COMMONWEALTH OF PENNSYLVANIA

ANGELO IAFRATE CONSTRUCTION COMPANY, INC.	:	BEFORE THE BOARD OF CLAIMS
VS.	:	
COMMONWEALTH OF PENNSYLVANIA, PENNSYLVANIA TURNPIKE COMMISSION	:	DOCKET NO. 3654

SUMMARY OF THE CASE

Plaintiff, Angelo Iafrate Construction Company (Iafrate) filed this claim on August 4, 2003, seeking $15,242,694.00 in damages in the form of loss-of-productivity costs incurred during reconstruction of a nine-mile section of the Pennsylvania Turnpike located in Westmoreland County. The Pennsylvania Turnpike Commission (PTC) awarded Iafrate the contract in August 1999 on a bid of $49,360,930.66. Iafrate substantially completed work on the project on or about October 9, 2002. Additional payments made to Iafrate for extra work and emergency work resulted in a final amount paid of $60,848,035.67.

Iafrate alleges that during construction, the PTC committed breaches of contract through a series of acts and omissions that so delayed and interfered with Iafrate's planned execution of its work that it suffered an enormous loss of work-productivity for which it is entitled to additional compensation. Specifically, Iafrate asserts the following acts and omissions by the PTC: (1) providing specifications for the construction of temporary travel lanes that resulted in extensive failure of the pavement and required time-consuming repairs; (2) failing to provide to contract bidders estimates of the amount of emergency roadway-repair and accident-response work that would be required during the project; (3) requiring the use of a material, lime-pozzolan, to stabilize the roadway subgrade, which failed to work and which required extensive re-work; (4) refusing to make an incentive payment of $70,000; (5) failing to accurately identify the location of subsurface rock; and (6) failing to design an adequately wide work zone in the median area of the roadway. Iafrate also maintains that because of the continuous and overlapping nature of the foregoing factors, it must calculate damages based on the "modified total-cost method," i.e., by subtracting the amount it bid on the contract from its total costs to complete the reconstruction project, with certain adjustments made in order to address bid errors and unrecoverable costs.

The PTC maintains that it has met all of its contractual obligations, that Iafrate was paid for all of the extra work it performed and that any losses Iafrate suffered during the project were the result of Iafrate's own errors. The PTC also contends that the "modified total-cost method" cannot be used to calculate damages, and that Iafrate has failed to prove its damage claims by any other method.

FINDINGS OF FACT

1. Plaintiff Angelo Iafrate Construction Company, Inc. ("Iafrate") is a Michigan corporation with its principal place of business located in Warren, Michigan. (Joint Stipulation of Facts ¶ 1.)

2. Defendant Commonwealth of Pennsylvania, Pennsylvania Turnpike Commission ("PTC") is an agency of the Commonwealth with its principal offices located in Middletown, Pennsylvania. (Joint Stipulation of Facts ¶ 2.)

3. On August 17, 1999, the PTC awarded to Iafrate Contract No. 98-003-RU78 ("Contract"), for a contract bid of $49,360,930.66. (Joint Stipulation of Facts ¶ 5.)

4. The purpose of the project was to totally reconstruct a nine-mile section of the Pennsylvania Turnpike roadway, including the removal of the existing concrete pavement structure, installation of a more stable roadway subgrade, widening of the median area, replacement of existing drains and pipes, and rehabilitation of overhead structures, bridges, and traffic barriers. (Notes of Trial Transcript (N.T.) vol. 4 at 124, 127.)

5. The project was broken down into nine sections of approximately one-mile lengths and that corresponded to increasing "milepost" markings running west-to-east along the Turnpike. Each one-mile section also encompassed a range of "station" designations to allow more precise location references:

Section	Milepost	Station
1	75.94 to 77.00	122+218.122 to 123+930.528
2	77.00 to 78.00	123+930.528 to 125+539.926
3	78.00 to 79.00	125+539.926 to 127+149.686
4	79.00 to 80.00	127+149.686 to 128+758.764
5	80.00 to 81.00	128+758.764 to 130+352.047
6	81.00 to 82.00	130+352.047 to 131+962.125
7	82.00 to 83.00	131+962.125 to 133+571.535
8	83.00 to 84.00	133+571.535 to 135+179.434
9	84.00 to 85.00	135+179.434 to 136+780.000

(Joint Stipulation of Facts at 2.)

6. The work to be performed was broken down into five phases:

Phase I: Iafrate was to overlay the westbound shoulder (Phase 1A) and the existing median (Phase 1B) from Milepost 75.94 to 85.00 so that the median and shoulder could be used as temporary traveling lanes in subsequent stages.

Phase II: Iafrate was to reconstruct one lane of the original eastbound roadway and its adjacent shoulder from Milepost 75.94 to 85. Barriers were to separate this work area from the active travel lanes. Four travel lanes were to be maintained, with the westbound traffic being

carried on the original westbound shoulder of the original slow westbound lane, and the eastbound traffic being carried on the original fast westbound lane and the newly overlaid median.

Phase III: Iafrate was to reconstruct the original eastbound fast lane adjacent to the median and reconstruct and widen the median. Westbound traffic was to be maintained on the westbound shoulder and westbound slow lane, in the same manner as in Phase II, while eastbound traffic was to be shifted to the reconstructed slow eastbound lane and shoulder. The median work area was to be separated from the active travel lanes by concrete barrier.

Phase IV: Iafrate was to reconstruct the westbound roadway and adjacent shoulder. Westbound traffic was to be maintained on the reconstructed eastbound fast lane and median, while eastbound traffic was to be maintained on the reconstructed eastbound slow lane and shoulder, as it had been during Phase III. The work zone was to be separated from the active travel lanes by concrete barrier.

Phase V: Iafrate was to complete the median reconstruction effort by milling and reshaping the surface to its final sloped condition. The concrete glare screen median barrier was also to be placed.

(Joint Stipulation of Facts at 2; Plaintiff's Exhibit 002 at PTC0010447-PTC0010460; see Iafrate's Post Hearing Brief at 2.)

7. The originally scheduled time frame for completing Phase I work was early 2000. (N.T. vol. 9 at 102.)

8. The originally scheduled time frame for Phase II work was from March 2000 to November 2000. (N.T. vol. 9 at 102.)

9. The originally scheduled time frame for Phase III work was from March 2001 to November 2001. (N.T. vol. 9 at 104.)

10. The originally scheduled time frame for Phases IV and V work was from March 2002 to August 2002. (N.T. vol. 9 at 104-105.)

11. The PTC retained SAI Consulting Engineers and MS Consultants to prepare the Contract's construction plans and specifications. (N.T. vol. 4 at 123.)

12. The PTC retained KCI Technologies to serve as the project's construction manager. James Lockhart served as the construction manager throughout the project. (Joint Stipulation of Facts at 2; N.T. vol. 4 at 177.)

13. Iafrate received a Notice to Proceed with work on September 2, 1999. (Joint Stipulation of Facts ¶ 11.)

14. Iafrate substantially completed work on the project on or about October 9, 2002. (Joint Stipulation of Facts ¶ 12.)

15. A "change order" is a written agreement between the project owner or its designee and a contractor to change a construction contract. Change orders add to, delete from, or otherwise alter the work set forth in the contract documents at the time that the contract was awarded. As the legal means for changing contracts, change orders are standard in the construction industry. Throughout the project, the PTC and Iafrate negotiated and signed 12 change orders covering extra work or changes in work performed under the Contract. The PTC approved and made additional payments under the following change orders, for the indicated reasons, and in the stated amounts:

Change Order No. 1 – Approved March 7, 2000, for $237,969.29; milling of the roadway surface and paving material.

Change Order No. 2 – Approved May 2, 2000, for $1,150,000.00; emergency roadway repairs.

Change Order No. 3 – Approved June 27, 2000, for $2,604,083.50; emergency roadway repairs.

Change Order No. 4 – Approved July 18, 2000, for $3,006,583.00; accelerated Phase II schedule costs.

Change Order No. 5 – Approved November 7, 2000, for $2,595,542.76; roadway repairs and resurfacing.

Change Order No. 6 – Approved December 19, 2000, for $732,881.51; emergency roadway repairs.

Change Order No. 7 – Approved April 17, 2001, for $508,225.88; emergency roadway repairs, and accident response and cleanup.

Change Order No. 8 – Approved June 5, 2001, for $832,211.80; lime-pozzolan treatment.

Change Order No. 9 – Approved July 24, 2001, for $1,214,281.58; emergency roadway repairs, accident response and cleanup, excavation.

Change Order No. 10 – Approved December 4, 2001, for $44,032.95; emergency roadway repairs, accident response and cleanup, lime-pozzolan treatment.

By the foregoing change orders, the PTC paid an additional $12,925,812.27, bringing the total amount payable to Iafrate to $62,286,742.93. Change Orders No. 11 through 15, not relevant to this case, reduced the total paid to Iafrate to $60,848,035.67. (Joint Stipulation of Facts ¶¶ 14-24; Plaintiff's Exhibits 2.1-2.15; Board Finding.)

Iafrate's Claim that the PTC Breached the Contract by Providing Inadequate Specifications for Construction of the Temporary Travel Lanes.

16. In Phase I of the project, Iafrate was to construct temporary travel lanes on the westbound roadway shoulder and in the median area of the Turnpike, so that the normal four lanes of traffic could be maintained throughout the duration of the project. In accordance with section G72.00 of the Contract's Standard Special Provisions, the PTC directed that the pavement surface in these areas was to be removed ("milling") and replaced with an eight-inch layer of Bituminous Binder Course ID-2, a paving material. The westbound shoulder and

median area had never before carried traffic on a regular basis. (Plaintiff's Exhibit 002 at PTC0010486; N.T. vol. 4 at 160-161, 165.)

17. Prior to the Iafrate project, the eight-inch layer of bituminous paving material was the standard specification for Turnpike construction projects. However, the PTC now performs individual pavement designs for temporary travel lanes, and the standard specification is now used only on smaller construction projects. (N.T. vol. 4 at 161-165.)

18. The paving of the temporary travel lanes was largely performed by Lane Construction, a subcontractor retained by Iafrate. (N.T. vol. 2 at 150-151.)

19. The milling and overlay of the westbound shoulder was completed and the shoulder was opened to traffic in November 1999. (N.T. vol. 4 at 186.)

20. Shortly after exposure to traffic the pavement began to fail, and the shoulder had to be closed to traffic on November 18, and December 10 and 15, 1999, so that it could be repaired. (Plaintiff's Exhibit 174.94 at WTHF0023009, WTHF0023015, WTHF0023023; Plaintiff's Exhibit 42.)

21. In a letter to KCI Construction Manager James Lockhart, dated November 29, 1999, Bob Coburn, one of Iafrate's project engineers, suggested that the entire westbound shoulder be resurfaced with more durable materials. Mr. Lockhart presented the proposal to John Ozimok, a PTC construction engineer, who said that the design of the temporary travel lanes was adequate. (N.T. vol. 4 at 186-188.)

22. On December 2, 1999, Mr. Lockhart directed that the westbound shoulder be completely resurfaced between Mileposts 81 and 84. He also ordered that core samples of the shoulder paving material be taken to ensure that Lane Construction had laid down the proper thickness of paving material. (Plaintiff's Exhibit 43; N.T. vol. 4 at 188-189.)

23. The core samples of the shoulder paving material showed that Lane Construction had laid down the correct thickness of paving material as required by section G72.00 of the Contract's Standard Special Provisions. (N.T. vol. 4 at 190.)

24. Between January 7 and March 22, 2000, Iafrate had to perform repair work to the Phase II, westbound temporary travel lanes (i.e., the repaved westbound shoulder and the original westbound slow lane) on approximately 27 days. (Plaintiff's Exhibits 195.02, 174-1-174.146.)

25. The pavement failures experienced on the westbound shoulder gave rise to concerns regarding the ability of the median temporary travel lane to withstand traffic. Prior to beginning paving of the median temporary travel lane, Matt Milliet, Iafrate's project manager, noted two problems with the existing median roadway. The first problem was that the existing subbase was not as thick as expected, and after "milling" (removing) the existing roadway material per PTC's specification the milling operation had almost reached the soil level. (N.T. vol. 2 at 151-153.)

26. The second problem discovered by Mr. Milliet was that the old asphalt and underlying concrete on the roadway that were eventually to connect to the temporary median pavement were crumbling. Mr. Milliet's concern with this problem was that because of the deteriorating asphalt, the newly laid paving material for the median temporary travel lane would not form a strong joint with the existing roadway and that the connection would ravel and deteriorate along the joint. (N.T. vol. 2 at 153-154.)

27. James Lockhart, project manager for KCI Technologies, also recognized that the potential for raveling of the asphalt along the joints between the existing roadway and what was to be the median temporary travel lane was a matter of concern. (N.T. vol. 4 at 196-197.)

28. At a pre-paving meeting held on March 23, 2000, in order to discuss paving of the median temporary travel lane, and attended by Mr. Milliet and Mr. Lockhart, project officials discussed the deterioration of the old roadway along what was to be the joints between the old roadway surface and the newly paved median travel lane. (Plaintiff's Exhibit 162.1 at PTC0110637; N.T. vol. 4 at 197-201.)

29. Because of the foregoing concerns with the median temporary travel lane, at the pre-paving meeting, Mr. Milliet recommended that the plan for paving the median temporary travel lane be amended to either: (1) require a thicker application of the ID-2 binder course that was to form the new roadway surface for the median travel lane; or (2) lay down the ID-2 binder course as planned, but then mill and overlay the entire width of the temporary travel lane area with another layer of asphalt, so that the final overlay would cover the joints between the newly paved median and the existing roadway surfaces on either side of the median area. (N.T. vol. 2 at 151-154, vol. 11 at 86-87.)

30. At the pre-paving meeting, Mr. Milliet suggested that performing additional milling and then overlaying the entire width of the temporary travel lane area with a layer of asphalt would: (1) cover the joints on each side of the median area and prevent raveling; and (2) provide additional protection for the subgrade in the median and provide a generally thicker, stronger roadway surface. (N.T. vol. 11 at 86-88.)

31. Despite Mr. Milliet's concerns and suggestions at the pre-paving meeting, PTC Construction Engineer John Ozimok decided that the median temporary travel lane would be constructed as originally designed (i.e. to an 8 inch depth and without a top layer overlapping the old asphalt and concrete for the full width of the temporary travel lane). (Plaintiff's Exhibit 162.1 at PTC0110637; N.T. vol. 2 at 154, vol. 4 at 198-206.)

32. In a letter to Mr. Lockhart dated March 30, 2000, Mr. Milliet reiterated his concern about joining the newly paved median temporary travel lane with the existing roadway surfaces. Mr. Milliet also restated his contention that the median area should be re-milled and an additional layer of asphalt be laid over the full width of the median temporary travel lane area. (Plaintiff's Exhibit 49; N.T. vol. 2 at 152-154, vol. 11 at 85-88.)

33. Iafrate completed construction of the median temporary travel lane on March 31, 2000, and placed traffic into its Phase II configuration. In this configuration, westbound traffic

utilized the temporary paved shoulder and the original westbound slow lane, and eastbound traffic utilized the original westbound fast lane and the median temporary travel lane. (Joint Stipulation of Facts at 2; N.T. vol. 4 at 208-209.)

34. By April 2, 2000, 21 potholes had developed in the median pavement, requiring that the travel lane be shut down for seven hours so that repairs could be made. (Plaintiff's Exhibit 162.10 at PTC0110021; N.T. vol. 4 at 208-213.)

35. On April 4, 2000, Mr. Bufagna, a PTC inspector, noted in his report that potholes were continuing to form and that a single lane would remain open for eastbound traffic until further notice, so that workers could continue repairing the median travel lane. (Plaintiff's Exhibit 162.10 at PTC0111023-PTC011024.)

36. On April 5, 2000, Mr. Lockhart noted in his inspection report that the pavement in the median area was failing at numerous points. (Plaintiff's Exhibit 162.11 at PTC0110046; N.T. vol. 5 at 5-7.)

37. Due to the magnitude of pavement failures in the median area and because Iafrate had not yet begun operating its onsite asphalt plant, on April 6, 2000, Norwin Construction, a paving subcontractor which already performed maintenance work for the PTC on an independent basis, was used temporarily to assist in emergency roadway repair. (Plaintiff's Exhibit 162.13 at PTC0110114; N.T. vol. 9 at 13, 165.)

38. On April 6, 2000, the PTC completely closed the eastbound travel lanes and eastbound traffic was detoured off the Turnpike for about 17 hours, so that workers could more efficiently repair potholes in the median travel lane. (Plaintiff's Exhibit 162.12 at PTC011078; N.T. vol. 5 at 8-9.) Because of ongoing repairs for the next three days, only a single lane remained open for eastbound traffic. (Plaintiff's Exhibits 162.13 at PTC0110115, 162.14 at PTC0110150; N.T. vol. 5 at 9-11.)

39. On April 8, 2000, a pothole developed that was so major it required Iafrate to move the concrete barriers separating the work zone from the median travel lane and to divert traffic into the work zone and around the pothole. (Plaintiff's Exhibit 162.15 at PTC0110193.)

40. During April 2000, Iafrate performed roadway repairs on 29 days, expending $637,894.11. (Plaintiff's Exhibit 174.146.)

41. In May 2000, Iafrate had to perform emergency roadway repairs on 13 different occasions, expending 3,292 man-hours at a direct cost of $277,893.24. (Plaintiff's Exhibit 174.146; N.T. vol. 3 at 70-73.)

42. In June 2000, Iafrate's work crews performed emergency roadway repairs on 17 different days, expending 1,273 man-hours at a direct cost of $112,713.85. (Plaintiff's Exhibit 174.146.)

43. Plaintiff has not directed the Board to the specific amount of time or number of days spent on emergency roadway repair from July 2000 through November 2000, but it is clear from the testimony that repairs to the temporary travel lanes were ongoing throughout Phase II and into Phase III. (Board Finding.)

44. From December 2000 through March 2001, Iafrate performed emergency roadway repairs on 31 days. (Plaintiff's Exhibit 174.146.)

45. At a meeting on April 11, 2000, Mr. Lockhart and other project officials determined that the median travel lane would have to be reconstructed and repaved from Milepost 77.6 to Milepost 78.4. This work required that eastbound traffic be diverted into Iafrate's Phase II work zone. The repaving was completed on April 15, 2000. (Plaintiff's Exhibits 162.18 at PTC0110269, 162.17 at PTC0110247; N.T. vol. 5 at 27-28.)

46. On May 6, 2000, Iafrate had to reconstruct and repave another section of the median travel lane from Milepost 76.4 to Milepost 77.6. Traffic again had to be switched into the Phase II work zone in order to perform this work. (Plaintiff's Exhibit 162.42 at PTC0122596; N.T. vol. 5 at 41-42.)

47. For all emergency roadway-repair work performed on the project, the PTC paid Iafrate an additional $4,809,467.00. (Plaintiff's Exhibit 183.)

48. One of the major causes of the temporary pavement failure in the median area was the failure in several locations of the pavement surface at the joints between the median's temporary pavement and the older asphalt and concrete on the existing roadway surfaces. This was the raveling problem correctly predicted by Mr. Milliet at the pre-paving meeting of March 23, 2000. (Findings of Fact 25-32; N.T. vol. 2 at 159-160; vol. 5 at 5-6; Board Finding.)

49. Because of the volume of roadway repair work that was necessary in the westbound shoulder and median temporary travel lanes, PTC project officials eventually concluded that the best course of action was to have Iafrate re-mill and overlay with additional asphalt the full width of large sections of the temporary travel lanes, as originally recommended by Iafrate at the March 23, 2000, pre-paving meeting. (Findings of Fact 25-48; N.T. vol. 3 at 88, 95-97; vol. 5 at 23-26.)

