SOLEBURY SCHOOL	:	
	:	
v.	:	**EHB Docket No. 2011-136-L**
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COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF ENVIRONMENTAL PROTECTION and NEW HOPE CRUSHED STONE & LIME COMPANY, Permittee	:	**Issued: July 31, 2014**

ADJUDICATION

By Bernard A. Labuskes, Jr., Judge

Synopsis

The Board rescinds a depth correction of a noncoal surface mine's permit where the mine's dewatering operations are causing the unabated formation of sinkholes on a boarding school campus, presenting a serious threat to the health, safety, and welfare of the children and adults who live on and use the campus.

FINDINGS OF FACT

I. Background

A. The parties

1. Solebury School (or, the "School"), the Appellant, is a private day and boarding school located at 6832 Phillips Mill Road, New Hope, Pennsylvania 18938. (Stipulation of the Parties Number ("Stip.") 1.)

2. The Department of Environmental Protection (the "Department") is the agency with the duty and authority to administer and enforce the Noncoal Surface Mining Conservation and Reclamation Act ("Noncoal Act"), 52 P.S. §§ 3301 – 3326, Section 1917-A of the

Administrative Code of 1929, 71 P.S. § 510-17 ("Administrative Code"), and the rules and regulations promulgated under those statutes. (Stip. 2.)

3. New Hope Crushed Stone & Lime Company ("New Hope"), the Permittee, is a Pennsylvania corporation with its principal place of business located at 6970 Phillips Mill Road, New Hope, Pennsylvania, 18938. (Stip. 3.)

4. Solebury School has approximately 225 day and boarding students in grades 7 through 12. (Notes of Transcript page ("T.") 77.)

5. Approximately 40 percent of Solebury School's upper school students board on campus during the school year. (T. 77, 130.)

6. There are 50 faculty, staff, and their dependents who live on campus. (T. 77.)

7. The School operates a 6-week summer day camp program on its campus serving approximately 125 children per week, ages 4 through 12. (T. 78.)

8. Solebury School is comprised of approximately 90 acres. (T. 78.)

9. Solebury School has numerous sports teams, including soccer, cross country, golf, track and field, lacrosse, and baseball, which use the campus and its grounds for training, practice, and competitive activities. (T. 80.)

10. The School has operated on the present campus since the late 1920s. (T. 77.) Some of the buildings on the campus date back to the 1700s. (T. 81.)

11. Solebury School allows its students to freely roam the entire 90-acre campus with only limited restrictions. (T. 83-85, 159, 223.)

12. The School's campus includes boys' and girls' dormitories, faculty housing, classroom and athletic facilities, and the other features that one would expect to find on a school campus. (T. 80-81, 143-45; Solebury School Exhibit ("S. Ex.") 248.)

13. Adjacent and directly to the east of the School is New Hope's noncoal surface mine quarry. (Stip. 4; S. Ex. 267; New Hope Crushed Stone Exhibit ("N.H. Ex.") 203.)

14. The area around the School and New Hope's quarry is relatively rural with a mix of agricultural and residential use. (T. 83, 156-157; N.H. Ex. 32.)

15. New Hope's property is 215.75 acres. The quarry extracts limestone and dolomite for aggregate use in mainly the road and construction industries. (Stip. 5.)

16. Surface mining is conducted on approximately 141 acres. (Stip. 8.)

17. Mining has taken place at the quarry property since at least 1829. (T. 1174; N.H. Ex. 186.)

18. Mining operations at the quarry up until the 1960s were limited to the removal of rocks from outcrops and surface exposures. These operations did not require dewatering. (S. Ex. 247; N.H. Ex. 186.)

19. The first mining to depth that required the quarry to be dewatered occurred in the late 1960s. (S. Ex. 247.)

20. The Department issued New Hope its first mining permit on March 2, 1976. (Stip. 9.)

21. New Hope operates the quarry pursuant to Noncoal Surface Mining Permit No. 7974SM3C12. (Stip. 7.)

22. Although the original permit approves mining to an elevation of two-hundred feet below sea level (-200 feet MSL (mean sea level)), separate Department permit revisions in the form of "depth corrections" have since been required to mine progressively closer to that level. (T. 1947-48; N.H. Ex. 1, 177.)

23. On January 15, 1995, the Department authorized New Hope to mine to a depth of -35 feet MSL. (N.H. Ex. 177; SMP7974SM3C3.)

24. On March 6, 2006, the Department issued a depth correction authorizing New Hope mine to a depth of -100 feet MSL. (N.H. Ex. 177; SMP7974SM3C7).

25. On December 21, 2007, the Department issued a depth correction authorizing New Hope to mine to a depth of -120 feet MSL. (Stip. 10; N.H. Ex. 177; SMP7974SM3C9.)

26. On July 29, 2011, the Department issued a depth correction authorizing New Hope mine to a depth of -170 feet MSL. (Stip. 7, 26; N.H. Ex. 177; SMP7974SM3C12.) It is this depth correction that is the subject of this appeal.

B. The setting

27. The School and the quarry are located in and above carbonate rocks, such as limestone and dolomite, which have a relatively high degree of solubility. This type of geologic area is referred to as a karst area. (T. 333-37, 349-53, 1371-72, 1859, 1943; S. Ex. 245, 247, 292, 323; N.H. Ex. 176, 214.)

28. Karst is a terrain that is characterized by greater than average soluble rock, thereby resulting in the formation of closed depressions, collapse sinkholes, caves, and conduits that allow the turbulent flow of groundwater. (T. 478; S. Ex. 245.)

29. Carbonate rock dissolves over geologic time. As a result, voids or open spaces form in the rock, often where there are preexisting fractures. Although this is how caves can form, most voids are much smaller than caves. (T. 331-37, 387, 450, 1278-79, 1426-28, 1883; S. Ex. 245.)

30. The voids tend to fill up over geologic time with unconsolidated residual or transported rock material known as regolith. (S. Ex. 245.)

31. If the water table drops below the regolith, there is an immediate drying effect that can cause a loss of cohesion. (N.H. Ex. 176.)

32. Regolith-filled voids can remain stable over geologic periods of time, or events may occur which cause the regolith to migrate away. (T. 333-40, 345, 416-17; S. Ex. 245.)

33. Regolith can wash away below the surface for a while without there being any observable effect at the surface, but at some point the surface may collapse. (T. 333-40, 345, 416-17, 1277-79, 1415.) When this unsupported arch of overburden suddenly falls in, it forms a collapse sinkhole. (T. 323-31, 506-08; S. Ex. 245, 319.)

34. Voids, fractures, bedding planes, and the like, whether filled with regolith or not, are preferential pathways for groundwater flow in karst terrain. (T. 335, 339-40; S. Ex. 245, 247.)

35. In karst, these preferential pathways can develop into conduits that allow groundwater to flow relatively rapidly and in relatively large, concentrated amounts. (T. 432; S. Ex. 245.)

36. Mapping these preferential conduits can be particularly difficult because wells, including monitoring wells, can be hit or miss at best, which limits the conclusions that can be reliably and unqualifiedly reached from tracking water levels in wells in such areas. (T. 711-12; S. Ex. 247.)

C. Primrose Creek

37. Primrose Creek originates in the hills to the west of the School and flows eastward across the School's campus toward the quarry. (Stip. 18; S. Ex. 329.)

38. Primrose Creek's use is designated as Trout Stocking and Migratory Fishes pursuant to 25 Pa. Code § 93.9, Drainage List E. 32. (Stip. 15.)

39. Both Solebury School and the quarry are located within the Primrose Creek Basin. (Stip. 16, 17.)

40. From 1976 to 1995, New Hope's mine consisted of two separate quarry pits, called the North Pit and the South Pit. Primrose Creek flowed on a narrow strip of land that separated the North Pit from the South Pit. (Stip. 11; S. Ex. 247; N.H. Ex. 27-29; Department Exhibit ("DEP Ex.") 121, 182, 183.)

41. Sometime in the early 1990s, a "swallet" opened in the stream channel of Primrose Creek approximately 200 feet west of the quarry's North Pit highwall. (Stip. 12; DEP Ex. 5.)

42. A swallet is a sinkhole in a stream that redirects stream flow down the hole and underground. (S. Ex. 245.)

43. Since the swallet hole opened in the stream channel, Primrose Creek flows into the swallet. (Stip. 12; S. Ex. 80, 245.)

44. The swallet captures the entire flow of the stream in all but the most severe storms and from there water travels underground. (T. 819-20; S. Ex. 80, 245, 246; DEP Ex. 5.)

45. In 1993, the Department issued a permit revision allowing New Hope to mine through the Primrose Creek stream channel that had separated the two pits. New Hope subsequently mined through the channel, eliminated the stream where the pits are now located, and connected the North and South Pits. (T. 1049; S. Ex. 245, 246; N.H. Ex. 177; DEP Ex. 182, 183.)

