS

ORDER SIGNED

Jeffrey F. Smith
Chief Administrative Judge

Harry G. Gamble, P.E.
Engineer Member

Andrew Sislo
Citizen Member