50. In its defense, PTC suggests that Iafrate may not have performed the temporary paving of the median in accordance with the PTC's specifications and points to a temporary shut down of the asphalt plant supply on March 30, 2000. (N.T. vol. 5 at 181-182.)

51. On March 30, 2000, Lane Construction (who was providing the asphalt mix as an Iafrate subcontractor at the time) had its paving operation temporarily shut down for part of one day because a PTC inspector had objections to the type of asphalt being produced. Paving resumed that evening after the PTC inspector's objections had been addressed. (Plaintiff's Exhibit 162.6; N.T. vol. 5 at 164-165, 180-186.)

52. During paving operations, both KCI Technologies and the PTC had onsite inspectors observing the production of asphalt and the paving operations. Prior to and after March 30, 2000, the inspectors' daily reports do not record any concerns with the quality of the asphalt being produced by Lane Construction or any work stoppages because of problems with the asphalt. (Plaintiff's Exhibits 162.1, 162.6; N.T. vol. 5 at 180-183.)

53. Approximately 38 pavement core samples taken at the direction of PTC engineers showed that the pavement materials in the median travel lane had been laid down at the correct thickness as required by section G72.00 of the Contract's Standard Special Provisions and showed no other problems with the application. (N.T. vol. 4 at 189-190, vol. 7 at 101-103.)

54. Michael Flack, a PTC assistant chief engineer for construction, acknowledged that "he never considered the failure of the roadway to be Iafrate's fault." (N.T. vol. 7 at 112.)

55. There is no evidence that Lane Construction delivered any asphalt to project paving sites that was unacceptable to inspectors from KCI Technologies and the PTC before, during or after the March 30, 2000 shutdown. (N.T. vol. 5 at 179-186; Board Finding.)

56. The type of asphalt produced by Lane Construction and the temporary interruption of paving operations on March 30, 2000, did not contribute to the pavement failures of the temporary travel lanes. (Findings of Fact 51-55; Board Finding.)

57. Iafrate paved the temporary travel lanes in conformity with the PTC's specifications set forth in section G72.00 of the Contract's Standard Special Provisions. (Findings of Fact 21-23, 51-56; Board Finding.)

58. Given the immediate and extensive failure of the temporary paving in the median, the concerns with the temporary paving design expressed by Mr. Milliet, the eventual solution adopted by the PTC, and the evidence that Iafrate constructed the temporary paving as specified by the PTC, the Board finds that the temporary pavement specification for the temporary travel lanes supplied by the PTC was inadequate for its intended purpose, i.e., to handle the traffic load in the project zone during reconstruction. (Findings of Fact 20-57; Board Finding.)

59. The use of the PTC's specifications for the paving of the temporary travel lanes resulted in loss of productivity and increased costs of performance for Iafrate because Iafrate diverted work crews from planned contract work to the repair of pavement failures in the temporary travel lanes. (Findings of Fact 20-49; Board Finding.)

60. Sometime in May or June 2000, the PTC attempted to have Norwin Construction, a paving contractor which already performed maintenance work for the PTC under a separate contract, assume the duty of performing emergency roadway repairs on the Iafrate project. (Plaintiff's Exhibit 73; N.T. vol. 3 at 88-93.)

61. Larry Kenetski, Iafrate's project manager objected to using Norwin to perform emergency roadway repair because this work was very profitable to Iafrate and because he

believed Iafrate had the ability to do both its base contract work and such repair. (N.T. vol. 3 at 89-93, 117-118.)

62. Iafrate informed the PTC that it opposed the idea of having Norwin Construction perform all of the emergency roadway-repair work by letter dated June 27, 2000. The letter also expressed Iafrate's concern that it would be held liable for work performed by a subcontractor under an already existing, independent contract with the PTC. (Plaintiff's Exhibit 73.)

63. Sometime in the early summer of 2000, Alexander Jansen, the PTC's chief engineer for construction, met with Angelo and Dominic Iafrate to discuss project-related issues. At this meeting the Iafrates expressed a desire to continue performing emergency roadway repairs. After the meeting, the PTC relented and allowed Iafrate to continue having primary responsibility for roadway repairs. (N.T. vol. 7 at 44-46.)

64. Payment involving emergency roadway repairs and accident-response work was made primarily on a force-account basis. A "force account" is a method of paying for work when, among other reasons, the volume and cost of the work to be performed is unknown. Force accounts provide for payment for a contractor's time, labor and material, with markups for overhead and profit. On this project, when extra work was authorized on a force-account basis the Contract required payment of the reasonable costs incurred for labor, material, equipment and other necessary expenditures, and included markups of 40% on labor costs, 25% on material costs, 5% on equipment costs and, when applicable, an 8% markup on the total value of the force-account work for work performed by a subcontractor. (Plaintiff's Exhibit 177 at 69 (Dept. of Transportation Specifications 1996 § 110.03(d)(7)); N.T. vol. 1 at 46-49; Board Finding.)

65. Norwin Construction was available to do more emergency roadway-repair work than it was being called upon to do by Iafrate. (N.T. vol. 9 at 19-22.)

66. Had Iafrate so elected, it could have hired additional workers or subcontractors to handle much of the work involving emergency roadway repairs instead of utilizing its base work crews to do this work. This would have been a reasonable way for Iafrate to mitigate some of the lost productivity it suffered from the inadequate temporary travel lane paving specifications. (N.T. vol. 3 at 117-118, vol. 9 at 18-22; Board Finding.)

67. Iafrate's business decision to continue performing roadway repair work with its own work crews, despite the opportunity to use subcontractors, contributed to Iafrate's loss of productivity and increased costs of performance on its base contract work. (Findings of Fact 60-66; Board Finding.)

68. By electing to utilize its own base contract work crews to perform emergency roadway repair to the extent it did instead of using other subcontractors such as Norwin, Iafrate failed to take reasonable steps to mitigate its loss of productivity damages attributable to the inadequate temporary paving specifications. (Findings of Fact 60-67; Board Finding.)

Iafrate's Claim that the PTC Breached the Contract by Failing to Provide Accurate Estimates of the Amount of Work that Would be Required for Emergency Roadway Repairs and Accident Response.

69. Sometime before May 1999, PTC officials realized that during Turnpike reconstruction projects it would be necessary to repair potholes and perform other emergency roadway repairs in a reconstruction project area, and that it was necessary to decide who would have responsibility for those repairs. (N.T. vol. 4 at 133-134.)

70. In areas of the Turnpike that are not under construction, the PTC performs pothole and other emergency repairs by using its own maintenance crews or by employing outside contractors who have been retained on an open-ended basis. (N.T. vol. 4 at 134-137.)

71. On May 6, 1999, Bradley Heigel, a reconstruction project manager for the PTC, convened a meeting of several PTC engineers and managers in order to discuss the issue of emergency roadway repairs on reconstruction projects. It was decided that the contractor responsible for the reconstruction project would also be responsible for pothole and other emergency roadway repairs that occurred within the reconstruction project zone. (Plaintiff's Exhibit 28; N.T. vol. 4, 132-133.)

72. Section G02.00 of the Contract's Standard Special Provisions contains the PTC's requirements regarding emergency roadway repairs in reconstruction project zones. Pursuant to the provision, the contractor responsible for the reconstruction project is responsible for emergency roadway repairs on a 24-hour-a-day basis, which work includes pothole repair, other roadway repairs, and responding to automobile accidents within the reconstruction zone if the accident causes damage to the roadway, guardrails, concrete barriers or other equipment. (Plaintiff's Exhibit 002 at PTC0010357; N.T. vol. 4 at 139-140.)

73. Section A11.00 of the Contract's Standard Special Provisions, relating to contingent work which includes roadway repairs and accident response, provides that "a predetermined amount of $100,000.00 has been established by the Commission to provide payment to the Contractor for Extra Work at a negotiated price or on a Force Account basis." Section A11.00 also states: "The sum indicated is for work outside project limits and/or scope, and is not to be construed as implying that any work, or work in this amount, or of no more than this amount, can be anticipated." (Plaintiff's Exhibit 002 at PTC0010303.)

74. Although section A11.00 set forth a predetermined amount of $100,000.00 for contingent work, PTC officials decided that work for roadway repairs would be paid through change orders or on a force-account basis, because that system would allow project managers to better identify for PTC commissioners the true cost of roadway repairs. (Plaintiff's Exhibit 28 at 2; N.T. vol. 4 at 136-138, vol. 7 at 36-37.)

75. Payment involving emergency roadway repairs and accident-response work was made primarily on a force-account basis. A "force account" is a method of paying for work when, among other reasons, the volume and cost of the work to be performed is unknown. Force accounts provide for payment for a contractor's time, labor and material, with markups for

overhead and profit. On this project, when extra work was authorized on a force-account basis the Contract required payment of the reasonable costs incurred for labor, material, equipment and other necessary expenditures, and included markups of 40% on labor costs, 25% on material costs, 5% on equipment costs and, when applicable, an 8% markup of the total value of the force-account work for work performed by a subcontractor. (Plaintiff's Exhibit 177 at 69 (Dept. of Transportation Specifications 1996 § 110.03(d)(7)); Board Finding.)

76. Section A09.00(a) of the Contract's Standard Special Provisions provides: "Covenant of Good Faith and Fair Dealing. This contract, in its performance and enforcement, imposes an obligation of good faith and fair dealing on the Contractor(s) and the Commission." (Plaintiff's Exhibit 002 at PTC0010301.)

77. PTC officials and project engineers did not attempt to estimate the quantity of work that would be required under section G02.00 for emergency roadway repairs and accident-response work because the project entailed transferring traffic from normal travel lanes to temporary travel lanes during active construction. Given the project's unique traffic configuration, the PTC felt that it had no reliable basis upon which to predict how many repairs would be necessary or how many accidents would occur. Instead, the PTC agreed to pay for such work on a force-account basis or through change orders. (Plaintiff's Exhibit 002 at PTC0010357, PTC0010514; N.T. vol. 1 at 112-114, vol. 7 at 35-36.)

78. Because emergency roadway repairs and accident-response work were to be paid on a force-account basis, Iafrate did not include in its contract bid an amount for such work. (N.T. vol. 1 at 112-114.)

79. In May 2000, Iafrate had to perform emergency roadway repairs on 13 different occasions, expending 3,292 man-hours at a direct cost of $277,893.24. (Plaintiff's Exhibit 174.146; N.T. vol. 3 at 70-73.)

80. In June 2000, Iafrate's work crews performed emergency roadway repairs on 17 different days, expending 1,273 man-hours at a direct cost of $112,713.85. (Plaintiff's Exhibit 174.146.)

81. Between April and November 2000, during Phases II-III of the project, Iafrate workers responded to 11 automobile accidents, expending 339 man-hours for accident cleanup. (Plaintiff's Exhibit 195.01.)

82. From December 2000 through March 2001, Iafrate performed emergency roadway repairs on 31 days. (Plaintiff's Exhibit 174.146.)

83. From November 2000 through April 2001, Iafrate workers responded to 27 automobile accidents. (Plaintiff's Exhibit 195.01.)

84. From May 2001 through October 2001, Iafrate workers responded to 13 automobile accidents, expending 387 man-hours. (Plaintiff's Exhibit 195.01.)

85. From November 2001 to the project's completion, in Phases IV and V of the project, Iafrate workers responded to 40 automobile accidents, the most serious of which consumed 551 man-hours. (Plaintiff's Exhibits 174.01-174.89. 195.01.)

86. For the entire duration of the project, Iafrate responded to 89 automobile accidents, for which the PTC made additional payments totaling $308,462.30. (Plaintiff's Exhibits 195.01, 174.01-174.89, 183.)

87. For all emergency roadway-repair work performed on the project, the PTC paid Iafrate an additional $4,809,467.00. (Plaintiff's Exhibit 183.)

88. Despite its assertions, Iafrate did not present evidence showing that the PTC possessed sufficient data to make reliable predictions for bidders of the amount of roadway repairs and accident-response work that would be necessary during the project. (Board Finding.)

89. Section A11.00 of the Contract's Standard Special Provisions clearly states that it should not be construed as implying any particular amount of work and is not misleading in this regard. (Findings of Fact 73-74; Board Finding.)

90. The PTC's decision not to estimate the amount of emergency repair and accident response work for the project, but to pay for same via force account and/or change order was reasonable under the circumstances. (Board Finding.)

Iafrate's Claim that the PTC Breached the Contract by Failing to Provide Adequate Specifications for the Application of the Lime-Pozzolan Mixture.

91. Prior to commencement of the project, MS Consultants, one of the PTC project managers, retained the company Earth, Inc. ("Earth"), to perform an investigation of the Turnpike roadway's subgrade. Earth is a geotechnical engineering firm providing consultative services for highway and commercial projects. As part of its investigation, Earth took 25 soil boring samples in the project zone, in order to determine the types of subsurface materials, the quality and stability of the old roadway, and whether it would be necessary to replace or stabilize the existing subgrade materials. (N.T. vol. 8 at 5-9.)

92. A report issued by Earth on April 2, 1998, contained two options for improving subgrade that was considered to be unstable. The first was the traditional method of removing the subgrade material by excavation and replacing it with rock. The second method was to apply to the subgrade a lime-pozzolan mixture, a process that was much less expensive than excavation. (PTC's Exhibit 206 at PTC0420463-PTC0420464.)

93. Lime-pozzolan is a mixture of lime and pozzolan, the latter being a type of ash. The mixture reacts with clay and water in a way that can stabilize the subgrade beneath a roadway. Because the subgrade for this project varied between clay and sand, a lime-pozzolan mixture was thought to be a good stabilizing agent. (N.T. vol. 8 at 15-16.)

94. In September 1998, Earth issued a second report entitled "Lime-Pozzolan Subgrade Improvement," stating that lime-pozzolan treatment could offer as much as $14.50 in savings per cubic meter of subgrade improvement as compared to traditional excavation. (PTC's Exhibit 209 at PTC0580209; N.T. vol. 8 at 17, 22-25.)

95. Earth issued a final version of its "Lime-Pozzolan Subgrade Treatment" report in November 1998, incorporating changes requested by the PTC. (PTC's Exhibit 210.)

96. Before the Iafrate project, the PTC had never used lime-pozzolan treatment to stabilize the Turnpike subgrade where needed. (N.T. vol. 8 at 162.)

97. The PTC adopted Earth's recommendations and included in Section G86.00 of the Contract's Standard Special Provisions specifications for the use of lime-pozzolan treatment of the roadway subgrade. (Plaintiff's Exhibit 002 at PTC0010494; N.T. vol. 8 at 33-34.)

98. Section G86.00 of the Contract's Standard Special Provisions required that after a subgrade area was treated with lime-pozzolan, the area treated was to be left undisturbed for a three-day "curing" period. Lime-pozzolan mixture was not to be used during rain, but there was no requirement in the specifications that an area treated be covered if it rained during the three-day curing period. (Plaintiff's Exhibit 002 at PTC0010494; N.T. vol. 8 at 71, vol. 4 at 33.)

99. Iafrate entered into a subcontract with Terra Firma Technologies to apply the lime-pozzolan mixture. (Joint Stipulation of Facts at 2.) On July 6, 2000, Terra Firma began treating the subgrade between Mileposts 80 and 81 (Section 5). By July 31, 2000, Terra Firma had applied lime-pozzolan mixture to sections 1 through 5 of subgrade between Mileposts 75.94 and 81, with each section consisting of approximately 1 mile. (Findings of Fact 5; PTC's Exhibits 214, 213; N.T. vol. 4 at 70-74.)

100. Application of the lime-pozzolan mixture was supervised by inspectors from KCI Technologies and the PTC. This oversight included testing the stability of the subgrade and testing for the moisture content of the subgrade soil. (Plaintiff's Exhibit 002 at PTC0010494; N.T. vol. 4 at 160, vol. 8 at 142-143.)

101. The only sections of the project treated with lime-pozzolan were Sections 1 through 5. Subgrade treated with the lime-pozzolan mixture failed to reach sufficient stability in Sections 1, 2, 4 and 5 of the project. (PTC's Exhibits 213, 214, 457 and 195.03; N.T. vol. 8 at 38-40, 43-65.)

102. In Section 1 of the project (Milepost 75.94 to Milepost 77), 75% of the area treated with the lime-pozzolan mixture failed to stabilize, requiring that the treated area be over-excavated and refilled with rock. (PTC's Exhibit 214; N.T. vol. 5 at 94-95 and vol. 8 at 42-44.)

103. With regard to all of the areas treated with lime-pozzolan during Phase II of the project (Sections 1-5), between 20% and 25% of the treated areas failed to achieve subgrade stability. If Section 1, where the failure rate was 75%, is excluded, the failure rate for the remaining Phase II areas is from 2.5% to 5%. (N.T. vol. 5 at 151-152, vol. 8 at 46.)

104. The failure of the areas treated with lime-pozzolan, particularly in Section 1, led the PTC to temporarily suspend the use of lime-pozzolan during the remaining Phase II work. (Plaintiff's Exhibit 162.50; N.T. vol. 5 at 97-98.)

105. On October 31, 2000, the PTC conducted a meeting headed by Ken Heirendt, a PTC geotechnical engineer, to determine whether the PTC should continue using lime-pozzolan treatment on the Iafrate project. (Plaintiff's Exhibit 168 at PTC0090762; N.T. vol. 8 at 139-140.)

106. After the meeting, Mr. Heirendt retained GeoMechanics, Inc., ("GeoMechanics") to determine the best method of stabilizing the roadway subgrade. (PTC's Exhibit 311 at 6; N.T. vol. 8 at 183-186.)

107. GeoMechanics used soil boring samples to conduct tests using various stabilizing agents. GeoMechanics provided recommendations in the spring of 2001 and issued a written report in July 2001. The report concluded that the use of lime-pozzolan alone would not achieve subgrade stabilization, and that significant improvement of an unstable subgrade could be achieved only through a mixture of lime-pozzolan and cement. (PTC's Exhibit 316 at 23.)

108. Based upon the GeoMechanics report, for purposes of using lime-pozzolan in Phases III and IV of the project, Mr. Heirendt changed section G86.00 of the Contract's Standard Special Provisions to change the method of lime-pozzolan application and to add cement to the lime-pozzolan mixture. (PTC's Exhibit 86; N.T. vol. 8 at 106.)

109. The failure rate for subgrade treated with the lime-pozzolan and cement mixture during Phases III and IV of the project was about 2%. (N.T. vol. 5 at 152.)

110. During the treatment of Sections 1-5 of the project, officials from Terra Firma Technologies and Earth observed that after applications of lime-pozzolan contractors had driven their equipment over areas of treated subgrade before expiration of the three-day curing period. In a letter to Iafrate, Dave Cannon, president of Terra Firma Technologies, informed Iafrate officials of this fact. (PTC's Exhibit 65; N.T. vol. 8 at 92-95.)

111. Anthony Leotta, Iafrate's project manager during Phase II of the project, acknowledged that some premature driving over lime-pozzolan treated subgrade had occurred. (N.T. vol. 4 at 73-74.)

112. The fact that equipment was driven over subgrade treated with lime-pozzolan in Sections 1-5 before the expiration of the three-day curing period contributed to the failure of those areas of subgrade. (Findings of Fact 101-104, 110-111; Board Finding.)