46. The stream no longer exists in this area, so there is now an upstream reach and a noncontinuous downstream reach that begins with the quarry's pump discharge and terminates at the Delaware River. (T. 915-16; S. Ex. 245, 246; DEP Ex. 120, 174-77.)

II. Sinkhole Formation at the School and Within the Basin

47. In 1989, three collapse sinkholes opened on the Solebury School campus—two in the southwest portion of campus and one in the northeast portion of campus. (T. 165, 258; S. Ex. 70, 267.)

48. The first collapse sinkhole appeared to the east of a pond on campus and measured approximately 3-4 feet across and 2 feet deep. (T. 165; S. Ex. 70.)

49. The second collapse sinkhole appeared to the east of the learning skills classrooms and was larger, measuring approximately 15-20 feet across and 6-8 feet deep. (T. 166-67; S. Ex. 70.)

50. The third collapse sinkhole, which appeared in the area of the baseball field, was the largest of the three, measuring approximately 40-50 feet across and 10 feet deep. (T. 168-69.)

51. This third collapse sinkhole occurred while school was in session and caused significant alarm because it swallowed up several bushes and small trees and created a funnel, or swirling suction, as water ran into it and down the throat of the collapse. (T. 168-69, 259-60.)

52. Solebury School repaired each of the collapse sinkholes that appeared in 1989. (T. 166-67.)

53. In July 1990, a private well on the School's campus that serviced the Girls' Dorm went dry at a depth of over 200 feet below ground surface (bgs). (T. 252-53; S. Ex. 101.)

54. Drillers hit voids when they attempted to deepen the well and, therefore, the well was abandoned. (T. 252-53; S. Ex. 101.)

55. In November 1991, the School drilled a new well to a depth of 225 feet bgs to service the Girls' Dorm and faculty housing. (T. 255; S. Ex. 101.)

56. In 1992, another collapse sinkhole opened in the northeast portion of the campus near the School's wastewater treatment plant. (T. 175-76; S. Ex. 71, 267.)

57. The 1992 collapse sinkhole measured 50-60 feet across by 12 feet wide and 7 feet deep. (T. 175; S. Ex. 71.)

58. Solebury School remediated the 1992 collapse sinkhole. (T. 176.)

59. In September 1992, the School needed to lower the pump in a well serving its faculty house from 113 feet to 132 feet bgs. (T. 253-55; S. Ex. 101.)

60. In 1994, two collapse sinkholes opened on the School's campus—one in the southwest portion of campus and the other in the northeast portion. (T. 176; S. Ex. 72, 267.)

61. The first collapse sinkhole appeared in the area between the classroom buildings and the wastewater treatment plant. (T. 176.)

62. The collapse sinkhole measured almost a quarter of an acre in size. (T. 176, 262; S. Ex. 72.)

63. The land in the area gave way and collapsed within a period of a couple of hours. (T. 261-62.)

64. The second collapse sinkhole appeared in the area south of the baseball field. (T. 176.)

65. This collapse sinkhole measured 30-40 feet across. (T. 176.)

66. Trees as large as 20 feet fell into the sinkhole. (T. 176.)

67. Solebury School repaired both of these collapse sinkholes. (T. 178-79.)

68. Given their size, it took at least 5-6 weeks and a couple hundred trucks filled with soil to remediate the sinkholes that appeared in 1994. (T. 179.)

69. In February 1995, the well servicing the faculty houses on the Solebury School campus went dry at an approximate depth of 138 feet bgs and was abandoned. (T. 253-55; S. Ex. 101.)

70. In 1996, another two collapse sinkholes opened at the School in the southeast and northwest portions of the campus. (T. 180; S. Ex. 73, 267.)

71. The first collapse sinkhole was approximately 4-5 feet wide by 2 feet deep and appeared in the woods along the path where the cross-country team ran. (T. 180.)

72. The second collapse sinkhole was approximately 4-5 feet wide by 2 feet deep and appeared on the east bank of School Lane. (T. 180.)

73. Solebury School repaired both collapse sinkholes that opened in 1996. (T. 181.)

74. In October 1997, the School drilled a new well to service the Boys' Dorm to a depth of 616 feet bgs. (T. 255; S. Ex. 101.)

75. In 2004, another collapse sinkhole opened in the northwest portion of the Solebury School campus. (T. 181; S. Ex. 267.)

76. This collapse sinkhole appeared between classroom buildings and measured 4-5 feet across and 2 feet deep. (T. 181.)

77. Solebury School repaired the 2004 collapse sinkhole. (T. 182; S. Ex. 267.)

78. In 2005, a collapse sinkhole developed on the Magill property located at the corner of School Lane and Phillips Mill Road. (S. Ex. 267.)

79. In 2006, another collapse sinkhole opened in the northeast section of the Solebury School campus. (T. 182.)

80. This sinkhole opened near the G7 classrooms and the maintenance buildings and measured 6-7 feet wide and 4-5 feet deep. (T. 182.)

81. Solebury School repaired the collapse sinkhole that appeared in 2006. (T. 182.)

82. In October 2006, the School drilled a new well to service the campus at a depth of 400 feet bgs. (T. 255-56; S. Ex. 101.)

83. When the well was drilled, voids in the subsurface were encountered between 225 and 250 feet bgs. (T. 255-56; S. Ex. 101.)

84. In or about March 2008, a collapse sinkhole was reported on the quarry property, west of the North Pit. (N.H. Ex. 58, 106.)

85. In or about February 2009, a collapse sinkhole was reported on the Borthwick property across from the North Pit on Phillips Mill Road. (N.H. Ex. 69.)

86. In the same year, four collapse sinkholes opened on the Solebury School campus. (T. 87; S. Ex. 74, 75, 267.)

87. The first sinkhole opened west of the administration building, at the base of a bridge frequented by female boarding students traversing between their dormitory and the dining hall and near picnic tables where summer campers gathered for snacks. (T. 87-88, 227; S. Ex. 267.)

88. The sinkhole measured 15 feet deep and 3-5 feet across. (T. 88.)

89. School officials initially repaired the collapse sinkhole themselves, but the repair did not hold and the collapse reopened within a few days. (T. 264-65.)

90. The second sinkhole was located adjacent to the faculty housing area where children play. (T. 87; S. Ex. 74, 267.)

91. The sinkhole measured 15 feet deep and 3-5 feet across. (T. 88.)

92. The third sinkhole was located to the east of the soccer fields. (T. 87; S. Ex. 74, 267.)

93. That collapse sinkhole was 30-50 feet across with a number of cracks and fissures. (T. 88.)

94. A worker at the School fell into the collapse sinkhole as the land gave way under him. (T. 266.)

95. The fourth sinkhole appeared near the girls' softball field, at the edge of the School's property where it borders on School Lane. (T. 87; S. Ex. 74, 267.)

96. While on the surface the collapse sinkhole was difficult to see as most of it was under the road, when it was excavated during repairs it was shown to be a large void in the regolith. (T. 88.)

97. Solebury School initially attempted to repair the first 2009 sinkhole itself, but the repair did not hold, so the School then engaged expert professionals to remediate each of the collapse sinkholes that opened in 2009. (T. 92, 264-65.)

98. In particular, Solebury School took the additional step of grouting areas where sinkholes appeared in proximity to campus buildings and high traffic areas. (T. 94-95.)

99. In total, the remediation effort for the collapse sinkholes that opened on the School's campus in 2009 required multiple days of consistently running triaxle truckloads of fill to the campus. (T. 267; S. Ex. 60.)

100. In or about April 2010, a collapse sinkhole opened on the property of Misty Hill Farms, which is located across from the School on Phillips Mill Road. (S. Ex. 267.)

101. In or about April 2010, three collapse sinkholes opened on the property of Patricia Knight, which is also located across from the School on Phillips Mill Road. (S. Ex. 76, 267.)

102. In the same year, six collapse sinkholes opened on the Solebury School campus. (T. 108; S. Ex. 267.)

103. A cluster of sinkholes opened near the faculty houses and where the School's golf team practiced. (T. 109.)

104. Another cluster of sinkholes opened near the School's Learning Skills Building. (T. 109.)

105. The sinkholes near the Learning Skills Building were approximately 20 feet wide by 25 feet deep and took a great deal of effort to remediate. (T. 109.)

106. Solebury School engaged expert professionals to remediate each of the sinkholes that opened in 2010. (T. 112-13.)

107. In 2011, nine collapse sinkholes opened on the Solebury School campus:

a. Four of the sinkholes were in the southwest, another four were in the southeast, and another in the northeast of campus.

b. A cluster of sinkholes appeared near the faculty housing where children play.

c. Another cluster of sinkholes appeared near the boys' and girls' soccer field.

d. Two sinkholes opened north and east of the Learning Skills Building in an area that students frequently use to walk to the main athletic center on campus.

e. One sinkhole appeared in the middle of the campus.

(T. 111; S. Ex. 136, 267.)

108. New Hope and its consultants remediated the collapse sinkholes that opened on campus in 2011, with oversight from Solebury School's expert consultants. (T. 112-13.)