113. Very shortly after the application of lime-pozzolan in Section 1 (Milepost 75.94 to Milepost 77), beginning either that evening or the next day, the project zone received heavy rain over a 24-hour period, perhaps as much as five inches. Mr. Cannon of Terra Firma Technologies testified that the heavy amount of rain and the lack of adequate drainage compromised the areas treated with lime-pozzolan on the previous day. (N.T. vol. 8 at 101-105.)

114. In regard to the areas of lime-pozzolan treatment that failed during Phase II (Sections 1-5), Mr. Cannon of Terra Firma Technologies observed subgrade drains that Iafrate had not placed sufficiently deep in the ground. He observed these drain problems in areas where the lime-pozzolan treatment had failed. (N.T. vol. 8 at 122-124.)

115. Mr. Sydlik and employees of Earth also observed several occurrences of subgrade drains that were not placed deep enough or with proper gradient slope to drain water properly from Section 1 and other areas treated with lime-pozzolan that failed. (N.T. vol. 8 at 37-41.)

116. In regard to Section 1 areas that failed during Phase II of the project, Ken Heirendt, then a geotechnical engineering manager with the PTC, observed undulations in the subgrade drain pipes after the Section 1 lime-pozzolan had been removed. He testified that the drainage pipe problem contributed to the lime-pozzolan failure in Section 1. (N.T. vol. 8 at 132-133, 135-36, 170-72.)

117. Iafrate was responsible for installing subbase drains so as not to compromise the effectiveness of the lime-pozzolan subgrade improvement operation. (Plaintiff's Exhibit 2, Section 6.6; N.T. vol 8 at 128-29.)

118. The Board finds the testimony of Messrs. Cannon, Sydlik and Heirendt with respect to drain placement, drainage problems and premature travel over lime-pozzolan treated areas in Sections 1-5 to be credible and persuasive. (Findings of Fact 110-116; Board Finding.)

119. Iafrate's failure to consistently place subbase drains at a proper depth and gradient slope interfered with the application of lime-pozzolan and contributed to the failure of lime-pozzolan treated subgrade areas in Sections 1-5 of the project. (Findings of Fact 110-118; Board Finding.)

120. In allowing equipment to travel over uncured areas of lime-pozzolan treatment prematurely and failing to consistently set subbase drains at their proper depth and slope in Sections 1-5, Iafrate has failed to establish that it applied the lime-pozzolan mixture in conformance with the PTC's specifications in section G86.00 of the Contract's Standard Special Provisions. (Findings of Fact 110-119; Board Finding.)

121. Because it has not established that it applied the lime-pozzolan treatment in the failed areas in accordance with PTC specifications, Iafrate has not established that the PTC's specifications for the application of lime-pozzolan were the cause of the lime-pozzolan failures or that these specifications were inadequate for their intended purpose on this project. (Board Finding.)

Iafrate's Claim that the PTC Breached the Contract by Failing to Pay a $70,000 Incentive Payment that was Due Under the Incentive Provision in Change Order No. 4.

122. In April 2000, Iafrate and the PTC began negotiating an acceleration agreement in order to overcome construction delays largely the result of the extensive failures of the pavement in the median temporary travel lane. The parties wished to accelerate the completion date for

Phase II work from November 2000 to September 15, 2000. Mr. Lockhart gave verbal directions to accelerate Phase II work on May 8, 2000. (Plaintiff's Exhibit 169.1; N.T. vol. 3 at 74-77; vol. 5 at 54-56.)

123. Iafrate's original project schedule was based on one ten-hour shift, five days per week. In order to accelerate the Phase II work, Iafrate scheduled a second ten-hour shift for five days a week. Iafrate and the PTC formally executed Change Order No. 4 on June 27, 2000, wherein in order to pay for the increased work, the PTC agreed to pay Iafrate an additional $3,006,583.00. (Plaintiff's Exhibit 002.4 at PTC00021157; N.T. vol. 3 at 76-77, 82-83, vol. 5 at 54-56.)

124. The acceleration of work during Phase II resulted in construction activities being performed throughout the nine-mile length of the project, making it difficult to move workers and equipment in order to perform emergency roadway-repair work or to respond to automobile accidents. (N.T. vol. 3 at 138-139.)

125. The parties implemented Change Order No. 4 in accordance with the following specific provision: "[T]he acceptance of this proposal by the PTC shall relieve the PTC of any and all claims for delay resulting from the emergency work and/or changes that have taken place prior to the date of the start of the acceleration, that is, May 8, 2000." (Plaintiff's Exhibit 002.4 at PTC0021158.)

126. Change Order No. 4 also contained a time-extension provision related to the amount of roadway excavation that might be required during Phase II reconstruction. Change Order No. 4 and the Contract contained the PTC's estimate that Iafrate would have to excavate 4,517 cubic meters of unsuitable subgrade material. In Change Order No. 4, the parties agreed that Iafrate would receive a one-day extension of the September 15, 2000, completion date for each 1,200 cubic meters of unsuitable subgrade material that Iafrate had to excavate in excess of 125% of the estimated 4,517 cubic meters. (Plaintiff's Exhibit 002.4 at PTC0021158; N.T. vol. 3 at 83-84, 106-109, vol. 5 at 56-57, vol. 9 at 111-112.)

127. Change Order No. 4 also contained an incentive provision that provided that Iafrate was to receive an additional $35,000.00 for each day prior to September 15, 2000, the agreed upon deadline, that it could complete Phase II construction work. The incentive provision also provided for penalties for failing to complete Phase II work by September 15, 2000. (Plaintiff's Exhibit 002.4 at PTC0021158.)

128. Iafrate ultimately excavated 43,765.97 cubic meters of unsuitable subgrade material. Using the calculation contained in the time-extension provision of Change Order No. 4, this extra excavation entitled Iafrate to a 32-day time extension in which to complete Phase II work, or until October 17, 2000. (Plaintiff's Exhibit 250; N.T. vol. 3 at 108-110, vol. 5 at 60-61.)

129. Iafrate completed Phase II work and switched traffic into its Phase III configuration on October 15, 2000. (Plaintiff's Exhibit 229; N.T. vol. 3 at 112-113, vol. 9 at 112.)

130. By letter dated October 19, 2000, Larry Kenetski, an Iafrate project manager, notified Mr. Lockhart that Iafrate had completed Phase II work. On or about October 19, 2000, Mr. Kenetski requested that Iafrate be paid a $70,000.00 incentive payment because Iafrate finished Phase II work on October 15, two days earlier than the extended deadline of October 17, 2000. Mr. Lockhart refused to make the payment. (Plaintiff's Exhibit 229; N.T. vol. 3 at 112-113.)

131. The language of Change Order No. 4 is ambiguous as to whether the text of the time-extension provision and the incentive-payment provision are meant to be read in conjunction, such that a change in the completion date in the time-extension provision will result in a corresponding change in the completion date in the incentive-payment provision. (Findings of Fact 122-130; Board Finding.)

132. Mr. Lockhart, as agent of the PTC, drafted Change Order No. 4. (N.T. vol. 4 at 176-77 and vol. 5 at 50-51.)

133. The PTC has not made any payment to Iafrate based on the incentive provision in Change Order No. 4. The PTC also has not assessed any penalty against Iafrate based on the incentive provision. (N.T. vol. 5 at 60, 62.)

Iafrate's Claim that the PTC Breached the Contract by Failing to Accurately Specify the Location and Quantity of Rock in the Project Zone.

134. Prior to putting the Contract out for bid, the PTC retained a consultant to take 25 soil boring samples throughout the project zone and to compile its findings in soil boring logs. The purpose of taking the samples was to determine the types of material that existed at various levels below the ground. (Plaintiff's Exhibit 176; N.T. vol. 1 at 119-121.)

135. As part of its preparation for bidding on the Contract, Robert Shunk, Iafrate's chief estimator, reviewed the soil boring logs and visited the project site on three occasions. Based on this information, Mr. Shunk concluded that Iafrate would have to excavate only small quantities of rock around Mileposts 83.08 to 83.39, because most of the remaining rock was situated below the excavation level of the roadway. (N.T. vol. 1 at 117, 121-123.)

136. Section 2.4 of the PTC's Erosion and Sediment Pollution Control Plan, included in the Contract documents, states that "fill material was evident beneath all borings except in the truck climbing lane from approximate Mileposts 82 to 84. In these locations, asphalt was overlaid on a rock, sand, gray brown dense subbase followed by a residual soil of clay, sand and rock." (Plaintiff's Exhibit 002 at PTC0010785.)

137. Based on the soil boring logs, site visits and section 2.4 of the PTC's Erosion and Sediment Pollution Control Plan, Mr. Shunk did not include in Iafrate's bid a separate amount for rock excavation. (N.T. vol. 1 at 121-123.)

138. Section 110.02(b) in the Department of Transportation's Specifications 1996 (Publication 408M/96), included as part of the Contract documents, provides:

> **(b) Differing Site Conditions.** During the progress of work, if subsurface or latent physical conditions are encountered at the site, differing materially from those indicated or 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 they are disturbed and before the affected work is performed. Upon written notification, the Engineer 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 as specified in Section 110.02(a).

(PTC's Exhibit 177 at 66.)

139. Section 203.1(a) of the Department of Transportation's Specifications 1996 (Publication 408M/96), included as part of the Contract documents, provides that Class 1 excavation includes excavation of "unforeseen . . . rock ledges." (PTC's Exhibit 177 at 90.)

140. As modified by Section 203.3(b) of the PTC's Modifications of Section 203, relating to construction and the removal of rock and hard shale, Section 203.3(b) of the Contract provides that the contractor shall "[r]emove all overhanging and protruding rock below the first bench as indicated and directed. Method of rock excavation is subject to the approval of the Engineer. Blasting is not permitted." (PTC's Exhibit 2 at PTC0010042.)

141. Section G93.00 of the PTC's Standard Special Provisions of the Contract, relating to the excavation of sandstone and limestone, provides that the removal of "project rock" is "incidental to Class 1 Excavation." (PTC's Exhibit 2 at PTC0010501-PTC0010502.)

142. The foregoing Contract provisions indicate that some reasonable amount of rock is to be expected throughout the project site and will be treated as within the scope of Class 1 excavation. (Findings of Fact 129-131; Board Finding.)

143. On nine days between December 14, 2000, and April 24, 2001, Iafrate encountered rock that required breaking-up and removal using special equipment and a more time-consuming excavation process. Removing the rock delayed installation of the roadway's subsurface drainage pipes in those areas where rock was encountered. Iafrate noted details of these encounters in nine of its inspectors' daily project reports:

December 14, 2000 – 1 foot of solid rock at station 127+910.[1]
December 18, 2000 – 2 feet of rock in bottom of ditch at station 128+443.
January 9, 2001 – 2 feet of rock in pipe trench.
January 15, 2001 – 2 feet of rock at stations 131+002 and 131+338.
January 18, 2001 – 3 feet of rock at station 134+480 and 2 feet of rock at station 134+550.
February 5, 2001 – 1 foot of rock at stations 130+140, 130+184, 130+214; 3 feet at 130+184.

[1] See Findings of Fact 5 for station designations.

April 15, 2001 – 2 meters of rock in ditch at station 122+668.
April 19, 2001 – Between 1 and 2 meters of rock at station 122+700.
April 24, 2001 – 1 foot of rock in grade between stations 132+250 and 132+280.

(Plaintiff's Exhibits 179.1-179.9; N.T. vol. 3 at 151-153, vol. 4 at 106-107.)

144. It is not clear from the record that all of the rock encountered on the nine days recorded in Iafrate's daily project reports was outside the areas indicated in the PTC's Erosion and Sediment Pollution Control Plan and the soil boring logs. (Plaintiff's Exhibits 179.1-179.9; Board Finding.)

145. The inspectors' daily project reports do not consistently record the number of man-hours and hours of equipment use necessary to remove the subsurface rock. (Plaintiff's Exhibits 179.1-179.9; Board Finding.)

146. Given the size of this project and the spacing of the soil test borings, it is unreasonable to read the geotechnical data as a representation that no rock at all would be encountered outside those areas indicated in the data. (Board Finding.)

147. The amount of unanticipated rock encountered by Iafrate was relatively small and does not render the information provided in the PTC's geotechnical data misleading. (Findings of Fact 134-146; Board Finding.)

148. Iafrate has not met its burden of showing through a preponderance of the evidence that the unanticipated rock it encountered was beyond the amount to be reasonably anticipated on the basis of the information provided in the geotechnical data provided by the PTC and the size of the project and has not established that the rock encountered is a "differing site condition as described in section 110.02(b) of the Department of Transportation's Specifications, Publication 408/1996. (Findings of Fact 134-147; Board Finding.)

Iafrate's Claim that the PTC Breached the Contract by Failing to Design a Median Work Zone for Phase III Construction that was Wide Enough to Allow Work without Delay and Loss of Productivity.

149. During Phase III of the project, Iafrate was to reconstruct the eastbound lane adjacent to the median area and to reconstruct and widen the median area. Westbound traffic was to travel on the westbound roadway shoulder and the normal westbound slow lane. Eastbound traffic was to travel on the eastbound roadway shoulder and the normal right eastbound slow lane. (Joint Stipulation of Facts at 2; Plaintiff's Exhibit 002 at PTC0010447-PTC0010460.)

150. Mr. Lockhart, project manager for KCI Technologies, testified that the project design called for extra widening of the westbound shoulder, that he reminded Bob Coburn, Iafrate's project manager during Phase I of the project, and that Iafrate had forgotten to widen the roadway shoulder for the westbound traffic at the far western end of the project. Because of the roadway's configuration at the far western end of the project, a small section of the roadway

shoulder had to be enlarged beyond the width of the existing shoulder for the remaining length of the project. With the onset of winter weather, Iafrate could not address the problem at that time. Mr. Coburn subsequently left the project and the issue was forgotten. (N.T. vol. 4 at 39-40, vol. 5 at 136-139.)

151. In the spring of 2001, Iafrate discovered that the project area at the far western end of the project was not wide enough to maintain four travel lanes and to allow an adequately wide median-area work zone for Phase III construction. Because of this limitation, the concrete barriers separating the median work zone from the eastbound travel lanes had to be placed on the joint between the eastbound lanes reconstructed during Phase II and the median work zone. (Plaintiff's Exhibits 166.12, 166.13, 252; N.T. vol. 8 at 17-22, 98-102.)

152. In the spring of 2001, Iafrate increased the width of the westbound roadway shoulder and moved the concrete barriers separating the median work zone from the westbound travel lanes further into the westbound lanes, thereby increasing the width of the median work zone. This allowed Iafrate to perform demolition and subgrade preparation at the western end of the project. However, for a few hundred feet at the far western end on the project, it was still necessary to repeatedly move barriers each time a new layer of paving material was laid down. This additional and unplanned work required Iafrate to divert work crews from planned construction tasks to assist in barrier movement. (Plaintiff's Exhibits 166.12, 166.13, 252; N.T. vol. 4 at 24-31.)

153. Anthony Leotta, Iafrate's project manager during the time relevant to this issue, testified that in addition to the problems at the west end of the project, the Phase III median work zone was too narrow throughout the nine-mile length of the project. Mr. Leotta further testified that this was caused by a defect in the project design documents and that this design defect required Iafrate to move nearly all of the nine miles of concrete barriers separating the Phase III eastbound travel lanes from the median work zone, in order to lay down the final paving material joining the median area with the eastbound travel lanes. (N.T. vol. 4 at 25-26, 33-35.)

154. Mr. Lockhart of KCI Technologies testified that although it was necessary to move the concrete barriers after the completion of each phase of work, it was never necessary to move all nine miles of barriers because of any problem with the designed width of the median work zone. (N.T. vol. 5 at 136-43, 169-170.)

155. Neither party brought to the attention of the Board additional evidence corroborating either Mr. Leotta's or Mr. Lockhart's testimony on this issue. (Board Finding.)

156. In regard to the PTC's design of, and the actual width of, the Phase III median work zone, neither party presented pertinent project plans or engineering or surveyors' drawings at hearing showing the designed width of the Phase III median work zone at various locations along the project. (Board Finding.)

157. Iafrate has not established through a preponderance of the evidence the width of the median work zone at the relevant locations along project zone, whether the work zone was

too narrow, and if so what caused the median work zone to be too narrow at some points. (Findings of Fact 149-156; Board Finding.)

Iafrate's Claim for Damages

158. In a letter dated January 9, 2002, Robert Adcock, an Iafrate vice president, notified Michael Flack, the PTC's chief engineer, that Iafrate intended to seek damages for the unanticipated volumes of excavation, pavement failures and accident responses that occurred in Phases II and III of the project. (PTC's Exhibit 158.)

159. On January 30, 2003, Iafrate submitted a Modified Total Cost claim to the PTC seeking $15,530,884.00 in damages. (Plaintiff's Exhibit 137.)

160. By letter dated July 21, 2003, Mr. Flack rejected Iafrate's claim. (PTC's Exhibit 160.)

161. In its Statement of Claim filed on August 4, 2003, Iafrate claims $15,242.694.00 in damages, plus interest and costs. (Statement of Claim at 10.)

162. In a modified total-cost method of calculating damages, the starting values are the total project costs and the contractor's bid amount, each of which is adjusted in order to account for errors and unrecoverable costs. The contractor's total project cost is adjusted downward to account for any project costs for which the contractor is responsible or which are unrecoverable. The contractor's bid amount is adjusted upward to account for bid errors. The difference between the adjusted total project costs and the adjusted bid amount is said to reflect the added costs for which the project owner is liable. Overhead costs, profit, bond costs and interest are then added to arrive at total damages. (N.T. vol. 6 at 27-28.)

163. The total-cost methodologies of calculating damages are used as a last resort, usually when the factual information necessary to do a detailed analysis is not available. (N.T. vol. 10 at 14.)

164. When using a total-cost methodology for calculating damages, there must be strong factual support for the claimed causation and liability. (N.T. vol. 10 at 14.)

165. A "measured-mile" analysis of damages is one that compares the work productivity achieved in a minimally affected section of a roadway construction project with the work productivity achieved in sections of the project that were affected by disruptions, work changes or delay. By measuring the respective quantities of work performed and the hours taken to perform that work, an expert can arrive at a reasonable estimate of damages for the work performed in sections of a project affected by disruptions and delays. (N.T. vol. 11 at 13-14.)

166. The measured-mile analysis is the preferred industry standard for analyzing loss-of-productivity claims. (N.T. vol. 10 at 12.)

167. Jeff Fuchs was retained by Iafrate and admitted by the Board as an expert in the areas of construction cost accounting, quantification of damages and construction claims analysis. (N.T. vol. 6 at 12, 17.)

168. As part of his review of Iafrate's damages claim, Mr. Fuchs reviewed Iafrate's accounting system, construction plans and specifications, bid documents, correspondence, meeting minutes and construction inspectors' daily reports. (N.T. vol. 6 at 21-24.)

169. Mr. Fuchs concluded that, because there was no time during Phases II through V of the project that Iafrate's work was not affected by extensive and overlapping disruptions and delays, and because Iafrate's work was constantly supplemented by change orders, the only methodology that could be used to calculate Iafrate's loss-of-productivity damages was the modified total-cost method. (N.T. vol. 6 at 24-28.)

170. Mr. Fuchs specifically stated: "Given the types of disruptions experienced from the very beginning of the project, it is impossible to calculate losses as a discrete measure of each impact. Thus, the modified total cost approach is appropriate." (Plaintiff's Exhibit 159 at 12.)

171. Using the modified total-cost method, Mr. Fuchs calculated a total damages claim for Iafrate of $17,792,299.00. This figure includes overhead and profit, bond costs, and pre-decision interest. (Plaintiff's Exhibit 159, Schedule 1; N.T. vol. at 6 at 71-72.)

172. William Schwartzkopf was retained by Iafrate and admitted by the Board as an expert in labor productivity and the calculation of damages. (N.T. vol. 6 at 158-159.)

173. As part of his review of Iafrate's claim for damages, Mr. Schwartzkopf initially reviewed Iafrate's claim and Mr. Fuchs' analysis. He also met with several Iafrate officials. Mr. Schwartzkopf also reviewed cost records, bid documents, change orders and billing documents. (N.T. vol. 6 at 159-160, 163-164.)

174. Mr. Schwartzkopf concluded that although he prefers other methodologies for calculating damages, such as the measured-mile approach, when several overlapping factors affect several construction tasks at the same time, one cannot isolate the impact of one factor on labor productivity. He concluded that because work in Phases II, III and IV was always affected by disruptive factors, a modified total-cost approach for calculating Iafrate's damages was appropriate. (N.T. vol. 6 at 163-165.)

175. Mr. Schwartzkopf specifically concluded that "[t]he pervasive nature of the impacts suggests that a modified total cost analysis is the only effective way to measure the impacts on Iafrate." (Plaintiff's Exhibit 157 at 10.)

176. Mike Rollage, retained by the PTC to examine Iafrate's damages claim, is a certified public accountant and a professor in the civil engineering department at the University of Pittsburgh. Mr. Rollage teaches subjects related to construction, finance and cost control. (N.T. vol. 10 at 98-99.)

177. Mr. Rollage was admitted by the Board to testify as an expert in construction damages analysis. (N.T. vol. 11 at 100.)

178. Mr. Rollage concluded that sufficient information exists about Iafrate's work on this project to render inappropriate a calculation of damages using the modified total-cost approach. (PTC's Exhibit 431 at 2.)

179. From his review of the project correspondence files, job minutes and other project documents, Mr. Rollage concluded that Iafrate contributed to its own loss of productivity by failing to coordinate work among subcontractors, failing to properly supervise work, and failing to maintain management continuity. (PTC's Exhibit 431 at 4-7; N.T. vol. 10 at 109-111.)

180. John Ramos, retained by the PTC to examine Iafrate's damages claim, is a senior project manager for Greyhawk North American, a construction consulting and management services firm. The Board admitted Mr. Ramos as an expert witness in the fields of construction claims analysis and scheduling analysis. (N.T. vol. 11 at 6-8.)

181. As part of his review of Iafrate's damages claim, Mr. Ramos met with PTC and KCI Technologies employees, and reviewed various project documents held by KCI Technologies. (N.T. vol. 11 at 10.)

182. Mr. Ramos concluded that the work records exist to do a measured-mile analysis of this project, that use of the modified total-cost approach is inappropriate, and that Phases IV and V could have been used to perform a measured-mile analysis of emergency roadway repairs and accident-response work. Mr. Ramos, however, did not do such an analysis. (N.T. vol. 11 at 13-15, 51-53, 57-59.)

183. Charles Boland was retained by the PTC to examine Iafrate's damages claim. He is employed by Greyhawk North American, providing consultation services related to construction management. He is an expert in construction claims analysis. (N.T. vol. 10 at 3-6.)

184. The Board admitted Mr. Boland as an expert in the field of construction claims analysis. (N.T. vol. 10 at 6.)

185. As part of his review of Iafrate's damages claim, Mr. Boland had at his disposal all of the PTC's records and records received from Iafrate via discovery. (N.T. vol. 10 at 9.)

186. Mr. Boland concluded that use of the modified total-cost method for calculating Iafrate's damages is inappropriate, because the information exists to do a measured-mile analysis of some of Iafrate's work activities. Mr. Boland, however, did not do such an analysis. (N.T. vol. 10 at 22-23, 28.)

187. The evidence of record establishes that the PTC's specifications for the construction and paving of the temporary travel lanes was inadequate and contributed to the loss of productivity and increased costs of performance experienced by Iafrate during the project. (Findings of Fact 57-59; Board Finding.)

188. The evidence of record does not provide the Board with a basis by which to separate the loss-of-productivity damages caused by the inadequate specifications for the construction and paving of temporary travel lanes from the loss-of-productivity damages caused by Iafrate's failure to mitigate those damages by a greater use of subcontractors to perform emergency roadway repairs. (Findings of Fact 57-68, 161-164, 167-175; Board Finding.)

189. The evidence of record does not provide the Board with a method by which it can separate the loss-of-productivity damages attributable to the PTC's inadequate specifications for construction and paving the temporary travel lanes from the loss-of-productivity damages attributable to (1) the PTC's failure to predict the quantity of emergency roadway repair and accident response in the bid or contract specifications; (2) the Contract's specifications for the application of lime-pozzolan; (3) the information included in bid packages regarding the existence and location of subsurface rock; or (4) the PTC's design of the median work zone. (Plaintiff's Exhibits 157 at 10, 159 at 12; Findings of Fact 57-59, 79-90, 101-104, 109-121, 137, 143-148, 152-157, 161-164, 167-175; Board Finding.)

190. As acknowledged by Anthony Leotta, an Iafrate project engineer beginning in Phase II of the project, Iafrate's work productivity was adversely affected by Iafrate's agreement to accelerate the completion of Phase II which caused the stacking of activities, working areas being over-crowded because multiple tasks were being performed out of sequence and because there was present extra workers and equipment, and the inability to move equipment, manpower and materials efficiently within the work zone. (N.T. vol. 3 at 135-140, vol. 4 at 54-55, 59-65, 105-106, 112-117.)

191. Iafrate voluntarily agreed to accelerate its work on Phase II via Change Order No. 4. It did so on its own accord and was paid an additional $3,006.583.00 to cover the costs of this acceleration. (Findings of Fact 15; N.T. vol. 4 at 59-62.)

192. In addition to the inefficiencies created by the agreed to acceleration, Iafrate experience other inefficiencies that adversely affected its work productively on the project, but which were not caused by the PTC. These inefficiencies include: problems with excavation/pipe installation and the productivity of subcontractor J.C. Lee, problems with moving about the construction zone because of trenching for drain pipe installation and limited access points, an accident causing a "shoring failure" that required several weeks of attention, truck shortages and the over-extension of its project management personnel. (N.T. vol. 3 at 135-139, vol. 4 at 50-69, 103-106, 112-117.)

193. Iafrate contributed to its own productivity problems through excessive personnel turnover, by not having sufficiently experienced traffic-control personnel, and by failing to consistently coordinate the work of subcontractors. Iafrate also experienced miscellaneous problems relating to vehicle movement, line painting, accident response and roadway repair which adversely affected its productivity. (Findings of Fact 192; N.T. vol. 9 at 55-85; Board Finding.)

194. The evidence of record does not provide the Board with a basis by which to separate the loss-of-productivity damages attributable to Iafrate's own errors or inefficiencies not

caused by PTC from the loss-of-productivity damages caused by the PTC's inadequate specifications for construction and paving of the temporary travel lanes. (Findings of Fact 57-59, 161-164, 167-175, 190-193; Board Finding.)

CONCLUSIONS OF LAW

1. The Board of Claims has exclusive jurisdiction to hear and determine this matter as a claim against the Commonwealth of Pennsylvania, Pennsylvania Turnpike Commission, arising from a contract entered into with the Commonwealth. Board of Claims Act, 72 P.S. §§ 4651-1 – 4651-10, repealed by Act of December 3, 2002, P.L. 1147, No. 142 (current law now codified at Sections 1701-1751 of the Commonwealth Procurement Code, 62 Pa.C.S.A. §§ 1701-1751).

2. The Board of Claims has jurisdiction over the parties as well as the subject matter of the claim asserted by Plaintiff, Iafrate Construction Company. Id.

3. 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. Department of Transportation, 750 A.2d 388 (Pa. Cmwlth. 1999).

4. When a contractor builds or otherwise performs according to plans or specifications supplied by a project owner, the contractor cannot be held responsible for the sufficiency of the work or for defects in the plan or specifications. United States v. Spearin, 248 U.S. 132, 39 S. Ct. 59 (1918); Canuso v. City of Philadelphia, 326 Pa. 302, 192 A. 133 (1937); A.G. Cullen Construction v. State System of Higher Education, Nos. 666, 776 C.D. 2005, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006); Department of Transportation v. W.P. Dickerson & Son, 400 A.2d 930 (Pa. Cmwlth. 1979); Allentown Supply Corp. v. Stryer, 195 A.2d 274 (Pa. Super. Ct. 1963).

5. Cases subsequent to Spearin, including Pennsylvania cases, have adopted the "Spearin Doctrine", but have limited its application to design specifications rather than performance specifications. By prescribing the character, dimensions, location and other design specifications for construction and paving of the temporary travel lanes and for the use of lime-pozzolan reinforcement of subbase in reconstruction of the Pennsylvania Turnpike sections on this project, the PTC provided design specifications for these tasks and warranted to Iafrate that if Iafrate complied with these specifications the work would be adequate for its intended purpose. (United States v. Spearin, 248 U.S. 132, 39 S. Ct. 59 (1918); Canuso v. City of Philadelphia, 326 Pa. 302, 192 A. 133 (1937); A.G. Cullen Construction v. State System of Higher Education, Nos. 666, 776 C.D. 2005, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006); Department of Transportation v. W.P. Dickerson & Son, 400 A.2d 930 (Pa. Cmwlth. 1979); Allentown Supply Corp. v. Stryer, 195 A.2d 274 (Pa. Super. Ct. 1963)).

6. In accordance with the principles stated in Spearin and its progeny, it was not necessary for Iafrate to present expert evidence showing that the PTC's specifications for the construction and paving of the temporary travel lanes or use of the lime-pozzolan as a subbase stabilizer were negligently designed as judged by industry standards. Instead, the operative issue is whether or not these specifications, warranted by the PTC, proved to be adequate for the job. This latter issue may be determined by the Board from the evidence provided without the necessity of expert testimony. See e.g., A.G. Cullen Construction; W.P. Dickerson & Son; Allentown Supply Corp.

7. Because Iafrate failed to establish that it complied with the PTC's specifications for the use of lime-pozzolan on this project or that these specifications were inadequate for the intended purpose, Iafrate has not established that the PTC breached its warranty to Iafrate with regard to the lime-pozzolan specifications for this project.

8. The PTC is not liable to Iafrate for any loss-of-productivity costs incurred by Iafrate because of Iafrate's use of the PTC's specifications for the application of the lime-pozzolan mixtures.

9. Because Iafrate has established that it complied with the PTC's specifications for the construction and paving of the temporary travel lanes on this project and that these specifications were inadequate for the purpose intended, the PTC breached its warranty to Iafrate with regard to these specifications for construction and paving of the temporary travel lanes for this project.

10. A party who claims a loss due to a breach of contract has a duty to make reasonable efforts to mitigate the loss. Gloviak v. Tucci Construction Co., 608 A.2d 557 (Pa. Super. Ct. 1992); State Public School Building Authority v. W. M. Anderson Co., 410 A.2d 1329 (Pa. Cmwlth. 1980); Glenn Distributors Corp. v. Carlisle Plastics, 297 F.3d 294 (3d Cir. 2002).

11. The burden of showing that the damaged party could have mitigated its losses is on the breaching party. Pontiere v. James Dinert, Inc., 627 A.2d 1204 (Pa. Super. Ct. 1993); W. M. Anderson Co.; Glenn Distributors.

12. Iafrate's business decision to utilize its own base contract work crews to perform roadway repairs to the temporary travel lanes to the extent it did rather than use subcontractors who were otherwise available to do this repair work constitutes a failure to mitigate its loss of productivity damages incurred due to the inadequate temporary travel lane paving specifications.

13. In accordance with the duty to mitigate losses, the amount recoverable by a damaged party must be reduced by the amount of losses that could have been avoided by reasonable effort. W. M. Anderson Co.; Glenn Distributors.

14. The PTC is liable to Iafrate only for the loss-of-productivity damages caused solely by the inadequate specifications supplied to Iafrate for the construction and paving of temporary travel lanes less the loss of productivity damages incurred by Iafrate because of its business decision to utilize its base contract work crews for temporary travel lane repair rather than available subcontractors. Id.

15. Every contract imposes upon each party a duty of good faith and fair dealing in its performance and its enforcement. Bethlehem Steel Corp. v. Litton Industries, 507 Pa. 88, 488 A.2d 581 (1985); Stamerro v. Stamerro, 889 A.2d 1251, 1259 (Pa. Super. Ct. 2005); Middletown Carpentry v. C. Arena & Co., No. 2698 Control 091526, 2001 WL 1807379 (C.P. of Pa. Nov. 27, 2001).

16. The duty to act in good faith has been described as the duty to act honestly in fact in the conduct or transaction concerned. Stamerro.

17. Bad faith conduct in violation of the duty of good faith and fair dealing has been said to include "evasion of the spirit of the bargain, lack of diligence and slacking off, willful rendering of imperfect performance, abuse of power to specify terms, and interference with or failure to cooperate in the other party's performance." Temple University Hospital v. Group Health, No. Civ.A. 05-102, 2006 WL 146426, at *5 (E.D. Pa. January 12, 2006) (quoting Restatement (Second) of Contracts § 205 cmt. D (1981)).

18. The principle of good faith and fair dealing in the execution of a contract did not require the PTC to predict the volume of emergency roadway repairs and accident-response work on this project because of the lack of sufficient data for prior comparable projects.

19. Section A11.00 of the Contract's Standard Special Provisions, stating that a predetermined amount of $100,000 is authorized to pay for extra work at a negotiated price or on a force-account basis, which also stated that the $100,000 figure was not to be construed as implying the amount of work anticipated, was not a warranty by the PTC of the amount of roadway-repair and accident-response work that could be anticipated on the project. Section A11.00 is not an actionable misrepresentation of a material term of the Contract.

20. The PTC is not liable to Iafrate for any loss-of-productivity damages incurred by Iafrate because of the PTC's decision to include in the Contract a predetermined amount of $100,000 for contingent work, which included emergency roadway-repair and accident-response work and to pay for same via negotiated price or force account. The PTC did not breach its duty of good faith and fair dealing by the manner in which it chose to address this issue on the project.

21. A contract's interpretation is a question of law that requires a court to ascertain and give effect to the parties' intentions as those intentions existed when the contract was formed. Department of Transportation v. Pennsylvania Industries for the Blind and Handicapped, 886 A.2d 706 (Pa. Cmwlth. 2005).

22. When a written contract's language is clear and unequivocal, the contract's meaning must be determined by its plain language; however, when the provisions of a contract are not clear, a court must interpret the contract by determining the intent of the parties and giving reasonable effect to all of the contract's provisions. Aloe Coal Co. v. Department of Transportation, 643 A.2d 757 (Pa. Cmwlth. 1994).

23. A contractual provision is ambiguous if it is reasonably susceptible of different constructions, is obscure in meaning through indefiniteness of expression or if it has a double meaning. If a contractual provision is ambiguous, a court may examine extrinsic evidence including the subject matter of the provision, the circumstances surrounding the contract's execution, and the subsequent acts of the parties. Department of Transportation v. IA Construction Corp., 588 A.2d 1327 (Pa. Cmwlth. 1991).

24. When a contractual provision is found to be ambiguous, a court may construe the provision against the drafter of the document. J.W.S. Delavau, Inc. v. Eastern America Transport and Warehousing, 810 A.2d 672 (Pa. Super. Ct. 2002).

25. The meaning of the time-extension and incentive-payment provisions in Change Order No. 4 is ambiguous, because it is unclear whether or not the two provisions are to be read in conjunction with each other, such that a change in the completion date in the time-extension provision will result in a corresponding change in the completion date in the incentive-payment provision.

26. The Board concludes that the proper interpretation of Change Order No. 4 is that the September 15, 2000, completion date listed in the incentive-payment provision was not an absolute, independent date by which an incentive or penalty was to be calculated, but was instead subject to change based upon an extension of time as calculated in the time-extension provision.

27. Pursuant to the incentive-payment provision in Change Order No. 4, the PTC is liable to Iafrate for a payment of $70,000.00.

28. The gravamen of Iafrate's case for damages is that it incurred increased costs through loss of work-productivity, not that it incurred increased costs because work was delayed past the Contract's completion date.

29. A party will not be found to have waived legal or contractual rights without doing so in an explicit, knowing manner, and the Board will narrowly interpret a waiver or release-of-claims provision in a change order. A change order will not bar a specific claim unless the language and factual circumstances clearly express that the waiver asserted was actually intended. See e.g. Pontiere v. James Dinert, Inc., 627 A.2d 1204 (Pa. Super. Ct. 1993); Samuel J. Marranca General Contracting Co. v. Amerimar Cherry Hill Associates, 610 A.2d 499 (Pa. Super. Ct. 1992).

30. Change Order No. 4's provision that "acceptance of this proposal by the PTC shall relieve the PTC of any and all claims for delay resulting from the emergency work and/or changes that have taken place prior to the date of the start of the acceleration" did not constitute a waiver by Iafrate of its right to later pursue damages based on loss-of-productivity allegedly caused by a PTC breach of contract.

31. The PTC is not liable for any loss of productivity experienced by Iafrate on its claim for an inadequately wide median work zone during Phase III of the project or the alleged "pinch point" on the western end of the project because Iafrate failed to show by a preponderance of the evidence that a design flaw in the PTC's construction plans caused these problems.

32. A contractor may recover additional compensation for work performed as a result of site conditions that differ from those stated in the contract specifications, if: (1) the contractor can show that the government agency made a positive representation of site conditions in the contract's specifications; (2) the representation goes to a material specification

in the contract; (3) the contractor, because of either time or cost restraints, had no reasonable means of investigating the agency's representation; (4) the representation proves to be false or misleading, either because of an actual misrepresentation on the part of the agency or by what amounts to a misrepresentation through gross mistake or arbitrary action on the part of the agency; and (5) the contractor suffers financial harm because of his reliance on the misrepresentation. Acchione and Canuso, Inc. v. Department of Transportation, 501 Pa. 337, 461 A.2d 765 (1983). See also Thomas M. Durkin & Sons, Inc. v. Department of Transportation, 742 A.2d 233 (Pa. Cmwlth. 1999); Jay Fulkroad & Sons, Inc. v. Department of Transportation, Docket No. 1659, 1998 WL 901881 (Bd. of Claims November 10, 1998).

33. The existence of rock in unanticipated locations does not constitute a "differing site condition" as described in section 110.02(b) in the Department of Transportation's Specifications 1996 (Publication 408M/96), because the applicable sections of the Department of Transportation's Specifications 1996, the Contract's Modifications of Section 203, and section G93.00 of the Contract's Standard Special Provisions clearly anticipate the excavation of some quantity of rock incidental to Class 1 excavation; the information contained in the soil boring logs in the bid packages could not reasonably be read to guarantee that there would be no additional rock encountered in the nine-mile stretch of reconstruction project; and Iafrate failed to establish that the quantity of additional rock encountered was anything other than would reasonably be expected on a project this size or outside the scope contemplated by the bid materials (including the soil boring logs).

34. The PTC is not liable to Iafrate for any loss-of-productivity damages incurred by Iafrate because Iafrate encountered rock in unanticipated locations in the project zone for the reasons indicated in Paragraph 33 above and because the bid materials and soil boring logs were not misleading.

35. The PTC is not liable to Iafrate for any loss-of-productivity caused by the acceleration of work in Phase II pursuant to the acceleration agreement (Change Order No. 4) because entering into this agreement was not a breach of contract by the PTC.

36. The PTC is not liable to Iafrate for any loss-of-productivity not caused by the PTC or that resulted from Iafrate's own errors or inefficiencies.