109. In 2011, other collapse sinkholes formed throughout the basin including, but not limited to:

a. Two on the property of Patricia Knight.

b. Three on the Busik property.

c. One near the property line of the Busik and Knight properties.

d. One on the Borthwick property.

e. One on the Mehok property.

f. One north of PECO road between the mining office water sampling locations NH-1 and NH-2.

(S. Ex. 77, 78, 79, 267; N.H. Ex. 84, 85, 175; DEP Ex. 9, 61.)

110. The largest of these sinkholes was on the Busik property and measured approximately 150 feet long, 75 feet wide, and 15-20 feet deep. (T. 425-26; N.H. Ex. 175; DEP Ex. 61.)

111. In 2013, one collapse sinkhole opened in the southeast corner of the Magill property just west of School Lane across from the School's headmaster's house. (T. 111; S. Ex. 267.)

112. In sum, at least 29 sinkholes have formed on the School's campus since 1989. (S. Ex. 267.)

113. Ten sinkholes formed in the first 17 years since 1989 and 19 have formed in the three years before this appeal was filed. (Finding of Fact ("FOF") 47-112.)

114. Additionally, at least another 12 sinkholes have formed off of the School's campus, but in the same immediate area within the Primrose Creek Basin. (S. Ex. 267.)

115. There is no credible, nonhearsay evidence that any sinkholes opened up on or near the School's campus before 1989. (T. 158-65, 170, 203-04, 214-15, 222-27, 427, 522-25, 537, 579-80, 757, 1288-89, 1602-07, 1615, 1874-75, 1903; S. Ex. 173, 245; N.H. Ex. 96, 181, 212, 214.)

116. Michael Kutney, P.G., the Department's hydrogeologist and lead permit reviewer, was taken aback when he first learned how many sinkholes were occurring at Solebury School. It was obvious to him that there was a serious problem. (T. 2118-19, 2206.)

117. The collapse sinkholes on the Solebury School campus tend to appear suddenly and without warning, with the land quickly giving way. (T. 89, 109, 111-12, 165-68, 258; S. Ex. 245, 247.)

118. The sinkholes have a tendency to continue to grow and expand after they initially open. (T. 89, 168, 178.)

119. The sinkholes have typically occurred when Solebury School has been in session. (T. 166, 168, 175.)

120. The development of collapse sinkholes at Solebury School is a hazardous condition that is creating a significant and ongoing risk to the health and safety of Solebury School, its students, faculty, visitors, buildings, and campus grounds. (T. 87-95, 108-11, 117-26, 171-72, 266, 426-29, 432; S. Ex. 25, 26, 31, 245, 247.)

121. The sinkholes occur near housing, play areas, sport areas, and other areas where children frequent. (T. 89, 109, 111, 120-21, 170, 180-81, 233; S. Ex. 10-12, 14, 18, 20, 58-61, 267.)

122. All sinkholes can result in property damage or personal injury or death, but the collapse sinkholes at the School are particularly dangerous because, as their name would imply, they open up suddenly and without warning. (T. 89, 109, 111-12, 165-68, 170, 181-82, 258, 261-62, 329, 331, 428, 432, 475-76, 500, 506, 587; S. Ex. 245, 247.)

123. Although some of the sinkholes have been large, small holes can also be dangerous, such as one that opened up near Phillips Mill Road, which was measured at 15 feet

deep and just wide enough to fit a person. A person who fell 15 feet into that hole would have a risk of injury and great difficulty getting out of the mud-walled slot. (T. 428-29.)

124. The development of sinkholes on the Solebury School property has impacted the School's ability to engage in any long-term planning, obtain grants and other funding, and develop its campus. (T. 86, 121-25, 146, 230, 234, 242; S. Ex. 28.)

125. After initially rerouting the cross-country running course in the mid-1990s, since 2010 Solebury School has ceased hosting cross-country meets due to sinkhole development. Cross-country meets since 2010 have been held away from the Solebury campus. (T. 120, 181.)

126. In the same year, the School's golf team was no longer permitted to practice on campus after a series of sinkholes developed in the area of their practice driving range. (T. 109, 120.)

127. Athletic coaches are required to avoid certain sections of the campus during practices and team runs. (T. 232-33; S. Ex. 36.)

128. Solebury School staff must constantly attempt to look for signs of sinkhole development in an effort to minimize the peril to its students, faculty, and campus visitors. (T. 117-20; S. Ex. 25, 26, 31-34.)

129. In addition to sports activities, the School has had to cancel other traditional events due to the appearance and concern of sinkhole development. (T. 121.)

III. New Hope's Application for a Depth Correction

130. New Hope submitted its application for a depth correction to advance to -170 feet MSL to the Department on October 20, 2008. (Stip. 25; N.H. Ex. 180.)

131. As part of New Hope's application for a depth correction, New Hope submitted to the Department a number of technical reports and supplemental materials. (N.H. Ex. 131, 178, 179, 180, 181, 195.)

132. Solebury School actively opposed the issuance of the depth correction. (T. 100-02, 323-24; S. Ex. 149, 158, 194.)

133. On February 6, 2011, Solebury School provided the Department with a report titled *Cause and Prognosis for Collapse Sinkholes at Solebury School, Bucks County, Pennsylvania*, prepared by its geology expert, Ira Sasowsky, Ph.D. (T. 323; S. Ex. 173, 174.)

134. Dr. Sasowsky concluded that the frequency, location, and type of sinkholes being experienced by Solebury School were unusual, that the quarry's dewatering activities were the underlying cause of collapse sinkhole formation at the School, and that deepening the quarry pit would promote continued sinkholes at the School. (S. Ex. 173.)

135. In response to the Department's request that the School provide potential engineering solutions to the appearance of collapse sinkholes on its campus, on March 7, 2011, Solebury School provided the Department with a copy of a March 2, 2011 letter report prepared by Michael Byle, P.E., a licensed professional engineer, detailing his evaluation of sinkhole mitigation options for the School. (T. 114-15; S. Ex. 175, 177.)

136. The Department dismissed Byle's proposed engineering solutions, arguing that they would be too expensive and/or would not work. (T. 115, 570.) There is no record evidence that any other possible remedies for preventing sinkholes from forming were ever proposed by New Hope or considered by the Department.

137. The Department did not apply any geotechnical engineering analysis to Byle's proposed solutions, and there is no record evidence that it would have had the expertise to do so. (T. 2303.)

138. An insufficient investigation has been done to date of possible measures to prevent the formation of sinkholes. (T. 571, 676.)

139. On May 9, 2011, Dr. Sasowsky received a call from Michael Kutney of the Department, informing him that: (1) New Hope was examining geologic features known as dikes within the quarry, (2) New Hope would be submitting to the Department a report detailing its findings within the week, and (3) the School would be provided one week to respond to New Hope's report. (S. Ex. 178.)

140. On May 12, 2011, New Hope provided the Department with a letter report titled *Requested Quarry Dike and Karst Feature Information*, prepared by Louis Vittorio, P.G., principal hydrogeologist at EarthRes Group, Inc. ("ERG"), the quarry's consultant. (S. Ex. 225.)

141. On May 12, 2011, Kutney provided Sasowsky with a copy of New Hope's *Requested Quarry Dike and Karst Feature Information* and instructed him that Solebury School would have until the close of business on May 20, 2011 to respond. (S. Ex. 181.)

142. On May 13, 2011, Kutney provided Sasowsky with a revised Sinkhole Minimization and Mitigation Plan ("SMMP") and told him that Solebury School had until the close of business on May 20, 2011 to provide comments. (T. 368; S. Ex. 181.)

143. Solebury School requested an extension from the May 20, 2011 deadline to provide substantive comments to the reports. (S. Ex. 181.)

144. The Department denied the School's request for a one-week extension, despite the fact that New Hope's application had been under consideration for more than 30 months. (T. 367-70; S. Ex. 181.)

145. On May 20, 2011, Sasowsky and Byle provided responses to ERG's reports. (S. Ex. 184.)

146. On May 24, 2011, New Hope Stone provided the Department with a new, revised SMMP. (N.H. Ex. 131.)

147. On June 2, 2011, Kutney provided Sasowsky with a copy of the May 24, 2011 revised SMMP and stated that the School had until the close of business on June 10, 2011 to provide comments. (T. 573-75; S. Ex. 187.)

148. The School requested an extension of this one week deadline, but the Department refused. (T. 574-75.)

149. On June 10, 2011, Byle provided the Department with the School's response to the May 24, 2011 revised SMMP. (S. Ex. 187.)

150. On June 10, 2011, Byle provided the Department with a letter report entitled *Engineering Evaluation of Potential Mitigation Measures.* (S. Ex. 188.)

151. From March 2010 to June 2011, Solebury School was assured by representatives of the Department that the protection and safety of the School was of paramount importance and that no decision would be made regarding the issuance of a new mining permit for New Hope until the Department had completed a process for investigating and protecting the School's campus. (S. Ex. 151, 190.)

152. The Department told Solebury School that the only way it would consider not approving the depth correction would be if the School could demonstrate to the Department's

satisfaction that New Hope's new mining (as distinct from the existing mining) would cause the School's sinkhole problem to get worse than it is now, as opposed to requiring New Hope to affirmatively demonstrate that mining could be reasonably accomplished under the law. (T. 114; S. Ex. 154.)

153. The Department told the School that it needed to develop a plan to address the sinkhole problem. (T. 114; S. Ex. 176.)

154. Although the School disagreed that the appropriate standard was whether additional mining would in and of itself make a bad situation worse, it nevertheless had its consultants attempt to answer that question. (T. 321.)

155. The Department limited its review of New Hope's application to an assessment of whether the parties who opposed the permit had proven to the Department's satisfaction that the 50-foot depth differential in and of itself would increase the frequency or severity of collapse sinkhole activity at the School. (T. 114, 2125, 2205-07; S. Ex. 154, 176.)

156. Kutney, the lead permit reviewer, was directed to apply this standard of review by his supervisors. (T. 2207.)

157. The Department limited its review to the marginal impact of adding 50 feet of depth to the quarry, as opposed to the continuing impact of the ongoing dewatering of the quarry. (T. 2171-74, 2178, 2205-07, 2411-12; S. Ex. 154, 176.)

158. The Department required the parties opposed to the depth correction to affirmatively demonstrate that New Hope's application should be denied. (T. 2205-07; S. Ex. 154.)

159. The Department issued the depth correction on July 29, 2011. This appeal followed. (Stip. 26, 27.)

160. Although New Hope has an NPDES permit authorizing its discharges into Primrose Creek, its permit was not up for renewal at the time of the depth correction, and the Department did not renew New Hope's NPDES permit in connection with the depth correction. (T. 2379-86, 2394-96; N.H. Ex. 1; DEP Ex. 190, 191.)

161. While its depth correction application was under review, New Hope continued mining, and mined deeper than its permitted depth of -120 MSL. (S. Ex. 141, 142.)

162. New Hope's unpermitted mining may have started as early as 2008 and included an area of approximately 100,000 square feet, amounting to approximately 50,000 cubic yards of stone. (T. 669-72; S. Ex. 142, 247, 278.)

163. The unpermitted mining was brought to the Department's attention by Solebury School. (S. Ex. 142.)

164. New Hope paid a civil penalty of $8,850 for its violation. (S. Ex. 146, 147, 196; N.H. Ex. 136.)

IV. Primrose Creek Impairment Listing

165. While the Department was reviewing New Hope's application for a depth correction, the Department was also involved in studying Primrose Creek to assess whether it was impaired. (S. Ex. 109, 110.)

166. Alan Everett, a water pollution biologist from the Department's Southeast Regional Office, concluded that the quarry's pumping and discharge resulted in flow reductions (baseflow diminution) in Primrose Creek upstream from the quarry and channel sedimentation downstream from the quarry. (T. 825; S. Ex. 109.)

167. Everett recommended that Primrose Creek be listed on Pennsylvania's Integrated List (303(d) list) as impaired for aquatic life uses. (T. 825; S. Ex. 109.)

168. Everett further recommended that the Source/Cause listings include "surface mining/baseflow diminution (flow alterations)" for Primrose Creek upstream from the quarry and "surface mining/sedimentation and hydromodification/other habitat alterations (Phillips Mill Dam)" for Primrose Creek downstream from the quarry. (S. Ex. 109.)

169. In February 2011, Kutney, of the Department's Pottsville District Mining Office, reached out to Rodney Kime, Environmental Program Manager for the Department, to request that the source of Primrose Creek's impairment be changed because the Pottsville District Mining Office did not believe that the quarry was the cause, or at least the sole cause, of the impairments to Primrose Creek. (T. 830, 1678-82, 2003-07.)

170. Kutney strongly advocated in support of the view that the quarry was not solely responsible for the stream impairments. (T. 1681, 1688-89; S. Ex. 116, 118, 267.)

171. Kime decided to accept Kutney's opinion instead of Everett's opinion regarding the source of the stream impairment, which was contrary to the directive of former Department Secretary John Hanger, who had previously directed that Primrose Creek be listed as impaired consistent with Everett's recommendations. (T. 1681-89; S. Ex. 115.)

172. The amended 2010 Integrated Report lists Primrose Creek in "Category 4c Waterbodies, Pollution not Requiring a TMDL" for aquatic life impairments upstream of the quarry, and adds "land development" to "surface mining" as a cause of the flow alterations impairment. (S. Ex. 119, 120.)

173. The amended 2010 Integrated Report lists Primrose Creek in "Category 5 Waterbodies, Pollutants Requiring a TMDL" for aquatic life impairment downstream of the quarry, and removes "surface mining" as the cause of the siltation impairment and replaces it with "source unknown." (S. Ex. 119, 120.)

V. The Quarry is Causing the Sinkholes

A. The quarry has lowered the groundwater levels below the School

174. Quarry dewatering is accomplished by pumping out the water that accumulates at the bottom of the pit. (T. 338-39, 1035; S. Ex. 247.)

175. Without dewatering the quarry would fill up with water, making mining impossible. (Stip. 19; T. 339, 1035.)

176. New Hope pumps approximately two to three million gallons per day (gpd) out of the quarry, although discharges can reach as high as twelve million gpd. (T. 1035-37; S. Ex. 265; N.H. Ex. 142, 176, 202.)

177. As authorized by NPDES Permit No. 0595853, the water is pumped out of settling ponds (or sumps) to Primrose Creek downstream and east of the quarry. (Stip. 20, 21.)

178. The water that New Hope is pumping comes from precipitation falling on the quarry, but also consists of groundwater coming from west of the quarry, which includes the area of the School. (T. 589-90, 1037-38; S. Ex. 247; N.H. Ex. 179, 180.)

179. It is clear that quarrying activities have led to a disturbance of the hydrologic balance of at least the Primrose Creek Basin. (T. 2184.)

180. The land surface at the School and the elevation of Primrose Creek is approximately 120 feet above mean sea level (+120 MSL). (T. 349, 409, 1177-79; S. Ex. 323, 329; N.H. Ex. 203.)

181. Prior to New Hope's mining, historic groundwater elevations beneath the School and quarry were close to ground surface at approximately +110 feet MSL (or 10-30 feet bgs). (T. 332-38, 376, 405-10, 493, 892-94, 1626-28, 1635-36; S. Ex. 86, 245, 247, 292.)

182. The Furlong Fault, which is immediately to the east of the quarry pit (on the far side from the School), is an effective groundwater barrier, which means that almost all of the groundwater that is entering the pit is coming from the other directions, including from the west in the direction of the School. (T. 337; S. Ex. 245; N.H. Ex. 97, 181; DEP Ex. 197.)

183. The Furlong Fault, forming the eastern boundary of the Primrose Creek Basin, is a major structure in the Newark Basin with a total vertical displacement of up to two kilometers. (T. 1230-31; N.H. Ex. 97, 181.)

184. Prior to mining, the Furlong Fault acted as a groundwater flow barrier, such that it created a water table close to the surface in the Primrose Creek Basin. (T. 335, 337, 349, 376-77, 437, 698, 1092; S. Ex. 245; N.H. Ex. 181; DEP Ex. 197.)

185. The Fault currently plays a limited role because during mining the quarry intercepts the groundwater before it reaches the Fault. (T. 337-38, 341.)

186. The Fault will continue to act as a barrier after mining terminates, which will allow groundwater levels to its west, where the School and the quarry are located, to return to their shallow, premining levels. (T. 376-77, 437, 1221; S. Ex. 245; N.H. Ex. 181; DEP Ex. 197.)

187. Over the life of the permitted quarry, groundwater levels as measured in nearby wells have been characterized by repeated periods of significant decline followed by periods of relative stability, followed by decline, etc. There have never been any sustained periods of groundwater levels trending up; the long-term trend has always been downward. (T. 455-58, 497, 1945, 2175-85, 2191, 2325-26; S. Ex. 247, 265, 328; N.H. Ex. 209.)

188. If the periods of decline seen in water well levels had been explained by drought, they would have rebounded, but that has not occurred here. (T. 2185-87.)

189. The parties in the case refer to the area where the quarry's pumping is lowering groundwater levels as the quarry's "zone of influence" ("ZOI"). (T. 590-91, 1070, 1091-92, 1945; S. Ex. 90, 206, 245, 247, 329; N.H. Ex. 176; DEP Ex. 197.)

190. Solebury School is within the quarry's zone of influence. (S. Ex. 90, 206, 247 329; DEP Ex. 124.)

191. Groundwater in the area travels from west to east, from areas west of the School, through the School property, through the quarry property, toward the Delaware River. (T. 682, 1372-73.)