37. The total-cost method of calculating damages recognizes the principle that damages need not be calculated with mathematical certainty, and that if a contractor has suffered financial injury, a government agency should not be exonerated merely because the contractor cannot prove his increased costs with precision. John F. Harkins Co. v. School District of Philadelphia, 460 A.2d 260 (Pa. Super. Ct. 1983).

38. In Pennsylvania, if strict evidentiary and other criteria are met, a plaintiff may recover damages based on the total-cost method of calculating those damages. A.G. Cullen Construction; In re Meyertech Corp., 831 F.2d 410 (3d Cir. 1987); Net Construction v. C & C Rehab and Construction, 256 F. Supp.2d 350 (E.D. Pa. 2003); Mergentime Corp. v. Department of Transportation, Docket No. 1563, 2000 WL 1481522 (Bd. of Claims August 30, 2000).

39. However, because it is imprecise, the total-cost method of measuring damages is not favored by the courts and it is used only when no other method is available and when the reliability of the supporting evidence is fully substantiated. A.G. Cullen Construction; Boyajian v. United States. 423 F.2d 1231 (Ct. Cl. 1970).

40. In order to recover damages on a total-cost theory, a plaintiff must show that: (1) the nature of the particular losses make it impossible or highly impracticable to determine them with a reasonable degree of accuracy; (2) the plaintiff's contract bid was realistic; (3) the claimed total project costs are reasonable; and (4) the plaintiff was not responsible for the added costs. John F. Harkins Co.; In re Meyertech Corp.

41. A claim for damages must be supported by a reasonable basis for calculation; mere guess or speculation is not enough. John F. Harkins, at 265.

42. If, when confronted with damages calculated on a total-cost method, a court finds that it cannot apportion the damages among causes for which the defendant is legally liable and those causes for which the plaintiff is not entitled to recover, the court may reject the damages claim in its entirety for want of proof. Lichter v. Mellon-Stuart Co., 305 F.2d 216 (3d Cir. 1962); Net Construction; Boyajian.

43. In regard to Iafrate's loss-of-productivity claims, the Board has recognized liability of the PTC only for damages caused solely by the inadequate specifications for the construction and paving of the temporary travel lanes (less damages incurred due to Iafrate's failure to mitigate damages). Because, on the record before the Board, the Board perceives no method by which it may allocate a portion of Iafrate's total claimed damages solely to that single breach of contract, absent guess or speculation, Iafrate cannot be afforded any relief on its loss-of-productivity claims. Boyajian; John F. Harkins.

44. The PTC is liable to Iafrate for the payment of prejudgment interest on the $70,000.00 amount that the PTC owes Iafrate pursuant to the incentive-payment provision of Change Order No. 4. Prejudgment interest is payable at the statutory rate for judgments (6% per annum) beginning on January 30, 2003, the date on which Iafrate presented its Modified Total Cost Claim to the PTC requesting damages, and running through the date of the attached Order. 41 P.S. § 202 (legal rate of interest); Section 1751 of the Commonwealth Procurement Code, 62 Pa.C.S.A. § 1751.

45. The PTC is liable to Iafrate for prejudgment interest in the amount of $14,120.40.

46. The PTC is liable to Iafrate for a total judgment, including prejudgment interest, of $84,120.40.

47. The PTC is liable for post-judgment interest on the total outstanding judgment at the statutory rate for judgments (6% per annum) beginning on the date of the attached Order and continuing until the judgment is paid in full.

OPINION

Plaintiff, Angelo Iafrate Construction Company (Iafrate), asserts a claim against the Pennsylvania Turnpike Commission (PTC) for damages in the amount of $17,792,299.00, representing loss-of-productivity costs and interest thereon, incurred during the reconstruction of a nine-mile section of the Pennsylvania Turnpike located in Westmoreland County. Iafrate performed the reconstruction work pursuant to Contract No. 98-003-RU78 (Contract), awarded by bid to Iafrate in August 1999 and executed by the parties on or about September 2, 1999. The PTC awarded the Contract to Iafrate on a bid of $49,360,930.66. The Contract provided that Iafrate was to reconstruct the road surface, road subgrade, shoulders and median area, and to rehabilitate all bridges along the length of the project. In addition, the Contract required Iafrate to remove and replace guard rails, perform any necessary soil excavation, install drainage pipes, perform emergency roadway repairs (e.g., repairing potholes), and respond to automobile accidents within the work zone.

The nine-mile reconstruction project, beginning at Turnpike Milepost 75.94 and extending eastward to Milepost 85.00, was divided into nine sections of approximately one-mile lengths: For example, Section 1 extended from Milepost 75.94 to Milepost 77.00; Section 2 extended from Milepost 77.00 to Milepost 78.00; and so forth until Section 9, which extended from Milepost 84.00 to Milepost 85.00, In order to maintain four lanes of traffic throughout the project, the reconstruction was to proceed according to the following five phases:

> Phase I: Iafrate was to overlay the westbound shoulder (Phase 1A) and the existing median (Phase 1B) from Milepost 75.94 to 85.00 so that the median and shoulder could be used as temporary traveling lanes in subsequent stages.
>
> Phase II: Iafrate was to reconstruct one lane of the original eastbound roadway and its adjacent shoulder from Milepost 75.94 to 85. Barriers were to separate this work area from the active travel lanes. Four travel lanes were to be maintained, with the westbound traffic being carried on the original westbound

> shoulder and one of the original westbound lanes, and the eastbound traffic being carried on the other original westbound lane and the newly overlaid median.
>
> Phase III: Iafrate was to reconstruct the eastbound lane adjacent to the median and reconstruct and widen the median. Westbound traffic was to be maintained on the westbound shoulder and westbound right lane, in the same manner as in Phase II, while eastbound traffic was to be shifted to the reconstructed eastbound lane and shoulder. The median work area was to be separated from the active travel lanes by concrete barrier, with openings provided in the barrier for construction traffic to enter and leave the work zone.
>
> Phase IV: Iafrate was to reconstruct the westbound roadway and adjacent shoulder. Westbound traffic was to be maintained on the reconstructed eastbound fast lane and median, while eastbound traffic was to be maintained on the other reconstructed eastbound lane and shoulder, as it had been during Phase III. The work zone was to be separated from the active travel lanes by concrete barrier.
>
> Phase V: Iafrate was to complete the median reconstruction effort by milling and reshaping the surface to its final sloped condition. The concrete glare screen median barrier was also to be placed.

(Joint Stipulation of Facts at 2; Plaintiff's Exhibit 002 at PTC0010447-PTC0010460; Iafrate's Post Hearing Brief at 2.)

The roadway reconstruction proceeded as a series of discrete operations that were intended to be performed in a sequential manner. The existing road surface was removed using a "milling" operation. The underlying concrete was broken into pieces and removed and an excavation crew then removed additional earth down to the new subgrade level of the roadway. Piping crews then installed deep stormwater drainage pipes. After the drainage pipes were installed, the roadway's subgrade was tested to determine its stability, and if it was found to be unstable, the Contract required that the unstable area be treated with a lime-pozzolan mixture or, if necessary, that the unstable material be excavated and replaced with crushed rock. In the last stages, paving crews were to lay down several layers of various paving materials and install shallow drainage pipes at the proper level The foregoing work activities were to be executed in sequence and in a linear, assembly-line fashion from one end of the nine-mile project to the

other. Ideally, each of the separate construction activities was to be instituted and completed in each section of the project so that each successive work crew could perform its tasks without delay by or interference from a preceding work crew.

The original Contract completion date was August 23, 2002, a date which by agreement of the parties was extended to August 27, 2002. Iafrate completed work on the project on or about October 9, 2002. During construction several problems arose which delayed and disrupted the planned sequence of work activities and caused Iafrate to divert men and equipment from their planned work tasks. Iafrate maintains that these disruptions to the work schedule that resulted in a loss of productivity and increased costs were caused by various acts and omissions of the PTC, that these acts and omissions constituted breaches of the Contract, and that Iafrate is therefore entitled to additional compensation in the form of loss-of-productivity damages. These problems may be summarized as follows:

1. Failure of the Temporary Roadway Design – In order to maintain four lanes of traffic throughout the project, Phase I of the Contract required Iafrate to lay down an eight-inch overlay of paving material on the westbound shoulder of the Turnpike roadway and on the median strip separating the regular four lanes of traffic, thereby allowing for temporary travel lanes while the regular lanes were being reconstructed. The westbound shoulder was opened to traffic in November 1999; the median was opened to traffic on March 31, 2000. When subjected to traffic, these temporary travel lanes began to fail almost immediately, resulting in numerous potholes and other defects requiring immediate repair. The failures were sufficiently serious that sections of the temporary travel lanes had to be repaved, and on occasion entire lanes had to be closed for repairs.

2. Volume of Emergency Roadway Repairs – The Contract required Iafrate to make roadway repairs within 24 hours of notification of a problem. These repairs included pothole repair, repair of guard rails, barriers and other structures damaged during accidents, and any other emergency repairs needed to maintain the flow of traffic. Iafrate asserts that, because of the large number of potholes and automobile accidents, this emergency work disrupted the planned flow of construction and absorbed an unpredictably large amount of labor and equipment resources.

3. Number of Automobile Accidents – The Contract required Iafrate to respond to and assist in the cleanup of any automobile accidents, to provide for traffic control, and to repair any structures damages by those accidents. Iafrate responded to 89 accidents during the project, thereby diverting equipment and personnel away from roadway reconstruction work.

4. Failure of Roadway Subgrade Areas Treated with Lime-pozzolan – Prior to awarding the Contract, the PTC determined that when feasible a lime-pozzolan mixture would be applied to the roadway subgrade in order to stabilize the subgrade. The PTC selected this method in lieu of the traditional, but more expensive, process of excavating the unstable material and replacing it with crushed rock. However, during Phase II of the project, substantial areas of the subgrade treated with lime-pozzolan failed and had to be excavated and refilled with more stable material. Less significant failures occurred during Phases III and IV of the project, also requiring Iafrate to excavate the failed areas.

5. Existence of Rock in Unexpected Locations – Based on an examination of the PTC's "soil boring logs" and site visits, Iafrate concluded that only negligible rock would be encountered during excavation of the roadway. However, during Phase III of the project Iafrate encountered rock in unexpected locations and with unexpected frequency. The process of

breaking up and removing the rock, in order to allow installation of drainage pipes, delayed construction in those areas where rock was encountered.

6. Inadequate Width of the Median Work Zone - Iafrate discovered that the median work zone that existed during Phase III construction was not as wide as was required in order to perform certain tasks. The inadequate width of the median work zone, which Iafrate contends was the result of a design defect in the PTC's project plans, required Iafrate to perform excavation work and to widen the median work zone in the west end of the project to allow it to perform necessary demolition work. In addition, at the west end of the project the inadequate width of the median work zone required Iafrate to perform some paving activities in stages and at night in order to minimize disruption of traffic caused by the closing of one travel lane. Finally, because the median work zone throughout the project was not wide enough, Iafrate claims it had to temporarily move nearly all nine miles of concrete barriers that were separating the eastbound travel lanes (the shoulder and the right eastbound lane) from the median work zone, in order to properly pave the left eastbound lane that was part of the median work zone during Phase III.

In addition to the foregoing problems, in order to overcome construction delays caused mainly by the failure of the temporary travel lanes constructed during Phase I, pursuant to an acceleration agreement embodied in Change Order No. 4, beginning in May 2000 Iafrate accelerated Phase II work by adding a second ten-hour work shift and performing construction work activities throughout the nine-mile length of the project. In addition to its loss-of-productivity claims, Iafrate maintains that the PTC breached the Contract by refusing to make a $70,000.00 incentive payment to which Iafrate is entitled because it finished the Phase II accelerated work ahead of schedule. Beginning in May or June 2001, Iafrate also accelerated certain work activities throughout Phases III, IV and V of the project. This acceleration in work,

involving the addition of work crews and equipment, disrupted the planned sequence of work by requiring several work activities to be performed simultaneously and in an order not originally contemplated.

It should be noted that the much of the direct costs for the unanticipated work performed by Iafrate because of the temporary travel lane failures, emergency roadway repairs, accident response and cleanup, failure of the lime-pozzolan subgrade, and other construction problems did not go uncompensated. Through a series of change orders approved during the project, the PTC paid Iafrate for additional work, extra work, and extra work paid for on a force-account basis. The PTC approved the following additional payments to Iafrate for the indicated work:

Change Order No. 1 – Approved March 7, 2000, for $237,969.29; milling of the roadway surface and paving material.

Change Order No. 2 – Approved May 2, 2000, for $1,150,000.00; emergency roadway repairs.

Change Order No. 3 – Approved June 27, 2000, for $2,604,083.50; emergency roadway repairs and supplies.

Change Order No. 4 – Approved July 18, 2000, for $3,006,583.00; accelerated Phase II schedule costs.

Change Order No. 5 – Approved November 7, 2000, for $2,595,542.76; roadway repairs and resurfacing.

Change Order No. 6 – Approved December 19, 2000, for $732,881.51; emergency roadway repairs.

Change Order No. 7 – Approved April 17, 2001, for $508,225.88; emergency roadway repairs, and accident response and cleanup.

Change Order No. 8 – Approved June 5, 2001, for $832,211.80; lime-pozzolan treatment.

Change Order No. 9 – Approved July 24, 2001, for $1,214,281.58; emergency roadway repairs, accident response and cleanup, and excavation.

Change Order No. 10 – Approved December 4, 2001, for $44,032.95; emergency roadway repairs, accident response and cleanup, and lime-pozzolan treatment.

By the foregoing change orders, the PTC paid an additional $12,925,812.27, bringing the total contract payable to Iafrate to $62,286,742.93. Change Order Nos. 11 through 15, not at issue here, reduced the total paid to Iafrate to $60,848,035.67. Payment for extra work involving emergency roadway repairs and accident-response work was made primarily on a force-account basis. When extra work was authorized on a force-account basis, the Contract required payment of the reasonable costs incurred for labor, material, equipment and other necessary expenditures, and included markups of 40% on labor costs, 25% on material costs, 5% on equipment costs and, when applicable, an 8% markup on the total value of the force-account work for work performed by a subcontractor.

Nonetheless, Iafrate maintains that the payments made by change orders did not account for work-productivity losses caused by the continuous and overlapping disruptions to the planned work schedule due to the volume of emergency work and by errors and omissions on the part of the PTC. Iafrate claims that the PTC breached the express covenant of good faith and fair dealing set forth in section A09.00 of the Contract's Standard Special Provisions by failing to include in the bid documents reasonably accurate estimates of the amount of emergency roadway-repair and accident-response work that could be expected during the project. Iafrate also contends the PTC otherwise committed breaches of the Contract under common-law principles, by: (1) furnishing inadequate specifications for the construction of temporary travel

lanes; (2) furnishing inadequate specifications for the application of the lime-pozzolan mixture; (3) refusing to make an incentive payment of $70,000 in accordance with Change Order No. 4; (4) failing to identify the location of rock in the geotechnical information provided as part of the bid information; and (5) failing to design an adequately wide median work zone during Phase III of the project. Iafrate argues that these actions and omissions by the PTC required Iafrate to continually reassign work crews from their scheduled construction work to other tasks such as emergency roadway repairs and accident response, thereby causing such massive disruptions of Iafrate's planned method of construction that the cumulative breaches by the PTC constituted a "cardinal change" in the agreed upon contract work.[2] Using a modified total-cost method of determining its damages, Iafrate claims $15,242,694.00 in damages, plus interest, bonding other costs.

The Board will consider in order: (1) Iafrate's claim that the PTC breached the Contract by providing inadequate specifications for construction of the temporary travel lanes; (2) Iafrate's claim that the PTC breached the Contract by failing to provide accurate estimates of the amount of work that would be required for emergency roadway repairs and accident response; (3) Iafrate's claim that the PTC breached the Contract by failing to provide adequate specification for the application of the lime-pozzolan mixture; (4) Iafrate's claim that the PTC breached the contract by failing to pay a $70,000 incentive payment that was due under the incentive provision in Change Order No. 4; (5) Iafrate's claim that the PTC breached the contract by failing to accurately specify the location and quantity of rock in the project zone; and

[2] A "cardinal change" in contract work occurs when the government agency effects a change in the planned work that is so drastic it requires the contractor to perform duties materially different than those contemplated by the original agreement. JHE, Inc. v. Southeastern Pennsylvania Transportation Authority, No. 1790 Nov. Term 2001, 2002 WL 1018941 (M.D. Pa. May 17, 2002). The doctrine is intended to provide a remedy for contractors who are directed by the agency to perform work that is not within the general scope of the contract and which exceeds the scope of the contract's changes clause. Id. The changes effectively made to the original agreement must be so drastic that the contract cannot be equitably adjusted. Allied Fire & Safety Equipment Co. v. Dick Enterprises, 972 F. Supp. 922 (E.D. Pa. 1997).

(6) Iafrate's claim that the PTC breached the contract by failing to design a median work zone that was wide enough to allow work without delay and loss of productivity.

Iafrate's Claim that the PTC Breached the Contract by Providing Inadequate Specifications for Construction of the Temporary Travel Lanes.

The project specifications set forth in section G72.00 of the Contract's Standard Special Provisions required that during Phase I of the project, Iafrate was to overlay the westbound roadway shoulder and the median strip of the Turnpike with eight inches of paving material, in order to create temporary travel lanes that could be used by traffic during reconstruction of the regular travel lanes. The westbound shoulder was repaved and opened to traffic in November 1999; the median was completed and opened to traffic on March 31, 2000. In both cases, the pavement began failing almost immediately after the road surface was exposed to traffic, requiring Iafrate to divert what it argues was an inordinately large amount of labor and equipment from planned reconstruction work to emergency roadway repair. Extensive sections of the temporary travel lanes had to be completely repaved.

Iafrate argues that the design and specifications for the temporary travel lanes were fundamentally inadequate to account for the volume of traffic traveling this section of the Turnpike. Iafrate also points out that it objected to the PTC specifications soon after the pavement on the westbound shoulder began to fail, and that the PTC declined Iafrate's suggestions for improving the temporary road surfaces, a decision that resulted in even greater pavement failures. Citing Canuso v. City of Philadelphia, 326 Pa. 302, 192 A. 133 (1937), Iafrate advances the principle, stated earlier in United States v. Spearin, 248 U.S. 132, 39 S. Ct. 59 (1918), that if a contractor builds according to plans supplied by the project owner, the contractor cannot be held responsible for problems with the work product. For these reasons, Iafrate argues that, although it was compensated for its direct costs in connection with

performing emergency roadway repairs, the PTC is still liable for the loss of work-productivity Iafrate suffered because it had to continually divert large amounts of labor and equipment from planned construction activity to emergency roadway repairs. It claims that these productivity losses on the base contract work were not compensated for through payments made on a force-account or change-order basis for the extra roadway repairs.

In opposition, the PTC first argues that, as a matter of law, Iafrate must present expert testimony that the PTC's specifications for constructing the temporary travel lane were defective or inferior to the industry standard in order to establish liability for the temporary lane paving failures.[3] The PTC asserts that because Iafrate presented no expert evidence on this issue, it cannot carry its burden of showing that the PTC's specifications for the temporary travel lanes were defective. The PTC points out that the principle stated in Spearin--i.e., if a contractor builds according to an owner's specifications the contractor cannot be held responsible for the consequences of defects in those specifications--is not binding on Pennsylvania courts. The PTC also points out that it has used the same specifications for many Turnpike projects without extensive failure, and suggests that the areas of pavement failure occurred because Lane Construction, an Iafrate subcontractor, used an inferior asphalt mix during initial work on the project.