192. To date, groundwater levels have dropped approximately 100 feet under Solebury School as a result of quarry dewatering. The groundwater table, which was about +110 MSL before quarrying, is now between +20 and 0 feet MSL. (T. 328, 405-11, 447, 458, 493, 1070, 1945, 2011; S. Ex. 90, 206, 245, 329; N.H. Ex. 137; DEP Ex. 131.)

193. Neither the Department nor New Hope dispute that quarry dewatering has substantially lowered groundwater levels beneath the School. (T. 1200, 1318-19, 1323, 1337, 1390, 1452, 1635, 1823-24, 1831; N.H. 176; DEP Ex. 131.)

194. The quarry's dewatering of the Primrose Creek Basin has been unusual compared to other limestone quarries due to its magnitude and rapidity. (T. 458.)

195. Quarry pumping is outpacing precipitation in the Primrose Creek Basin. (T. 601-04, 613, 1589-90; S. Ex. 247, 265, 299, 324.)

196. The parties differentiate between two species of groundwater: shallow groundwater, which is groundwater primarily supplied by precipitation falling within the topographic Primrose Creek Basin; and "regional groundwater," which is groundwater that

originates from a larger area that includes areas outside of the topographically defined Primrose Creek Basin. (T. 1038-39, 2011-12, 2014; N.H. Ex. 176, 178, 179.)

197. There is no distinct separation between the two zones of groundwater. (T. 1458-59.)

198. Because the Delaware River is at about 50-60 feet MSL, any water at or below that level is likely to include some regional flow. (T. 411, 1369; S. Ex. 245, 329.)

199. The quarry is essentially draining all of the in-basin groundwater out of the basin and has done so since the early 1990s. (T. 536, 1108, 1118, 1132, 1375, 1484, 1563, 2011-14, 2175, 2184, 2294-97, 2325-25, 2355.)

200. A large portion of the groundwater inflow into the quarry manifests at a waterfall that emerges from the western highwall at about 0 feet MSL. Little is known about the source of the waterfall, but it appears that the waterfall is related to a prolific conduit that focuses the submerged flow of the former Primrose Creek, as well as the groundwater inflow from both above and to a certain extent below 0 feet MSL. (T. 680-85, 688-90, 1409-12; DEP Ex. 56, 57.)

201. The water levels that now exist at and near the School reflect a regional groundwater component. (T. 1090, 1480, 2019, 2034, 2085, 2116, 2293.)

202. Quarry dewatering will continue to drain essentially all of the in-basin water, but it will also draw down more regional groundwater. (T. 1477, 2085, 2116, 2186-89.)

203. As a result, it is likely that continued dewatering associated with New Hope's mining will further depress groundwater levels below the School. (T. 338, 613, 641-47, 708-09, 1562, 2186-89; S. Ex. 245, 247.)

204. Unless the quarry intercepts a major karstic feature like the one it may have hit in the early 1990s, the effect is likely to be muted, but the water table under the School is

nevertheless likely to be lowered further as New Hope mines lower. (T. 328, 338, 604, 638-39, 684-88, 690-92, 694-96; S. Ex. 245, 247.)

205. There is no disagreement that groundwater levels below the School will remain at least as depressed as they are now so long as New Hope continues mining.

206. The Department only evaluated the effect that the quarry has had on groundwater levels in the Primrose Creek Basin since 2005. (T. 2171-72, 2189, 2293; DEP 136, 137, 197.)

207. By 2005, the quarry had already had a profound impact on groundwater levels, essentially having already dewatered the basin of its in-basin groundwater component down to the 20 feet MSL level. (T. 1945-46, 2175, 2181-84, 2325-26; S. Ex. 128.)

208. The Department was aware of the water level suppression, but only evaluated data from 2005 onward. (T. 2181-82, 2353, 2355, 2409.)

B. The quarry dewatering, which is causing the lowered groundwater table, is the cause of the hazardous sinkhole problem at the School.

209. Several factors play a role in the timing of collapse sinkhole development. The factors include the presence of carbonate bedrock, surface water flow, flooding, and precipitation. (T. 319-22, 342-45, 466-67; S. Ex. 177, 194, 245, 247; N.H. Ex. 176; DEP Ex. 196, 197.)

210. Dewatering of quarries in limestone areas such as the Primrose Creek Basin, which lowers the surrounding groundwater table, is a known and generally accepted cause of sinkholes. (T. 319; S. Ex. 245.)

211. Both the Department's and New Hope's credible experts acknowledge that the quarry dewatering at least contributes to the formation of sinkholes on and near the School's campus. (T. 1276-77, 1286, 1319-20, 1337, 1598-99, 1639-42, 2052-53, 2120-23, 2215; N.H. Ex. 176; DEP Ex. 197.)

212. In fact, New Hope's dewatering of the quarry is the overriding cause of sinkholes forming on and near the Solebury School's campus. (T. 328, 335-336, 342-345, 411, 430-431, 498-99, 509-12, 578, 582, 587, 591, 604, 613, 701, 782-83, 1277, 1349, 1616-17, 1891; S. Ex. 104, 173, 245, 247, 267.)

213. Quarry dewatering is also the major cause of the swallet that intercepts Primrose Creek, which eliminates essentially all surface flow downstream of the swallet and upstream of the quarry. (T. 536, 846, 889, 979-80; S. Ex. 245, 246.)

214. By lowering groundwater levels and changing groundwater gradients, as well as exposing groundwater conduits to an open mine pit, the quarry has created an unstable situation that allows the regolith that formerly filled voids in the limestone to settle or travel downward. As the effects of this settling have reached the surface, it has caused sinkholes to open. (T. 337-41, 498, 1599-1600, 1872-73, 2052-53; S. Ex. 167, 245, 292.)

215. Regolith being washed through voids that empty into the quarry would not necessarily be visible in discharges. (T. 710, 1414.)

216. The suspended solids measured in the quarry's NPDES discharge would be more than enough to account for the loss of regolith on the School's campus. (T. 710; S. Ex. 247.)

217. The large difference in water levels between the School and the quarry over a very short distance creates a steep hydraulic gradient that drives the formation of sinkholes. (T. 336, 433, 494-96, 532, 587; S. Ex. 245, 247.) There is a 160-foot water level drop over a very short distance. (T. 1108; S. Ex. 329.)

218. Continued mining will increase the hydraulic gradient between the School and the pit, which will increase the head differential and energy giving rise to the movement of regolith

and the resultant formation of collapse sinkholes at the School. (T. 328, 338, 587, 591, 604; S. Ex. 245, 247.)

219. Floods may trigger a sinkhole, but flooding associated with heavy precipitation events is not the cause of collapse sinkhole formation at the School because, among other things, portions of the Solebury School campus have experienced natural flooding throughout human memory, but that flooding did not result in the development of collapse sinkholes until after quarry dewatering began. (T. 160-62, 182-83, 225, 1286, 1891, 2200, 2218-19, 2222; S. Ex. 245, 247.)

220. Solebury School's development activities have not caused or significantly contributed toward the development of sinkholes on and near the campus. (T. 169-174, 199, 233-34, 272-75, 418-23, 431, 508-12, 582-87, 1608-09, 1619-22, 1890, 2216; S. Ex. 167, 245, 247, 288.)

221. Development in the surrounding area has not caused the collapse sinkholes on and near Solebury School. (T. 157, 221-22; S. Ex. 245, 247.)

222. So long as quarry dewatering continues, sinkholes will continue to propagate on and near the Solebury School campus. (T. 328, 335-38, 345, 412, 431, 440, 475-76, 532, 587, 604, 613, 615, 639, 782-83, 1338 1349; S. Ex. 245, 247.) No expert from any party opined that the hazardous situation that currently exists will dissipate during mining.

223. Continued mining will perpetuate the unstable hazardous conditions at the School. (T. 328, 338, 439, 694, 730-31; S. Ex. 245, 247.)

224. Even if the hydrologic regime in the basin could be characterized as in temporary equilibrium or very slow decline, sinkholes will continue unabated at the School. (T. 475-76, 703, 782-83; S. Ex. 245, 247.)

225. Returning the groundwater under the School to its premining levels, and without the dramatic head differential, will likely, in time, stem the formation of sinkholes. (T. 148-149, 154-55, 432-33, 496, 531-32, 587, 604, 615, 676-80, 1640-42; S. Ex. 175, 245, 247.)

226. After mining, it is anticipated that the pit will infill with water within 5 to 7 years, and the cone of depression caused by pit dewatering will dissipate, returning the water table approximately to pre-mining conditions. (T. 2312-14; N.H. Ex. 180; DEP Ex. 161.)

227. Closing the quarry would allow the water table to return to its premining levels near the surface and, therefore, sinkholes would abate. (T. 376-77, 676-80, 1640-42, 2312-14; S. Ex. 175.)

228. There may be engineering solutions for returning the water table to premining levels, such as a man-made groundwater cut-off or grouting, but those options have not been fully explored by the Department or New Hope and the Department believes they may be cost-prohibitive and/or ineffective. (T. 569-70, 677-79, 746; S. Ex. 175, 247.)

229. We credit the expert opinions of Sasowsky and Byle that the dewatering of the quarry is directly resulting and will continue to result in the hazardous formation of collapse sinkholes on and near the School's campus. (T. 328, 342, 411, 430-31, 457-58, 475-76, 507-08, 578, 587, 590-91, 615-16, 766-67, 782-83; S. Ex. 245, 247.)

VI. Natural Conditions Are Not Protecting and Will Not Protect the School

A. Shale layer

230. The Department issued the depth correction to New Hope based in part on the belief that a thin shale layer underlying the School's campus will help isolate the School from the effects of continued and deeper mining, premised on the theory that the shale will help maintain existing groundwater levels. (T. 378, 1110, 1822; N.H. Ex. 176; DEP Ex. 127, 128, 196, 197.)

231. If the shale layer were an effective protective measure, sinkholes would not be propagating the way they are at the School. (T. 648-52; S. Ex. 323, 330.)

232. There has been no credible evaluation of the extent, nature, continuity, or location of the shale layer and there is no credible evidence that it acts as a groundwater barrier that will insulate the School from the effects of New Hope's mining. (T. 378-80, 648-52, 766-67, 1822, 2063-68, 2236.)

233. The shale layer is thin where exposed to view, weathered, highly fractured, and may pinch out altogether. (T. 378, 1386-89; N.H. Ex. 178; DEP Ex. 46, 47, 48, 127, 128, 196, 197.)

234. The shale layer probably does not exist beneath portions of the School. (T. 2067.)

235. The limited available credible evidence suggests that the shale is not acting as a groundwater flow barrier, even where it does exist. (T. 378-80, 648-52.)

B. Dike 1

236. The Department issued the depth correction based upon its belief that a natural geologic feature known as Dike 1 would help prevent the frequency and severity of sinkholes from increasing at the School. (T. 362-63, 1054-55, 2051-53; DEP Ex. 197.)

237. Therefore, the Department added Special Condition 22 to the depth correction, which provides as follows:

> Future mining through the westernmost diabase dike (Dike 1, shown on Figure 1 Dike Location Map, dated June 9, 2011) below an elevation of -50' MSL is not authorized until the Permittee submits the results of a hydrogeologic investigation or predictive model detailing the potential hydrologic effects of removing the dike. The westernmost dike shall be field marked with durable paint and maintained so that it is visible and can be readily avoided by site personnel and contractors.

(N.H. Ex. 1.)

238. Dike 1 is a diabase dike, which is generally accepted as a semi-impermeable igneous intrusion into surrounding rock that can vary in size and thickness. (T. 361-64; DEP Ex. 197.)

239. Dike 1 runs through the quarry on the western side and strikes north 15 degrees east. (N.H. Ex. 176; 205.)

240. Dike 1 is obviously not preventing the formation of sinkholes at the School. (T. 413; S. Ex. 267; FOF 47-129.)

241. There is little data regarding the specific geologic characteristics of Dike 1 and an insufficient scientific basis for concluding at this time that it is in fact an effective hydrogeological barrier. (T. 372-74, 432, 572-73, 640-41, 718, 765, 1451, 1531-32, 1553-60, 1568-70, 1904, 2034-35, 2044-51, 2240-41; S. Ex. 138, 188, 206, 225, 247; DEP Ex. 106; N.H. Ex. 97, 179, 195.)

242. The limited evidence that does exist suggests that Dike 1 is not acting as an effective barrier to groundwater flow such that it will be or is in any way protective of the School. (T. 374, 412-14, 432, 438, 478-80, 641-647, 718, 1044-46, 1053-58, 1479-84, 1499-1500, 1506-08, 1551-53, 1558, 2029-36, 2051-52, 2239; S. Ex. 236, 247, 327, 328, 329.)

243. The permit itself recognizes the lack of information regarding the dike because it only prohibits mining through Dike 1 until New Hope submits the results of "a hydrogeologic investigation or predictive model detailing the potential hydrologic effects of removing the dike." (N.H. Ex. 1.)

244. Dike 1 has already been mined through from the surface down to as low as approximately -40 MSL, which is 40 to 60 feet below the current water table under the School. (T. 374-75, 1046, 1108, 1384, 1574; S. Ex. 323, 329; N.H. Ex. 176.)

245. Based upon the assumption that Dike 1 is a protective hydrogeologic barrier, the Department has restricted New Hope from "mining through" the dike below -50 MSL. (T. 2034-36; N.H. Ex. 1.)

246. The dike can be mined through where it exists above -50 MSL. (T. 374-75, 654-58, 1384-85, 1572-74, 2253-54; N.H. Ex. 205; DEP Ex. 161.)

247. The permit does not provide a buffer zone around Dike 1 to protect the dike from damage due to quarry blasting operations. (T. 414, 475-76, 653-54, 1366-67, 1571, 2250-51, 2339; S. Ex. 196, 247; N.H. Ex. 1.)

248. New Hope has indicated that it will voluntarily observe a buffer zone, but that is not a permit requirement and is not enforceable. (T. 1345-46, 1366-67, 2251; N.H. Ex. 91.)

C. Rock becoming tighter at depth

249. The Department issued the depth correction based upon the premise that the rock that New Hope is mining at depth is tighter than the rock previously mined closer to the surface. (T. 2031-32, 2061-62; N.H. Ex. 176; DEP Ex. 197.)

250. In fact, in the Department's view the rock is so tight that there are not likely to be *any* significant karst features at depth. If they are encountered, that "changes the game" according to the Department. (T. 2061-62.)

251. It is unlikely that there are *no* significant karst conduits at depth. (T. 338, 382-83, 440, 441, 458, 661-63, 691, 694, 711-12, 732, 740, 781; S. Ex. 245, 247, 326.)

252. There appear to be two geologic units of carbonate rock in the vicinity of the School and the quarry, which the parties refer to as "Unit A" and "Unit B." (T. 359-60, 1029.) The lower (deeper) rock in the quarry is referred to by the parties as Unit A. Unit A is what is being characterized as tighter. (N.H. Ex. 176; DEP Ex. 129, 130, 131, 197.)

253. While there is much less weathering and fewer known karstic features in Unit A than the higher, more weathered rock (Unit B), there are still voids and other likely water-bearing zones in the deeper rock. (T. 256, 382-88, 437-41, 523, 617-38, 691-94, 711, 726, 729, 738, 1226-27, 1461, 1490-98, 1524-28, 1861-64, 1539-40, 1581-85, 2018-19, 2243-47; S. Ex. 92, 95, 206, 208, 247, 275, 276, 323, 326; N.H. Ex. 179, 181; DEP Ex. 53.)

254. The tighter geologic strata at depth have been mined by New Hope for years, yet mining the strata is not preventing sinkholes and water losses now, so there is no reason to believe the strata will do so in the future. (T. 647, 705; S. Ex. 245, 247; FOF 47-129.)

255. Although mining deeper typically intercepts fewer water-bearing zones, those that are intercepted tend to produce more water. (T. 382-83.)

256. As New Hope mines deeper, and then wider at depth, it will intercept more water-bearing zones. (T. 388, 691-95; S. Ex. 245, 247.)

257. The interception of more water-bearing zones at depth has and will continue to lower the water table under the School. (T. 415-17, 637-38, 2061-62, 2177-78; S. Ex. 245, 247.)

258. No expert could testify with any confidence where Unit A and Unit B divide or where, if anywhere, they are under the School, but it is clear that Unit A is very close to the surface and/or exclusive of Unit B on portions of the campus. (T. 700, 702, 1077, 1109, 1520 (MW 11 in Unit A), 1912-14, 2064-68, 2103 (MW 11 in Unit A), 2232, 2236, 2304 (MW 11 in Unit A); N.H. Ex. 206; DEP Ex. 48, 176, 196 (Fig. 4, 5).)

259. Numerous sinkholes caused by New Hope's mining have formed in areas underlain by Unit A only, which indicates that Unit A does not provide protection to the School from quarry dewatering. (T. 705.)

VII. Other Provisions in the Permit Will Not Protect the School

A. Special Condition 21

260. In an effort to protect the School, the Department added Special Condition 21 to the permit, which provides as follows:

> To safeguard against unexpected significant and sustained new inflows of water or sediment laden water the Permittee shall report to PADEP if during pre-blast drilling, or during the expansion of the pit area either laterally or vertically the permittee encounters: (a) mud seams or voids coupled with the down hole loss of compressed air and/or a significant increase or decrease in return water during any drilling, and/or (b) sustained high yield artesian conditions. If a or b are encountered no blasting or additional mining in the area in question may occur until the Department is notified and concludes, following an evaluation of the hydrogeologic conditions, that further mining shall not adversely impact the prevailing hydrogeologic balance in the basin.

(N.H. Ex. 1.)

261. The original language for this permit condition was written by New Hope's consultant, Mr. Vittorio. (T. 1227-28, 2254-55, 2314-16; N.H. Ex. 195.)