First, the Board does not accept the PTC's argument that it may not find the PTC liable for the extensive failure of the temporary travel lane paving unless Iafrate presents expert testimony that the specifications were defective or inferior to industry standards. The essence of Iafrate's claim is not that the specifications for constructing the temporary travel lanes were

[3] The PTC cites, in order: Electron Energy Corp. v. Short, 597 A.2d 175 (Pa. Super. Ct. 1991); Kosmack v. Jones, 807 A.2d 927 (Pa. Cmwlth. 2002); Bloomsburg Mills v. Sordoni Construction Co., 401 Pa. 358, 164 A.2d 201 (1960).

negligently designed or failed to meet industry standards, but that the PTC, by requiring Iafrate to use the specifications, was warranting that the specifications would be suitable for the job.[4] Iafrate should not be penalized because of pavement failures occurring in areas constructed if it correctly implemented the PTC's specifications. Contrary to the PTC's argument, Pennsylvania courts have recognized the general principles stated in Spearin; i.e., when a project owner provides the specifications by which a contractor is to build, the owner warrants the adequacy of those specifications and the contractor cannot then be held liable for adverse consequences resulting from the faithful implementation of the specifications. Canuso v. City of Philadelphia, 326 Pa. 302, 192 A. 133 (1937); A.G. Cullen Construction v. State System of Higher Education, Nos. 666, 776 C.D. 2005, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006); Department of Transportation v. W.P. Dickerson & Son, 400 A.2d 930 (Pa. Cmwlth. 1979); Allentown Supply Corp. v. Stryer, 195 A.2d 274 (Pa. Super. Ct. 1974).

Second, the Board is persuaded by an overwhelming preponderance of evidence that, on this project, the PTC's specifications for an eight-inch overlay for the temporary travel lanes

[4] The cases cited by the PTC in support of its argument present different facts and different issues. In Electron Energy Corp. v. Short, 597 A.2d 175 (Pa. Super. Ct. 1991), the project owner sued the contractor for the cost of replacing certain equipment on a plant heating system. Although the contractor coordinated the construction of the heating system, apparently the contractor did not design the system or warrant that the equipment and design specifications were adequate, and the owner produced no evidence that the system's malfunction was caused by negligent design specifications. Kosmack v. Jones, 807 A.2d 927 (Pa. Cmwlth. 2002), involved a negligence action against the Department of Transportation arising from fatalities caused by an automobile accident. During the trial, plaintiffs offered expert testimony on highway design and how the accident might have been prevented. The Commonwealth Court concluded that, as a matter of law, the expert's testimony was insufficient to show that the Department of Transportation had any common-law duty to design the highway differently. In Bloomsburg Mills v. Sordoni Construction Co., 401 Pa. 358, 164 A.2d 201(1960), the project owner brought a breach-of-contract action against an architectural partnership which designed and prepared specifications for the construction of a weaving mill. The mill's roof was defective. The Supreme Court merely recognized that the architectural firm had a duty to provide a design and specifications of professional quality, that plaintiffs presented evidence that defendants' design and specifications did not meet professional standards, and that the issue of whether the firm's design was substandard was a question for the jury. Although these cases might be persuasive in a PTC action against a contractor or design professional for negligent design of the eight-inch temporary paving design used on this project, they are not persuasive in this case, where the PTC required Iafrate to use the PTC's own specifications when constructing the temporary travel lanes. Moreover, unlike the cases cited by the PTC where lay juries had to evaluate competing claims, the Board has had extensive experience with roadway construction cases and has the assistance of an engineer who sits on the Board.

were inadequate for the intended purpose. The failure of the temporary roadway surface on the westbound shoulder, opened to traffic in November 1999, and the temporary median travel lane, opened in March 2000, was immediate and extensive. Earlier in March 2000, through its project manager Matt Milliet, Iafrate raised specific concerns about the PTC specifications for the temporary roadway surfaces and suggested that the median area that was to form the second temporary travel lane be re-milled and overlaid for its entire width with an additional layer of asphalt binder. Mr. Milliet suggested that reconstructing the median area in this manner would provide a more durable roadway surface and avoid raveling at the joints and other problems experienced with the pavement on the westbound shoulder. Although the PTC initially concluded that the specifications for the temporary roadway surfaces were adequate, emergency repairs to the median roadway pavement were voluminous and, much as Mr. Milliet had initially suggested, substantial sections of the temporary travel lane in the median area had to be re-milled and overlaid with additional paving materials. This reconstruction evidently produced a more stable temporary roadway surface. Moreover, a clear preponderance of the evidence showed that Iafrate properly applied the paving material. Tests conducted by PTC engineers showed that the temporary paving had been laid down to a proper depth and the tests revealed no other inconsistencies. Indeed, at trial, Michael Flack, the PTC's assistant chief engineer for construction, testified that in his opinion the pavement failures were not the fault of Iafrate.

The PTC's defenses on this issue were limited and unpersuasive. PTC's complaints regarding the quality of the asphalt mixture, voiced on March 30, 2000, resulted in only a brief shutdown of asphalt mixing on that day until the PTC onsite inspector was satisfied that any problem had been rectified. The Board does not find this isolated incident to be a persuasive explanation of the extensive temporary paving failures. In addition, the Board wonders why, if

the asphalt mix was deficient or the condition of the roadway's subgrade was unsuitable for paving, the PTC inspectors who were at the asphalt plant and the jobsite on a daily basis did not record these problems or temporarily halt paving work.

Based on the evidence as a whole, the Board concludes that Iafrate faithfully implemented the temporary paving specifications and that these specifications for the construction of temporary travel lanes were inadequate for their intended purpose. Accordingly, we find that the PTC breached its warranty that the specifications it provided for construction of the temporary travel lane were sufficient for their intended purpose.

Were we to find that the inadequacy of the temporary paving design was the only significant factor in creating the productivity losses suffered by Iafrate with respect to the extensive roadway repair experienced on this project, our analysis of this issue might end here. However, we do not find this to be the case. In fact, the Board views a second factor to be of equal, if not greater significance, in causing the productivity losses asserted here by Iafrate. Specifically, we find that Iafrate's decision to perform the extra pothole and other roadway repairs in-house and with existing base contract construction crews, despite the opportunity and encouragement from the PTC to utilize available subcontractors for this work, constitutes an intervening causal element and a failure to take reasonable steps to mitigate any loss-of-productivity damages arising from the inadequacy of the temporary paving specifications.[5] In regard to this issue, the Board notes that Iafrate was notified in the late Spring or early Summer of 2000 that the PTC wished to have Norwin Construction, a paving contractor which already

[5] It is a familiar rule of law that a party who claims a loss due to a breach of contract has a duty to make reasonable efforts to mitigate the loss. Gloviak v. Tucci Construction Co., 608 A.2d 557 (Pa. Super. Ct. 1992); State Public School Building Authority v. W. M. Anderson Co., 410 A.2d 1329 (Pa. Cmwlth. 1980); Glenn Distributors Corp. v. Carlisle Plastics, 257 F.3d 294 (3d Cir. 2002). By this principle, the amount recoverable by the damaged party must be reduced by the amount of losses that could have been avoided by reasonable effort. W. M. Anderson Co.; Glenn Distributors. The burden of showing that the other party could have mitigated its losses is on the breaching party. Pontiere v. James Dinert, Inc., 627 A.2d 1204 (Pa. Super. Ct. 1993); W. M. Anderson Co.; Glenn Distributors.

performed roadway repair work for the PTC on an independent basis, perform emergency roadway repairs on the Iafrate project. However, Larry Kenetski, Iafrate's project manager at the time, objected strongly to this idea both in person and in a letter to James Lockhart dated June 27, 2000. After a meeting between Alexander Jansen, PTC's chief engineer for construction, and Angelo and Dominic Iafrate, the PTC relented and allowed Iafrate to continue to perform emergency roadway repairs as it wished. Although Iafrate suggests that its primary concern was its liability for Norwin's work, the Board is not persuaded that this concern was an insuperable obstacle to Iafrate ridding itself of this repair work, if it had so desired, since Iafrate had used Norwin as a subcontractor in a limited role and had demonstrated its willingness to utilize other subcontractors on many other aspects of this project. In point of fact, the Board finds that the real reason Iafrate wanted to perform the roadway repair work itself was that it felt this work to be highly profitable, as testified to before the Board by Mr. Kenetski. Accordingly, the Board is left with the difficult task of attempting to ascertain the appropriate allocation of damages attributable only to the PTC breach, (i.e., the inadequate temporary paving design) less the damages that could have been avoided had not Iafrate insisted on performing the temporary travel lane repairs in-house to the extent it did. We will address this issue following conclusion of the liability analysis of Iafrate's remaining complaints.

Iafrate's Claim that the PTC Breached the Contract by Failing to Provide Accurate Estimates of the Amount of Work that Would be Required for Emergency Roadway Repairs and Accident Response.

Section G02.00 of the Contract's Standard Special Provisions, relating to roadway repairs, provides that Iafrate was to be responsible for all roadway repairs within the nine-mile work zone, including cleanup and repairs necessitated by automobile accidents. Section G02.00 also provides that Iafrate had to make repairs within 24 hours of notification of the problem.

Section A11.00 of the Standard Special Provisions, relating to contingent work, states that a predetermined amount of $100,000.00 was authorized to pay for extra work at a negotiated price or on a force-account basis.

Citing Fairbanks North Star Borough v. Kandik Construction, 795 P.2d 793 (Alaska 1990), opinion vacated in part on reh'g, 823 P.2d 632 (1991), as nonbinding precedent, Iafrate asserts that the PTC's liability for the Contract specifications applies not only to provisions stating the scope of work and how it is to be done, but also to the estimated quantity of that work. Iafrate argues that the $100,000.00 predetermined amount inserted in the invitation for bids for extra work set forth in section A11.00 (including emergency roadway repairs and accident response), while not warranting that no greater amount of extra work would be required, was so wildly understated that it constituted a misrepresentation of a term of the Contract. Iafrate asserts that no bidder on the project could have reasonably anticipated the amount of emergency roadway repair and accident-response work that would be necessary.[6] It argues that, given the age of the Turnpike roadway and the PTC's extensive experience with pothole repairs and accidents, the PTC had an obligation to gather repair and accident data in order to provide bidders with more accurate estimates of the volume of emergency-repair and accident-response work that would be required during the project. Iafrate claims that the failure of the PTC to provide more accurate estimates of anticipated roadway repairs and the number of automobile accidents affected Iafrate's bid and thereafter resulted in work-productivity losses that were not compensated for by payments made under the change order and/or force-account provisions of the Contract. This failure, Iafrate concludes, also violates section A09.00 of the Contract's

[6] The PTC paid Iafrate an additional $4,809,467 for roadway repairs and $308,462.30 for accident response and cleanup pursuant to change orders as per the Contract.

Standard Special Provisions, which specifically provides that contractors and the PTC have an obligation of good faith and fair dealing in their performance and execution of the Contract.

The Board is not persuaded that the PTC's decision not to provide estimates of emergency roadway-repair and accident-response work constitutes a breach of the Contract's requirement for good faith and fair dealing, nor does the Board find the PTC's decision to insert into the specifications a predetermined amount of $100,000.00 for extra work to be a misrepresentation of said work. It is generally true that if an owner supplies specifications according to which a contractor is to build or otherwise perform, the owner warrants that the contractor will be able to render a satisfactory performance if it performs in accordance with those specifications. See Hercules, Inc. v. United States, 516 U.S. 417, 116 S. Ct. 981 (1996); A.G. Cullen Construction v. State System of Higher Education, Nos. 666, 776 C.D. 2005, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006) (affirming in part and reversing in part the Board's decision at Docket No. 3468, and applying a modified version of the Spearin doctrine); IA Construction Corp. v. Department of Transportation, 591 A.2d 1146 (Pa. Cmwlth. 1991) (noting that contractor who reasonably relies on agency's material misrepresentation, in this case drawings that failed to show location of underground utilities, may recover damages caused by the misrepresentation).

However, the decisions cited above simply do not fit the facts of the case here. Although the PTC inserted a predetermined amount of $100,000.00 into the Contract to cover mainly emergency roadway-repair and accident-response work, the inclusion of that figure cannot be characterized as an actionable misrepresentation. Section A11.00 of the Contract's Standard Special Provisions states that the $100,000.00 figure "is not to be construed as implying that any work, or work in this amount, or of no more than this amount, can be anticipated."

Furthermore, the Board does not agree that the Contract's covenant of good faith and fair dealing in section A09.00 of the Standard Special Provisions, or the general principle of good faith and fair dealing imposed by Pennsylvania case law on all parties to a contract,[7] required the PTC to predict and represent to bidding contractors the future volume of emergency roadway repairs and accident-response work. Although Iafrate has asserted that the PTC had sufficient history and data to make reliable predictions, it produced no evidence to establish these assertions. Instead, the evidence produced established the opposite. Alexander Jansen, the PTC's Deputy Executive Director for Engineering and Maintenance at the time of this project, testified that the PTC had no way of estimating the volume of emergency roadway repairs and accidents during the project because the construction required that traffic be placed into temporary travel lanes and in lane configurations through a section of the Turnpike that had never before handled such traffic alterations. He also testified that the PTC had no comparable experiences upon which to base any estimates of the amounts of roadway repairs and accidents. Because the volume of emergency repairs and accident-response work could not be reliably predicted, the PTC included a predetermined amount of $100,000.00 in order to prevent widely varied estimates and ensure more comparable bids among contractors. Just as importantly, in addition to the disclaimer noted above, the bid specifications made it clear that the work would be paid for on a force-account basis precisely because the quantity could not be estimated.

[7] Even in the absence of such an explicit provision, Pennsylvania courts have accepted the principle that, "Every contract imposes upon each party a duty of good faith and fair dealing in its performance and its enforcement." Bethlehem Steel Corp. v. Litton Industries, 507 Pa. 88, 125, 488 A.2d 581, 600 (1985) (quoting Restatement (Second) of Contracts § 205 (1981)); Stamerro v. Stamerro, 889 A.2d 1251, 1259 (Pa. Super. Ct. 2005) (same); Middletown Carpentry v. C. Arena & Co., No. 2698 Control 091526, 2001 WL 1807379, at *5 (C.P. of Pa. Nov. 27, 2001) (same). The duty to act in good faith has been described as the duty to act honestly in fact in the conduct or transaction concerned. Stamerro, 889 A.2d at 1259. Bad faith conduct in violation of this duty has been said to include "evasion of the spirit of the bargain, lack of diligence and slacking off, willful rendering of imperfect performance, abuse of power to specify terms, and interference with or failure to cooperate in the other party's performance." Temple University Hospital v. Group Health, No. Civ.A. 05-102, 2006 WL 146426, at *5 (E.D. Pa. January 12, 2006) (quoting Restatement (Second) of Contracts § 205 cmt. D (1981)).

Finally, the Board recognizes, and would expect that a contractor with the experience and expertise of Iafrate would recognize, that inclusion in the bid specifications of a predetermined amount for extra work, and the fact that this work was to be paid for on a force-account basis, indicated that the PTC was clearly not making a representation of the anticipated amount of work, but was instead specifically avoiding such a prediction.[8] In sum, the evidence does not support a conclusion that the PTC acted in bad faith by the manner in which it chose to address these issues. Consequently, the PTC cannot be held liable for any alleged loss of productivity caused by the PTC's decision to include in the Contract a predetermined amount of $100,000.00 for emergency roadway repairs and accident-response work and to pay for same by force-account.

Iafrate's Claim that the PTC Breached the Contract by Failing to Provide Adequate Specifications for the Application of the Lime-Pozzolan Mixture.

Because of the age of the Turnpike roadway, there was concern that much of the subgrade support for the roadway surface could be unstable. The traditional method of repairing an unstable subgrade is to excavate the unstable material and replace it with crushed stone. This method of stabilization is evidently reliable, but expensive, as it requires deeper excavation and imported fill materials. Prior to awarding the Contract, the PTC determined that, when feasible, it would instead use a lime-pozzolan mixture to stabilize portions of the roadway subgrade before commencing paving work. The PTC's decision was partially based on recommendations made by Earth, Inc., a PTC consultant, that lime-pozzolan was significantly less expensive than the traditional method of excavating the unsuitable subgrade, and that up to 75% of the project's unstable subgrade could be stabilized with lime-pozzolan. The PTC included specifications for

[8] The Board also notes once again that the Contract did not mandate that Iafrate self-perform that work. Iafrate acknowledged that it could have hired subcontractors to perform or assist in the work, but that it did not do so because this type of work was highly profitable.

the use of lime-pozzolan in section G86.00 of the Contract's Standard Special Provisions, which prescribed the lime-pozzolan mixture and provided that it was to be applied to a certain thickness, watered and then allowed to harden for three days before being subjected to vehicular traffic or other construction activities.

Between July 6 and 31, 2000, during Phase II of the project, Terra Firma Technologies, a subcontractor engaged by Iafrate, treated areas of roadway subgrade with lime-pozzolan from Milepost 75.94 to Milepost 81 of the project, beginning in Section 5 (Mileposts 80 to 81) and working backwards to Section 1 (Mileposts 75.94 to 77). In Section 1 of the project, 75% of the treated areas failed to achieve sufficient stability, requiring Iafrate to go back, over-excavate the failed areas and fill them with rock. Areas treated with lime-pozzolan in Sections 2 through 5 of the project experienced a much lower failure rate. Overall, the failure rate for areas treated with lime-pozzolan during Phase II of the project was about 20%, but if Section 1 is excluded the failure rate for the remaining sections ranges from 2.5% to 5.0%. These failures, particularly in Section 1, led the PTC to suspend the use of lime-pozzolan for the remaining sections of Phase II work. Based in part on recommendations made by GeoMechanics, another PTC consultant, in the spring of 2001 and in a report issued in July 2001, the PTC modified the lime-pozzolan specifications to include a cement additive and a different application process. During Phases III and IV of the project, subgrade areas treated according to these new specifications experienced only minimal failure.

The PTC argues, as it did regarding the specifications for the temporary travel lanes, that Iafrate cannot prevail on this claim because it failed to present expert testimony showing how the specifications for lime-pozzolan application were defective. For the reasons stated in the discussion of the specifications for the temporary travel lanes, the Board does not agree that

Iafrate had the obligation to present expert testimony showing how the lime-pozzolan specifications were defective. Instead, the issue is whether Iafrate can be held accountable for the adverse consequences of certain work if it performed that work according to specifications supplied by the PTC. The cases previously cited on this question make it clear that when an owner provides the specifications by which a contractor is to build the owner warrants the adequacy of those specifications and the contractor cannot then be held liable for any adverse consequences resulting from work done in accord with the specifications. See, e.g., Canuso v. City of Philadelphia, 326 Pa. 302, 192 A. 133 (1937).

However, in this instance, the PTC has presented substantial and credible evidence that the lime-pozzolan treatment was not consistently implemented in conformance with prescribed specifications. First, the PTC presented evidence that, during Phase II construction, trucks and other construction equipment tracked over lime-pozzolan treated areas before expiration of the three-day hardening period provided for in the specifications, thereby compromising the stability of the treated areas. Dave Cannon, head of Terra Firma Technologies, the subcontractor which applied the lime-pozzolan treatment, testified that trucks and other equipment were repeatedly driven over areas that had received lime-pozzolan treatment before completion of the three-day hardening period stated in the specifications. In a letter dated July 13, 2000, Mr. Cannon notified Iafrate that workers and equipment of various contractors had been tracking over lime-pozzolan treated subgrade before completion of the three-day hardening period. Anthony Leotta, one of Iafrate's project engineers, acknowledged that driving equipment over lime-pozzolan treated areas prematurely had occurred, and that he had discussions with project officials on how to prevent this unwanted practice.

In addition to evidence of the foregoing problem, the PTC presented credible evidence that, in several of the failed areas treated with lime-pozzolan, drains and drainage pipes below the roadway were not placed at the proper depth or with even gradient slope to properly drain these areas as required by the specifications. Mr. Cannon testified that he personally observed his equipment hitting subsurface drains, indicating that the drains had not been placed at the proper depth. Mr. Sydlik also testified that subsurface drains were not placed at their proper depth or with even gradient slope to properly drain Section 1 and other areas in which the lime-pozzolan failed. Ken Heirendt, a geotechnical engineer manager for the PTC, confirmed Mr. Sydlik's testimony regarding undulations in the drainage pipes in Section 1.

The Board finds the foregoing evidence substantial and credible. This evidence casts significant doubt on Iafrate's argument that it applied the lime-pozzolan treatment in accordance with the Contract's specifications and that any failure must have then been due to the inadequacy of the specifications.[9] In light of this considerable amount of evidence that suggests other factors such as premature vehicular traffic and inadequate drainage installation caused or contributed to the failure of lime-pozzolan treated subgrade areas, the Board concludes that Iafrate failed to sustain its burden of showing that it implemented the PTC's specifications for lime-pozzolan application correctly or that these specifications were insufficient for the intended purpose of this project.[10] Accordingly, the PTC is not liable for any loss-of-productivity costs that may have resulted from the failure of subgrade areas treated with the lime-pozzolan mixture.

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[9] The PTC also presented evidence that a great amount of rainfall, up to five inches in one day, occurred immediately after lime-pozzolan treatment during Phase II, Section 1 of the project (Mileposts 75.94 to 77) and may have contributed to the extraordinary 75% failure rate that occurred in Section 1.

[10] Iafrate emphasizes that the PTC itself changed the lime-pozzolan specification part way through the project and that the PTC's own consultant, GeoMechanics, Inc., tested the PTC's lime-pozzolan mixture and concluded in recommendations issued in the spring of 2001 and in a report issued in July 2001 that the initial lime-pozzolan mixture was ineffective in stabilizing the subgrade. However, if Section 1 lime-pozzolan treatment is excluded, the failure rate for the remaining sections of Phase II work was only 2.5% to 5%. Consequently, the Board does not

Iafrate's Claim that the PTC Breached the Contract by Failing to Pay a $70,000 Incentive Payment that was Due Under the Incentive Provision in Change Order No. 4.

As originally contemplated, Phase II construction was to be completed by November 2000. In April 2000, the PTC and Iafrate began negotiating an agreement to accelerate the Phase II work schedule in order to overcome delays caused by the need to make extensive repairs to the temporary travel lanes and in order to finish repairing the westbound travel lanes before the onset of winter. The parties' agreement was recorded in Change Order No. 4, which provided that Iafrate was to accelerate work beginning May 8, 2000, and was to complete Phase II work on or before September 15, 2000. The order provided for an additional payment of $3,006,583.00. Pertinent to the issue of whether Iafrate earned a $70,000.00 incentive payment, the order also contained a time-extension provision and an incentive-payment provision. The time-extension provision related to the quantity of excavation that would have to be performed during acceleration and stated:

> The September 15, 2000 completion date will be extended only for the following reasons:
>
> 1) The quantity established in the contract drawing for Class 1A Undercut in Stage [Phase] 2 is 4,517 cubic meters. Should this quantity overrun by greater than 25%, then a one day time extension will be granted for each 1,200 cubic meters of excavation over and above the 25% increase.

The incentive payment penalty provision provided:

> For each calendar day or any part thereof that AICC has switched traffic to it's [sic] Stage 3 configuration prior to 12:01 AM on September 15, 2000, AICC will be paid an incentive of $35,000.00 per day, up to a maximum of 15 calendar days. Likewise, for each calendar day or any portion thereof that AICC fails to switch traffic to it's stage 3 configuration after the aforementioned time and date, AICC will be penalized $35,000.00 per day up to a maximum of 30 calendar days. Beyond 30 calendar days, AICC will be accessed [sic] normal contract liquidated damages until the traffic has been switched.

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find the decision to change the specification or the GeoMechanics report to be dispositive on this issue in light of the other problems identified in the application process.

(PTC's Exhibit 109 (Iafrate letter dated June 27, 2000).)

Iafrate ultimately excavated a total of 43,765.97 cubic meters of material, which by the time-extension formula entitled Iafrate to a 32-day extension, or October 17, 2000. Iafrate completed work and switched traffic to its Phase III travel lanes on October 15, 2000, two days before the extended completion date. Iafrate argues that these facts entitle it to a $70,000.00 incentive payment, $35,000.00 for each of the two days that work was completed before the adjusted completion date of October 17, 2000. The PTC's position is essentially that the time-extension provision is independent of the incentive-payment provision; that in regard to an incentive payment, September 15, 2000 was an absolute time limit; and therefore Iafrate is not entitled to an incentive payment calculated in reference to the adjusted completion date of October 17, 2000.

This issue is one of contract interpretation. A contract's interpretation is a question of law that requires a court to ascertain and give effect to the parties' intentions as those intentions existed when the contract was formed. Department of Transportation v. Pennsylvania Industries for the Blind and Handicapped, 886 A.2d 706 (Pa. Cmwlth. 2005). When a written contract's language is clear and unequivocal, the contract's meaning must be determined by its plain language; however, when the provisions of a contract are not clear, a court must interpret the contract by determining the intent of the parties and giving reasonable effect to all of the contract's provisions. Aloe Coal Co. v. Department of Transportation, 643 A.2d 757 (Pa. Cmwlth. 1994). A contractual provision is ambiguous if it is reasonably susceptible of different constructions, is obscure in meaning through indefiniteness of expression or if it has a double meaning. Department of Transportation v. IA Construction Corp., 588 A.2d 1327 (Pa. Cmwlth. 1991). If a contractual provision is ambiguous, a court may examine extrinsic

evidence including the subject matter of the provision, the circumstances surrounding the contract's execution, and the subsequent acts of the parties. Id. When a contractual provision is found to be ambiguous, a court may construe the provision against the drafter of the document. J.W.S. Delavau, Inc. v. Eastern America Transport and Warehousing, 810 A.2d 672 (Pa. Super. Ct. 2002).

Here, the ambiguity that exists is whether or not the time-extension provision and the incentive-payment/penalty provision are to be read in conjunction, such that a change in the completion date by the time-extension provision will result in a corresponding change in the completion date in the incentive-payment/penalty provision. The purpose of Change Order No. 4 was to overcome previous construction delays and to ensure that certain work was completed so that four suitable travel lanes remained open throughout the winter of 2000-2001; thus, time was of the essence. However, by including a time-extension provision specifically tied to the quantity of excavation, the parties recognized that the required work might render compliance with the original deadline difficult or impossible. In fact, the estimate of the excavation required was grossly understated, resulting in a 32-day extension of time and a new completion date of October 17, 2000. In these circumstances, and although the original completion date was not met, as work progressed it remained in the parties' interest to complete the work as soon as possible, and the incentive-payment/penalty provision provided the same reason to do so regardless of whether the completion date was September 15 or October 17, 2000. Furthermore, by not demanding a $35,000.00 per-day penalty from Iafrate for each day after September 15 that the work was not completed, the PTC quite sensibly recognized that the completion date stated in the incentive-payment/penalty provision was subject to extension based on the unanticipated quantity of excavation.

For all the foregoing reasons, the Board concludes that the proper interpretation of Change Order No. 4 is that the September 15, 2000, completion date listed in the incentive-payment/penalty provision was subject to change based upon an extension of time as calculated in the time-extension provision. Accordingly, the PTC is liable to Iafrate for payment of the $70,000.00 incentive payment.

Iafrate's Claim that the PTC Breached the Contract by Failing to Accurately Specify the Location and Quantity of Rock in the Project Zone.

As preparation for the project, Earth Inc., a PTC consultant, extracted 25 soil boring samples throughout the project site in order to determine the type of material that existed at different locations below ground level. The findings are recorded in boring logs (drawings) that the PTC included in the information available to bidders on the Contract. In section 2.4 of the project's Erosion and Sediment Pollution Control Plan, the PTC noted that most of the subsurface materials in the project zone consisted of pavement, subsurface fill, pavement base materials and soil, and that only in a two-mile area in the east end of the project was the roadway's asphalt surface overlaying rock, sand, and clay materials. Based on his review of the boring logs and visits to the project site, Robert Shunk, Iafrate's chief bid estimator, concluded that it was unlikely that Iafrate would encounter much rock at the levels of excavation necessary for this project, and therefore he did not include in the bid a cost estimate for the removal of rock. However, Iafrate encountered rock at shallow depths in locations not indicated by the PTC's geotechnical information, which could only be removed with special equipment and by a more time-consuming type of excavation.

Iafrate claims that the PTC breached its contractual duty to accurately specify the location of rock within the project area, and that the PTC's failure to do so resulted in construction delays and loss of productivity caused by the need to break up and remove

unanticipated rock in order to allow installation of subsurface drains and pipes. Iafrate argues that the PTC warranted the accuracy of the information contained in the boring logs and report, and that Iafrate justly relied on that information. Iafrate notes that it would be unreasonable to expect every contractor who bid on this project to conduct his own tests, and that the PTC might not even allow such testing.[11] Iafrate also asserts that section 110.02(b) in the Department of Transportation's Specifications, Publication 408/1996 incorporated as part of the Contract, specifically provides that the PTC shall pay for additional costs for work incurred because of unexpected subsurface conditions:

> **(b) Differing Site Conditions.** During the progress of work, if subsurface or latent physical conditions are encountered at the site, differing materially from those indicated or 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 they are disturbed and before the affected work is performed. Upon written notification, the Engineer 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 as specified in Section 110.02(a).

(PTC's Exhibit 177 at 66.) Iafrate concludes that it is entitled to damages for the loss of productivity caused by the need to excavate the unanticipated rock, on the basis that the presence of the rock constituted a "differing site condition" than that which was represented by the PTC.

Pennsylvania courts and the Board have recognized that a contractor may recover additional compensation for work performed as a result of site conditions that differ from those

[11] As Mr. Shunk noted in his testimony, bidders on such roadway construction projects are "not allowed to go onto the turnpike with a backhoe and start digging up their shoulders." (N.T. vol. 1 at 181.) See, e.g., Department of Transportation v. P. DiMarco and Co., 711 A.2d 1088, 1091 (Pa. Cmwlth. 1998) ("[T]he determining factor remains whether it was reasonable to expect DiMarco to dig beneath the surface of the road in order to test for subsurface 'soft spots' before its bid to DOT.").

stated in the contract specifications, if: (1) the contractor can show that the agency made a positive representation of site conditions in the contract's specifications; (2) the representation goes to a material specification in the contract; (3) the contractor, because of either time or cost restraints, had no reasonable means of investigating the agency's representation; (4) the representation proves to be false or misleading, either because of an actual misrepresentation on the part of the agency or by what amounts to a misrepresentation through gross mistake or arbitrary action on the part of the agency; and (5) the contractor suffers financial harm because of his reliance on the misrepresentation. Acchione and Canuso, Inc. v. Department of Transportation, 501 Pa. 337, 461 A.2d 765 (1983). See also Thomas M. Durkin & Sons, Inc. v. Department of Transportation, 742 A.2d 233 (Pa. Cmwlth. 1999); Jay Fulkroad & Sons, Inc. v. Department of Transportation, Docket No. 1659, 1998 WL 901881 (Bd. of Claims November 10, 1998).

Although differing site conditions are a basis for recovery if a plaintiff can prove the required factual elements, in this case the Board is persuaded that there is not a contractual or factual basis for Iafrate's requested relief. First, the Contract specifications certainly contemplate that some amount of rock will be encountered during roadway excavation, and so provide that excavation of rock is to be part of the general Class 1 excavation. Section 203.1(a) of the Department of Transportation's Specifications 1996 (Publication 408M/96), incorporated as part of the Contract, provides that Class 1 excavation includes, among other activities, excavation of "unforeseen . . . rock ledges." (PTC's Exhibit 177 at 90.) As modified by Section 203.3(b) of the PTC's Modifications of Section 203, relating to construction and the removal of rock and hard shale, Section 203.3(b) of the Contract provides that the contractor shall "[r]emove all overhanging and protruding rock below the first bench as indicated and

directed. Method of rock excavation is subject to the approval of the Engineer. Blasting is not permitted." (PTC's Exhibit 2 at PTC0010042.). In section G93.00 of the PTC's Standard Special Provisions of the Contract, relating to the excavation of sandstone and limestone, rock that may later be used in embankments and for backfill, provides that the removal of "project rock" is "incidental to Class 1 Excavation." (PTC's Exhibit 2 at PTC0010501-PTC0010502.) The foregoing provisions indicate that excavation of some reasonable amount of rock is to be expected and will be treated as within the scope of Class 1 excavation.

Second, although by including the information contained in the soil boring logs in the bid packages, the PTC surely made some representation regarding the existence of subsurface rock in the project zone, that information cannot fairly be characterized as a guarantee that no rock would be encountered. In fact, it would be unreasonable, given the size of the project and the spacing of the test borings, to read this geological report as a representation that no rock at all would be encountered. Thus, the real issue is whether the rock encountered outside of the areas indicated in the boring logs was of a sufficient quantity to constitute an actionable misrepresentation of a material term of the Contract.

The Board concludes that, given the magnitude of this project (the reconstruction of nine miles of roadway over a three-year period), the amount of unanticipated rock encountered by Iafrate workers was relatively minimal and does not render the information provided in the soil boring logs an actionable misrepresentation. According to its daily work reports, Iafrate encountered unanticipated rock on 9 days in 14 or 15 locations. It is not clear from the record that all of the rock encountered was found outside those locations indicated in the soil boring logs and the PTC's Erosion and Sediment Pollution Control Plan. The daily work reports do not consistently record the number of man-hours or extra equipment necessary to remove this rock.

Given the volume of roadway excavation performed, the Board finds this incidental amount of rock to be within what one might expect on a project of this size and certainly not outside the scope of what appears to have been contemplated by the Contract's provisions on Class 1 excavation and the removal of rock.[12] Consequently, Iafrate has not established that the rock it encountered constituted a "differing site condition" as described in section 110.02(b) in the Department of Transportation's Specifications, 408/1996 and Iafrate is not entitled to any relief based on this claim.

Iafrate's Claim that the PTC Breached the Contract by Failing to Design a Median Work Zone for Phase III Construction that was Wide Enough to Allow Work without Delay and Loss of Productivity.

Finally, Iafrate claims that the PTC breached the Contract by designing a median work zone that was too narrow to allow Iafrate to pursue its work without unnecessary delay and loss

[12] In contrast, in many of the cases granting relief because of differing or latent site conditions, the courts have noted either an extraordinary misstatement of the quantity of work required or the existence of radically different conditions than were represented by the agency. In Acchione and Canuso, Inc. v. Department of Transportation, 501 Pa. 337, 461 A.2d 765 (1983), the contractor calculated the amount of trenches that would have to be dug on a project based in part on statements by Department of Transportation engineers that 50% of the existing in-ground conduit could be reused and thus would not require replacement. As it turned out, the Department's estimate was wildly inaccurate and the number of feet of trenches that had to be dug increased by as much as 336%, thereby substantially increasing the contractor's per-foot cost of performance. In A.G. Cullen Construction v. State System of Higher Education, Nos. 666, 776 C.D. 2005, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006), the agency mistakenly omitted from the contract specifications the fact that windows that were to be removed from a building were painted with lead-based paint. The contractor had to implement a lead-based paint abatement procedure that resulted in a 31-day delay. The existence of the lead-based paint was found to be a differing site condition, entitling the contractor to delay damages. In Thomas M. Durkin & Sons, Inc. v. Department of Transportation, 742 A.2d 233 (Pa. Cmwlth. 1999), on a project involving the construction of a retaining wall, the Department's contract specifications precisely pinpointed areas of the wall's site that were comprised of rock or of soil. Based on the specifications, construction of the wall was not to require any rock removal. However, rock was found in critical areas of the wall site not indicated in the specifications, and the contractor had to remove a substantial amount of rock, work that was outside the scope of the contract. In IA Construction Corp. v. Department of Transportation, 591 A.2d 1146 (Pa. Cmwlth. 1991), the Department's drawings of a work site failed to reveal extensive subsurface utility lines and drainage structures, which obstructed construction, increased the cost of performance, and entitled the contractor to damages based on the misrepresentation. In Jay Fulkroad & Sons, Inc. v. Department of Transportation, Docket No. 1659, 1998 WL 901881 (Bd. of Claims November 10, 1998), a contractor hired to construct and rehabilitate sections of a highway discovered that a nearby landfill encroached into the work area. The contractor had relied on Department drawings and statements indicating that no part of the landfill was within the project zone. In order to complete the project, the contractor was required to temporarily relocate some of the landfill, hire an environmental consultant, and comply with environmental regulations regarding disposal of the unearthed material, all work clearly outside the scope of the contract. The Board does not find the relatively small amount of rock encountered by Iafrate to be analogous in magnitude to the differing site conditions found in the foregoing cases.

of productivity. This problem arose during Phase III of the project. During Phase III work, originally scheduled to commence in March 2001, Iafrate was to demolish and reconstruct the normal eastbound passing lane and the adjacent Turnpike median area. Westbound traffic was to use the westbound shoulder and the normal westbound right lane, and eastbound traffic was to use the eastbound shoulder and the normal eastbound right lane. Concrete barriers separated this traffic from the median work zone throughout the length of the project.

Iafrate claims that the PTC's error manifested itself in two ways. First, at the western end of the project site, beginning at approximately Milepost 76, the median work zone was not wide enough to allow Iafrate to conduct its demolition and subgrade preparations and yet still maintain two lanes of traffic on each side of the median. To address this problem, in the spring of 2001 Iafrate increased the width of the westbound shoulder at Milepost 76 and moved the barriers separating the median work zone from the westbound travel lanes toward the westbound travel lanes, thereby increasing the width of the median work zone while still allowing for two lanes of traffic on the westbound side. This correction allowed Iafrate to complete demolition and subgrade preparation of the median work area at the west end of the project without further problems. However, in a small stretch of road near Milepost 76 (apparently a few hundred feet), the enlarged median work zone still did not allow Iafrate to properly lay the new asphalt road surface. Instead, workers had to close one of the eastbound travel lanes, move the barriers separating the work zone from the travel lanes and then lay the asphalt in that area. This process had to be repeated several times in order to lay down the necessary several layers of road material.

Second, because the concrete barriers separating the eastbound travel lanes from the too-narrow median work zone had to be placed on the roadway where the road surface of the

eastbound travel lanes was to be joined with the road surface of the median work zone, workers had to move the barriers throughout the nine-mile length of the project in order to complete the road surfacing. The barriers then had to be moved back to their original positions in order to allow additional work in the median work area. Iafrate argues that the PTC's error in designing an insufficiently wide median work zone resulted in Iafrate having to reassign work crews from planned reconstruction to such tasks as moving concrete barriers, and that it lost several days of work productivity in addressing these problems.