262. This permit condition does not address the general lowering of the water table, is likely to only address a water loss due to conduit flow after it has already occurred, and is not likely to do much good because conduits once intercepted are difficult to control. (T. 414-17, 484-85, 565, 617, 659, 660, 764.)

263. Prolific voids or mud seams do not always react quickly or show any immediate effect from being intercepted. (T. 416, 484-89, 617, 660.)

264. All of the inflow near the bottom of the pits is to some extent artesian, so "sustained high yield artesian conditions" may already be occurring. (T. 1228-29, 2256.)

265. "Artesian" is somewhat variably defined but is not defined in the permit. (N.H. Ex. 1; *see* T. 1227-29, 1495-97.)

266. It is unclear how a "sustained high yield artesian condition" will be distinguishable from other flow into the quarry, particularly because the phrase is not defined in the permit. (T. 659-60, 667-68, 1229; N.H. Ex. 1.)

267. New Hope interprets Condition 21 to be limited to sudden gushing water of at least 100 to 200 gallons per minute that lasts at least an hour, which is between 144,000 and 288,000 gpd. (T. 1576-78.)

268. By way of perspective, it only takes 6,000 gpd of pumping discharge, less than 0.1% of the average daily quarry discharge, to potentially lower the groundwater within the mapped zone of influence by six inches per year. (S. Ex. 247 at 22.)

B. Sinkhole Minimization and Mitigation Plan

269. The Department has required New Hope to develop and implement a Sinkhole Minimization and Mitigation Plan. (N.H. Ex. 131, 137, 138; DEP Ex. 197.)

270. New Hope must also describe new sinkholes occurring within the basin in its quarterly monitoring reports. (T. 1237; N.H. Ex. 69-91.)

271. The SMMP requires that New Hope close sinkholes using proper techniques within the "ZOI/sinkhole-prone areas." The use of proper techniques may help reduce the risk of the sinkhole in question reopening and may reduce the likelihood of other sinkholes (or another opening of the same underlying hole) opening up in very close proximity to the initial sinkhole, but the plan is misnamed because it does not prevent new sinkholes from forming in the first place. (T. 417-18, 432, 574, 668-89, 1240-41, 1250-52, 1346, 1642-43, 1850, 2257-58; S. Ex. 183, 187, 196, 247; N. H. Ex. 131, 137, 138; DEP Ex. 150, 197.)

C. Monitoring well network

272. The Department premised the issuance of the depth correction on the assumption that New Hope's requirement to monitor groundwater levels in monitoring wells located throughout the quarry's zone of influence and report the results quarterly to the Department will help protect the School. (T. 1975, 2055, 2075-79, 2101, 2115, 2140-42; DEP Ex. 197.)

273. Groundwater monitoring does not itself prevent sinkholes from forming in the first place and it cannot predict where and when they will form. (T. 389, 462, 705-06.)

274. Groundwater monitoring has not been protective of the School to date. (FOF 47-129.)

275. The monitoring program is not an effective preventative measure because it only reveals a problem after it has already occurred, and the effects can be subtle. (T. 705-06.)

276. The quarry does not presently monitor any water wells on the property of Solebury School. (T. 116-117, 191, 257, 400-02, 594-95, 1399-1400; S. Ex. 329.)

277. Whether a change in water levels is actually observed and understood depends in part on the review of New Hope's groundwater contours as created by its groundwater modeling. (T. 2223-24, 2229, 2237-38, 2331.)

278. New Hope views the modeling results as a secondary tool to help back up actual data points. (T. 1535.)

279. The groundwater modeling that the Department and New Hope rely upon is entitled to limited weight because (a) the model has predicted wild, unnatural flow contours that are unlikely to reflect real-world conditions; (b) it is not clear the extent to which the model fully accounts for karst conditions; (c) the data relied upon is in some respects over-inclusive and in

other respects insufficient. (T. 388-405, 453, 460, 600-601, 606-13, 1103-06, 1394-1402, 1488, 1519-22, 1532-37, 1593-1403, 1427; S. Ex. 245, 247, 268, 287, 329.)

280. We credit the expert opinions of Sasowsky and Byle that the purportedly protective natural features and permit conditions have not and will not protect the School from the hazardous formation of sinkholes on the School's campus. (T. 328, 413-15, 418, 475-76, 479-80, 484-86, 574, 646-47, 652, 653-54, 659, 660, 668, 669, 705-06, 764, 765-67; S. Ex. 245, 247.)

VIII. Primrose Creek Upstream Flow Impairment

281. Primrose Creek was historically a perennial stream that received its baseflow from the shallow water table and ran across the Solebury School campus and where the quarry is currently located. (T. 158, 162, 203-04, 222, 405-06, 978, 1636; S. Ex. 84, 85, 245, 247.)

282. Today, Primrose Creek is a losing intermittent or ephemeral stream with extended periods of little or no flow in its reach upstream (west) of the quarry and upstream of the swallet. (T. 105-06, 226, 890, 977-79, 1447; S. Ex. 245, 247.)

283. The stream only flows between the swallet and the quarry during large storm events. (T. 889.)

284. The lowered groundwater levels caused by quarry dewatering are the dominant cause of the flow impairment of the stream. (T. 826-27, 890-898, 1200, 2006-07; S. Ex. 84, 109, 117, 119, 245, 246, 247, 292, 302; N.H. Ex. 176.)

285. Little additional impairment can be expected while New Hope continues mining because the water table has already dropped from 10 to 100 feet bgs, which means there is no shallow baseflow left in the carbonate formation. (T. 405-06, 890-91, 978, 992; S. Ex. 109, 119.)

DISCUSSION

Solebury School is challenging the July 29, 2011 depth correction issued by the Department to New Hope Crushed Stone's noncoal surface mining permit 7974SM3C12, which authorizes New Hope to mine to a depth of -170 feet MSL at its quarry in Solebury Township, Bucks County—an additional 50 feet deeper than its previous depth correction. The permit that was originally issued in 1976 authorized New Hope to mine to a final depth of -200 feet MSL, but the permit has been changed over time so that New Hope must now apply for a permit amendment, known as a depth correction, for periodic intervals of additional mining down to the -200 level. Although the School complains of damage to the hydrologic balance, including impacts to the stream on its campus, its overarching concern is that New Hope's mine is causing numerous collapse sinkholes to form on its campus, which presents a significant risk of harm to the School's students and faculty.

In third-party appeals of Department actions the appellant bears the burden of proof. 25 Pa. Code § 1021.122(c)(2). The appellant must show by a preponderance of the evidence that the Department acted unreasonably or contrary to the law, or that its decision is not supported by the facts. *Gadinski v. DEP*, 2013 EHB 246, 269. In this appeal, Solebury School must show by a preponderance of the evidence that the Department acted unreasonably or contrary to the law in issuing the depth correction to New Hope. The Board reviews Department actions *de novo*, meaning we decide the case anew on the record developed before us. *Dirian v. DEP*, 2013 EHB 224, 232; *O'Reilly v. DEP*, 2001 EHB 19, 32; *Warren Sand & Gravel Co. v. Dep't of Envtl. Res.*, 341 A.2d 556 (Pa. Cmwlth. 1975).

The purpose of the Noncoal Act includes protecting land, decreasing soil erosion, preventing pollution of rivers and streams, generally improving the use and enjoyment of the

lands, and most importantly here, preventing and eliminating hazards to health and safety. 52 P.S. § 3302; *see Tinicum Twp. v. Del. Valley Concrete*, 812 A.2d 758, 760 n.4 (Pa. Cmwlth. 2002) ("The Non-Coal Act was passed to address the negative affects [sic] of surface mining by improving conservation of the land, protecting the health and safety of citizens and wildlife, and limiting pollution."). No permit may be issued unless the applicant affirmatively demonstrates that:

> (1) The permit application is accurate and complete and that all requirements of this act and the regulations promulgated hereunder have been complied with.
> (2) The operation and reclamation plan contained in the application can be accomplished as required by this act and regulations.
> (3) The operation will not cause pollution to the waters of this Commonwealth.

52 P.S. § 3308. The applicable regulations provide that a permit, permit renewal, or revised permit application may not be approved unless the applicant affirmatively demonstrates and the Department finds in writing that, among other things,

> (1) The permit application is accurate and complete and that the requirements of the act, the environmental acts and this chapter have been complied with.
> (2) The applicant has demonstrated that the noncoal mining activities can be reasonably accomplished as required by the act and this chapter under the operation and reclamation plan contained in the application.
> (3) The applicant has demonstrated that there is no presumptive evidence of potential pollution of the waters of this Commonwealth.