In making its case, Iafrate relies on the testimony of Anthony Leotta, one of its project managers, who described the nature of the problems with the median work zone and the work Iafrate performed in order to rectify or work around those problems. Mr. Leotta stated that a change in the previously existing curvature of the road at the west end of the project, in combination with the presence of a large embankment retaining wall, resulted in a too-narrow median work area at the west end of the project. This in turn required Iafrate to perform the previously described corrective work and movement of concrete barriers. Mr. Leotta also testified that before commencing the project, Iafrate engineers and surveyors reviewed the contract plans and did site inspections to verify roadway measurements, and that the cause of these problems must have been a design error by the PTC.

James Lockhart, construction manager for KCI Technologies throughout the project, testified on behalf of the PTC. Mr. Lockhart stated that the project plans showed that a small section of the west end of the project would require construction of an extra-wide shoulder in order to allow the necessary travel lanes and an adequate median work area, and that Iafrate forgot to account for this special requirement when it reconstructed the westbound shoulder during Phase I. Mr. Lockhart stated that he brought this oversight to the attention of James

Coburn, at the time the Iafrate project manager, in the early winter of 1999, but that the problem could not be addressed at that time because of the onset of winter weather. Consequently, the barriers separating Phase II westbound travel lanes from the median work zone at the west end of the project necessarily had to be placed on what should have been part of the median work zone. Thereafter, according to Mr. Lockhart, the problem was forgotten and was not raised again by Iafrate until Phase III work began at the west end of the project. In regard to Iafrate's claim that it had to move the barriers separating the eastbound travel lanes from the median work zone for the entire length of the project in order to complete Phase III paving, Mr. Lockhart explained that while the barriers had to be moved after each phase of work, it was never necessary to move all nine miles of the barriers in order to complete Phase III paving because of a design error.

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. Department of Transportation, 750 A.2d 388 (Pa. Cmwlth. 1999). In this case, the Board was presented with contradictory testimony regarding the reasons for the existence of an inadequately wide median work zone during Phase III of the project. However, neither party presented engineering drawings showing the planned design and measurements of the roadway and work areas, or any other documentary evidence corroborating the testimony of Mr. Leotta or Mr. Lockhart. Moreover, Mr. Lockhart's testimony regarding the early discovery of the issue and resolution with James Coburn (then project manager for Iafrate) was uncontradicted, as Mr. Leotta was not on the project at that time. The burden of showing a design flaw in the PTC's construction plans, and that the flaw resulted in a loss of work productivity, was Iafrate's. On the evidence presented, the Board concludes that Iafrate failed to sustain that burden. Accordingly, the PTC is

not liable for any loss of productivity experienced by Iafrate because of alleged errors in designing the median work zone.

Iafrate's Claim for Damages

The Board has concluded that the PTC is liable to Iafrate for the payment of a $70,000 incentive fee earned pursuant to Change Order No. 4, and that the PTC is liable to Iafrate for the loss of productivity caused solely by the extensive pavement failures of the Phase II temporary travel lanes.[13] [14] On all of Iafrate's other claims, the Board has concluded that the PTC cannot be held liable for any alleged loss of work productivity. The issue now arises as to how the Board may determine the appropriate amount of damages to award.

Iafrate claims $15,242,694.00 in loss-of-productivity damages, calculated by using what is known as the "modified total-cost method" of determining damages. Stated in slightly simplified terms, by the modified total-cost method, a plaintiff's damages are calculated by starting with the contractor's total project costs and the amount of the contract bid. The amount of the contractor's claimed total project costs is adjusted downward to account for any claimed costs that are the responsibility of the contractor, for example, higher costs resulting from the contractor's own errors or inefficient work.[15] The contract bid is adjusted upward to account for

[13] In regard to Iafrate's claim of damages, the PTC suggests in its proposed findings of fact that by agreeing to Change Order No. 4, Iafrate waived any claims for damages accruing before May 8, 2000, the date of acceleration under Change Order No. 4. (See PTC's Proposed Findings of Fact 483; Board's Findings of Fact 104.) However, the gravamen of Iafrate's complaint is loss of productivity, and not the delay mentioned in Change Order No. 4. In keeping with the well-established principle that a party will not be found to have waived legal or contractual rights without doing so in an explicit, knowing manner, the Board will narrowly interpret a waiver or release-of-claims provision in a change order, and will not bar a specific claim unless the language is specific and the factual circumstances clearly express that the waiver asserted was actually intended. See Pontiere v. James Dinert, Inc., 627 A.2d 1204 (Pa. Super. Ct. 1993); Samuel J. Marranca General Contracting Co. v. Amerimar Cherry Hill Associates, 610 A.2d 499 (Pa. Super. Ct. 1992). The Board does not find such a specific release or waiver in this case.

[14] The characterization of the PTC being liable for the loss of productivity caused "solely by" the temporary pavement failure is intended to exclude damages relating to the temporary pavement failure that were incurred due to Iafrate's failure to mitigate its damages. The failure to mitigate its damages was the result of Iafrate's business decision to do the repair work with its own work crews, instead of utilizing subcontractors. Supra pp. 37-38.

[15] For example, Jeffrey Fuchs, one of Iafrate's experts retained to analyze and quantify Iafrate's damages, subtracted $2,471,922.00 from Iafrate's claimed total-project costs, an amount representing costs incurred by Iafrate for the

the contractor's "bid errors," (amounts for bid items that, in retrospect, are deemed unrealistically low).[16] The difference between the adjusted total project costs and the adjusted contract bid is said to reflect the added costs that are attributable to the owner of the project, here the PTC. Overhead, profit and interest are then tacked-on to the added costs to arrive at a total damages amount.

The modified total-cost method of calculating damages derives from the general principles that damages need not be calculated with mathematical certainty, and that if a contractor has suffered financial injury, a government agency should not be exonerated merely because the contractor cannot prove his increased costs with precision. John F. Harkins Co. v. School District of Philadelphia, 460 A.2d 260 (Pa. Super. Ct. 1983). Pennsylvania's state courts, some federal courts and the Board have recognized that, if certain evidentiary and other criteria are met, a plaintiff may recover damages based on the modified total-cost method of calculating those damages. A.G. Cullen Construction v. State System of Higher Education, Nos. 666, 776 C.D. 2005, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006); John F. Harkins Co.; In re Meyertech Corp., 831 F.2d 410 (3d Cir. 1987); Net Construction v. C & C Rehab and Construction, 256 F. Supp.2d 350 (E.D. Pa. 2003); Mergentime Corp. v. Department of Transportation, Docket No. 1653, 2000 WL 1481522 (Bd. of Claims August 30, 2000).

However, "because the total cost method of measuring damages is imprecise it is fraught with danger and must be applied with caution." John F. Harkins Co., at 430-431. "This theory has never been favored by the court and has been tolerated only when no other mode was available, and when the reliability of the supporting evidence was fully substantiated." Boyajian

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purchase of asphalt, for administrative overhead, for idle equipment, and for legal expenses. Mr. Fuchs deemed these costs to be unallowable or Iafrate's sole responsibility. (Plaintiff's Exhibit 159 at 7.)

[16] Mr. Fuchs increased Iafrate's contract bid ($49,360,930.66) by $2,367,189, an amount representing increases in Iafrate's original estimates for Class I excavation, sale of recycled asphalt, and mobilization costs. (Plaintiff's Exhibit 159 at 7.)

v. United States. 423 F. 2d 1231, 1243 (Ct. Cl. 1970) (quoting WRB Corp. v. United States, 183 Ct. Cl. 409, ___, 1968 WL 9146 at *8 (April 19, 1968)). See also A.G. Cullen Construction, 2006 WL 625255 at *24 ("[T]his court holds the method may be applied where the nature of the particular loss renders it impossible or highly impracticable to determine damages with a reasonable degree of accuracy and where the loss is substantiated by reliable evidence."). Specifically, in order to recover damages on a total-cost or modified total-cost theory, a plaintiff must show that: (1) the nature of the particular losses make it impossible or highly impracticable to determine them with a reasonable degree of accuracy; (2) the plaintiff's contract bid was realistic; (3) the claimed total project costs are reasonable; and (4) the plaintiff was not responsible for the added costs. John F. Harkins Co., 460 A.2d at 263; In re Meyertech Corp., 831 F.2d at 419.

In this case, Iafrate has not shown that the PTC is responsible for all of the claimed loss-of-productivity damages, and the Board can perceive no factual basis on which it can segregate the loss-of-productivity damages caused solely by the PTC's breach of contract respecting the temporary travel lane paving specification from the loss-of-productivity damages caused by Iafrate's failure to mitigate these damages, the other factors complained of, Iafrate's own errors or other inefficiencies not caused by the PTC. Iafrate claims $15,242,694.00 in damages caused by the following breaches of contract: (1) the failure of the PTC-prescribed specifications for temporary paving of the Phase II temporary travel lanes; (2) the failure to provide accurate estimates of the amount of work required for emergency roadway repairs and accident response; (3) the failure of the PTC-prescribed specifications for the use of lime-pozzolan subgrade treatment; (4) the failure to make a $70,000.00 incentive payment in accordance with Change Order No. 4; (5) the failure to accurately specify the location of rock formations in the project

zone; and (6) the failure to design an adequately wide, Phase III median work zone. The failure to make the $70,000.00 incentive payment in accordance with Change Order No. 4 is, of course, a discrete factor unrelated to the loss-of-productivity claim and can be set apart. Of the remaining factors, the Board has concluded that the only alleged breach of contract for which the PTC is liable is for the failure of the specifications for the temporary travel lanes. It has also found that this amount itself must be further refined by excluding damages which were incurred by Iafrate's failure to mitigate same. Thus, the Board is left with the task of attributing a portion of Iafrate's claimed loss-of-productivity damages to the single factor for which the PTC is liable. Unfortunately, the factual record, legal theories and damage calculations upon which Iafrate relies do not provide a basis for doing so.[17]

The courts have addressed the problem the Board now faces. For example, in Lichter v. Mellon-Stuart Co., 305 F.2d 216 (3d Cir. 1962), the court of appeals concluded that a substantial amount of the extra cost of performing masonry work was the consequence of factors other than the prime contractor's breach of contract. The subcontractor presented evidence, and the court found, that the prime contractor had interfered with the planned execution of masonry work by changing the project schedule, directing subcontractors to perform work out of sequence, and

[17] Further complicating the Board's task of attempting to apportion damages is the considerable evidence suggesting that Iafrate's own performance contributed to a loss of productivity. For example, Anthony Leotta, Iafrate's project engineer beginning in Phase II of the project, acknowledged that Iafrate experienced significant inefficiencies because of its agreement to accelerate Phase II resulting in the inability to efficiently move manpower, equipment and materials in the work zone. There were also problems with excavation/pipe installation, subcontractor J.C. Lee, an accident causing a "shoring failure" that required several weeks of attention, truck shortages and over-extended project management personnel. Randall Wadding, a project consultant for KCI technologies, stated that Iafrate suffered from excessive personnel turnover, that Iafrate did not have sufficiently experienced traffic-control personnel, that Iafrate had trouble coordinating the work of subcontractors, and that Iafrate experienced miscellaneous problems relating to line painting, accident response and roadway repair. In his expert report compiled for the PTC, Michael Rollage noted that Iafrate had problems with coordination of work, poor productivity on the part of some subcontractors, and lack of management continuity. As is the case with the Board's attempt to separate loss-of-productivity costs caused by the PTC's breach of warranty from loss-of-productivity costs caused by factors for which the PTC is not responsible, the Board has no factual basis or method by which it can account for Iafrate's own performance problems and inefficiencies not caused by the PTC in determining reasonable damages.

changing project specifications. The subcontractor's claim for damages rested on a comparison between the estimated cost of completing the masonry work without interference and the actual costs incurred because of the overall delays and inefficiencies. However, the court also found that nonactionable factors for which the prime contractor was not responsible, including labor strikes, late delivery of materials, defective materials and change orders, were also substantial causes of delays and interfered with the efficient completion of the masonry work, and because the court had no basis on which to apportion damages among several causes, the plaintiff-subcontractor could not use a total-cost method as a basis for recovery. The court of appeals noted:

> But even if Southern is correct in its contention that Mellon breached the contract by insisting that the subcontractor proceed under conditions necessitating piecemeal performance of the masonry work, we think there is an insuperable obstacle to recovery on this record. In the opinion of the court below, on Southern's motion for denying a new trial, this difficulty is stated as follows:
>
> Even if one could find from the evidence that one or more of the interfering contingencies was a wrongful act on the part of the defendant, no basis appears for even an educated guess as to the increased costs suffered by plaintiffs due to that particular breach or breaches as distinguished from those causes from which defendant is contractually exempt from responding in damages.

Id. at 219 (quoting Lichter v. Mellon-Stuart Co., 196 F. Supp. 149, 151 (W.D. Pa. 1961)). The court of appeals concluded: "Since the court could find no basis for allocation of this lump sum between those causes which were actionable and those which were not, it was proper to reject the entire claim." Id. at 220.

Similarly, in Net Construction v. C & C Rehab and Construction, 256 F. Supp.2d 350 (E.D. Pa. 2003), the court declined to award delay and loss-of-productivity damages when the plaintiff-subcontractor's evidence offered no basis by which to separate delays caused by the general contractor's breach of contract from delays caused by other factors. The subcontractor

contracted to perform concrete work for the general contractor as part of the construction of a housing development. Completion of the project was delayed for one year, after which the subcontractor filed suit for approximately $383,000.00 in damages, including $234,000.00 in loss-of-productivity costs, based on a total-cost method of calculating the damages. The subcontractor presented evidence showing that certain of the general contractor's actions had contributed to project delays and increased the subcontractor's cost of performance. The evidence also showed that other factors such as bad weather, the presence of asbestos, and unsuitable soil conditions had also contributed substantially to the overall delay. The court concluded that it could not award damages based on a total-cost theory:

> Net fails to establish a reasonable allocation of its extra costs as a result of particular delays caused by C & C. While Net established that there were delays in completing the construction project, it failed to demonstrate that its damages for lost productivity were the result of delays for which C & C was responsible. After two days of testimony and briefing on the damages issues in this case, "no basis appears for even an educated guess" as to the increased costs suffered by Net as a result of delays for which C & C was responsible. Net failed to distinguish losses suffered as a result of delays by C & C from losses that it might have suffered because of Net's own performance problems, weather, unsuitable soils, or the existence of asbestos on the site. There is simply no basis on which to conclude that Net's losses were the result of delays caused by C & C. Accordingly, Net is not entitled to recover damages on its claim of lost productivity.

Id. at 355.

In contrast to the courts' decisions in Lichter and Net Construction, when a contractor's delay or loss-of-productivity costs are entirely the result of the general contractor's or project owner's actions, or when the evidentiary record allows the tribunal to separate the effects of multiple causes of delay, the Board and appellate courts have endorsed the total-cost method when necessary to afford a plaintiff just relief. For example, in A.G. Cullen Construction v. State System of Higher Education, Docket No. 3468, 2006 WL 1607180 (Bd. of Claims

March 4, 2005), aff'd in part and rev'd in part, Nos. 666, 776 C.D. 2006, 2006 WL 625255 (Pa. Cmwlth. March 15, 2006), a project involving the renovation of a historic building, the Board awarded delay damages based on a total-cost calculation. Although the State System, the owner of the project, was found responsible for only one of the two major causes of project delay, the evidentiary record allowed the Board to calculate a per-diem delay amount for the overall project, to determine a discreet 31-day period of delay caused by the State System's failure to provide for lead-based paint removal, and to then multiply the per-diem delay amount by the 31-day period of delay in order to arrive at a reasonable damage award. The Commonwealth Court affirmed the Board's reasoning and award.

In Larry Ambruster and Sons, Inc. v. State Public School Building Authority, 505 A.2d 395 (Pa. Cmwlth. 1986), after commencement of work by an electrical contractor, the Authority changed the manner in which plaster was to be applied to the walls and changed the specifications for the type of wall cover, both of which actions increased the costs and time for performance of the electrical contractor. It was found that the Authority was responsible for substantially all of the causes of delay, and the court affirmed the Board's award of damages based on a total-cost calculation. Similarly, in Glasgow, Inc. v. Department of Transportation, 529 A.2d 576 (Pa. Cmwlth. 1987), the record showed that the Department's decision to stop construction, redesign certain roadway structures, and require some additional work outside the scope of the contract was responsible for a three-month construction delay. This in turn increased the contractor's cost of performance. The Board awarded delay damages calculated by the total-cost method, modified to exclude payments already made for the additional work outside the scope of the contract. The court affirmed the Board's award, noting that the contractor's claimed costs were supported by sufficient evidence and that the record showed that,

except by using the total-cost method, the contractor could not document a reasonable figure for damages.

The Board has examined Iafrate's expert reports on damages and its recommended findings of fact, and the Board finds no evidence or method that would allow it to apportion claimed loss-of-productivity costs among the several alleged causes of that loss of productivity.[18] Indeed, in his report on Iafrate's damages claim, Mr. Fuchs concludes: "Given the types of disruptions experienced from the very beginning of the project, it is impossible to calculate losses as a discrete measure of each impact. Thus, the modified total cost approach is appropriate." (Plaintiff's Exhibit 159 at 12.) Mr. Schwartzkopf, Iafrate's other expert on the calculation of damages, agreed that "[t]he pervasive nature of the impacts suggests that a modified total cost analysis is the only effective way to measure the impacts on Iafrate." (Plaintiff's Exhibit 157 at 10.)

In light of the foregoing, the Board accepts Plaintiff's argument that it is entitled to utilize the total-cost or modified total-cost method of calculating damages in this case as a matter of law. We are, however, finding that, given the substantial nature of most if not all the multiple causes of lost productivity on this project; our findings that the PTC is responsible for only an indeterminate portion of one of those causes; and the Plaintiff's inability to point to or provide us with a basis in the record to apportion its claimed damages among these causes (which inability was acknowledged by its own experts), the Board, as a matter of fact, is unable to ascertain a

[18] The parties' experts agree that the ideal method by which to measure a roadway contractor's loss-of-productivity costs is the "measured-mile" approach. In the measured-mile approach, productivity achieved during the construction of a section of the project that was relatively unaffected by schedule disruptions and delays is compared to the productivity achieved during construction of those sections of the project affected by disruptions and delays. The comparison allows an expert to make reasonable estimates of the degree to which loss of productivity occurred during different construction tasks in different phases of the project. The PTC maintains that Phase IV of the project was relatively unaffected by delays and disruptions, and therefore that Iafrate should have performed a measured-mile analysis using Phase IV as a baseline for calculating loss of productivity. Iafrate's experts concluded that all phases of the project, including Phase IV, experienced extensive disruptions and therefore a measured-mile analysis was impossible.

basis in the record by which to determine damages attributable to the inadequate specifications for the paving of the temporary travel lanes. Having so found, the Board will not award Iafrate any damages for its loss-of-productivity claim.

ORDER

AND NOW, this 13th day of June, 2006, **IT IS ORDERED** and **DECREED** that judgment be entered in favor of Plaintiff, Iafrate Construction Company, and against Defendant, Commonwealth of Pennsylvania, Pennsylvania Turnpike Commission, in the sum of $84,120.40. This sum consists of $70,000.00, the amount owed to Iafrate pursuant to the incentive-payment provision in Change Order No. 4, and $14,120.40 in prejudgment interest on that amount. In addition, Plaintiff is awarded post-judgment interest on the total outstanding judgment at the statutory rate for judgments (6% per annum) beginning on the date of this Order and continuing until the judgment is paid in full. Each party herein will bear its own costs and attorney fees.

BOARD OF CLAIMS

_____
Jeffrey F. Smith
Chief Administrative Judge

_____
Ronald L. Soder, P.E.
Engineer Member

_____
John R. McCarty
Citizen Member

OPINION SIGNED