25 Pa. Code § 77.126(a). Among other requirements of Chapter 77, the applicant must show that it will ensure the protection of the quality and quantity of surface water and groundwater, both within the permit area and adjacent areas, as well as the rights of present users of surface water and groundwater. 25 Pa. Code § 77.457(a); *Plumstead Township v. DER,* 1995 EHB 741, 776-

77; *see also* 25 Pa. Code § 77.521 (mining to be planned and conducted to minimize disturbances to the prevailing hydrologic balance in the permit and adjacent areas).[1]

This case at its core is about health, safety, and public welfare. The Department clearly has the legal authority to deny a permit amendment such as New Hope's depth correction if continued mining is causing an unavoidable and serious hazard to health and safety. 52 P.S. §§ 3302 (purposes of Noncoal Act), 3308 (permit requirements), 3311 (authority to require the abatement of nuisances, which include conditions that create a risk of subsidence, cave-in, or other hazards to health or safety); 71 P.S. § 510-17(3) (authority includes abatement of conditions detrimental to public health); 25 Pa. Code §§ 77.126 (permitting requirements); 77.130(1) (permits are to prevent adverse impacts to public health and safety), 77.243 (bond amounts sufficient to cover measures that may be necessary to prevent adverse impact on public health, safety, or welfare), 77.294 (penalties are to consider impact to public health and safety and damage to property), 77.352 (inspections for adverse impacts to public health, safety, and welfare), 77.401 (waiver of permit application requirements if not needed to evaluate impacts on public health and safety). The Department's duty to ensure that mining can be "reasonably accomplished" requires it to ensure that the mining can be performed without an undue risk to health, safety, and welfare. Pointedly, no party in this case has argued otherwise. In fact, there is actually no dispute in this case that New Hope's continued mining is at the very least contributing to an intolerable and dangerous sinkhole problem at the School. The question, then, is whether the Department acted unlawfully or unreasonably by enabling this serious hazard to health, safety, and welfare to continue unabated. We conclude that the Department's approval of

[1] Hydrologic balance is defined as "[t]he relationship between the quality and quantity of water inflow to, water outflow from and water storage in a hydrologic unit, such as a drainage basin, aquifer, soil zone, lake or reservoir. The term includes the dynamic relationships among precipitation, runoff, evaporation and changes in groundwater and surface water storage." 25 Pa. Code § 77.1.

continued mining was in accord with neither the law nor reason, and therefore, we rescind its approval of the depth correction, effective immediately.

The School presented a compelling case that it is suffering from an alarming collapse sinkhole problem on its campus. To their credit, neither the Department nor New Hope disputed this point, nor could they. The School has now been the site of 29 sinkholes, and that does not include the 12 known sinkholes that have formed on nearby properties. (FOF 112, 114.) The sinkholes appear suddenly and without warning. At least one person has already fallen into one. Some holes are small, but others have been as large as a quarter of an acre. One hole was narrow and deep enough to potentially cause entrapment. It would seem that it is only a matter of time before someone gets hurt.

Aside from the danger to adults and children, the School is being deprived of the quiet use and enjoyment of its property. The School must operate under the constant threat that at some unknown time and location, the ground will collapse underfoot. There is no dispute that this will occur again and again so long as New Hope keeps mining. The School has lost grant money, foregone construction projects, and cancelled—sometimes permanently—school activities.

Although not a safety issue *per se*, it bears mentioning that by dropping the water table 100 feet, quarry dewatering has robbed Primrose Creek of most of its baseflow. A stream that undoubtedly once beautified and added to the character of the campus is now usually a dry ditch. And that is before the stream channel is intercepted by one of the most problematic of all the sinkholes caused by the quarry: the swallet.

The Department Applied the Incorrect Standard for Reviewing New Hope's Application

The Department was fully aware of the School's precarious situation. Indeed, the Department's lead permit reviewer was taken aback when he first learned of the School's sinkhole problem. (T. 2118-19, 2206.) Yet, for reasons we find difficult to understand, the Department decided that New Hope's ability to continue mining must take precedence. Toward that end, the Department fashioned and applied an unlawful and unreasonable standard for reviewing the depth correction application. The Department decided that the depth correction would be approved unless the School proved to the Department's satisfaction that the additional 50 feet of mining authorized by the depth correction, and only that narrow band of mining, would "increase the frequency and severity" of collapse sinkhole formation on the School's campus. Every aspect of this standard of permit application review is wrong.

First, the Department placed the burden of proof, if you will, on the wrong party. Although the School bears the burden of proof at this stage of the proceedings in this appeal, the law states that no permit may be issued or revised unless the *applicant affirmatively demonstrates* that mining can be performed safely. 52 P.S. § 3308(a); 25 Pa. Code § 77.126. In order to comply with the Noncoal Act and the regulations, it is the applicant that must show that hazards will be prevented or eliminated. Here, New Hope did not do that. There are known, continuing, unsafe conditions and New Hope was not required to show how those unsafe conditions could be rectified.

Secondly, there is no legally or scientifically justifiable reason to limit the permit review to only that portion of the harm that is being caused by New Hope's latest 50 feet of mining. The Department repeatedly tells us that only a depth correction is involved in this case. The original permit authorized mining to a depth of -200 MSL, and the Noncoal Act and regulations

do not mandate permit renewals. *See* 25 Pa. Code § 77.128 (permit terms). The Department does not explain why any of that matters. This particular permit by its own terms must be revised, regardless of whether Noncoal Act would ordinarily require it. No party has challenged that aspect of the permit, and events have shown that it was a good idea. The Department has required New Hope to periodically revise its permit through depth corrections to give the Department an opportunity to ensure that the mine *as a whole* was not unduly disturbing the hydrologic balance of the basin. (DEP Ex. 150, Conditions 18-20.)

Since the permit must be revised, regulations must be met based upon existing information. *Angela Cres Trust v. DEP*, 2009 EHB 342; *Wheatland Tube Co. v. DEP*, 2004 EHB 131; *Tinicum Township v. DEP*, 2002 EHB 822. When considering an application for a permit revision, the question is not whether the limited subject of the revision can be safely accomplished. The question is whether the project as a whole, as revised, can be safely accomplished. 25 Pa. Code §§ 77.141 and 77.126. In this case, even without the revision the mining is causing a safety hazard.

In *Solebury Township v. DEP*, 2004 EHB 95, Solebury Township challenged the Department's decision to renew New Hope's NPDES permit for the same quarry that is the subject of this appeal. The permit renewal made no material changes to the terms of the permit. Among other things, the Department never considered whether the quarry's pumping limit of four million gpd was appropriate because the Department said it "was not going to tell them how to operate their operation." 2004 EHB at 119. We rejected New Hope and the Department's argument that the Township was barred from challenging the permit renewal because no changes had been made. We ultimately held that the Department failed to fully consider the impact to the hydrologic balance caused by the quarry's discharge *going forward.* It never occurred to the

parties or us in that case that the Department's review of the effect of continued mining would be artificially limited to anything other than the effect of the discharge from the *entire mine* on the hydrologic balance, rather than some smaller increment related to recent mining, and that is what New Hope eventually did.

Following the hydrogeologic study mandated by us in the 2004 Adjudication, the Department renewed New Hope's NPDES permit again in 2006 and the Township appealed again. Among other things, the Township attempted to challenge the Department's decision in 1995 that authorized New Hope to eliminate the portion of Primrose Creek between its two pits. We dismissed that challenge, stating that our review was of the permit renewal going forward, not of a separate Department action from eleven years earlier. *Solebury Twp. v. DEP*, 2007 EHB 713, 722-73. The Department refers us to this holding but we find it to be inapposite. The stretch of the creek that was eliminated by the quarry was long gone when the Township raised its concern in 2006. In contrast, the sinkholes in this appeal continue to propagate at an alarming rate. The School in this case is not challenging some prior Department action authorizing sinkholes, and it is not arguing that any *past* permit decision was improper because it resulted in sinkholes. The School has not sought remediation of past environmental damage, as the Township did in its 2006 appeal. Rather, the School is pursuing exactly the sort of challenge we found to be appropriate in both prior cases, namely, whether the Department's action is lawful and reasonable in light of the effect of the quarry dewatering *going forward.* The School argues that the depth correction, because it authorizes years of additional mining, will result in more collapse sinkholes going forward. Nowhere in the 2007 decision did we hold or suggest that restricting the Department's review to only one small part of the mine had any legal or scientific merit.

The Department cites *Inquiring Voices Unlimited v. DER*, 1990 EHB 798, in further support of its position that it only needs to look at the band of mining 50 feet at the bottom of an already large pit, but that case can be easily distinguished from the current situation. In *Inquiring Voices*, and the *Del-AWARE Unlimited v. DER* cases cited therein (1986 EHB 919 and 1988 EHB 1097), the appellants appealed various extensions of permits and construction deadlines. However, the appellants used those appeals to directly challenge the issuance of the original permit, openly arguing that the original issuance was contrary to law. In this case, the School is not arguing that the issuance of the 1976 permit was contrary to law. Instead, it is arguing that the factual situation in which the permit operates has changed significantly, and therefore, the effect of the continued operation of the permit needs to be reevaluated as a whole. The harms that the School is challenging did not exist and were not anticipated when the original permit was issued in 1976. The harm the School is now suffering from is ongoing and the result of a cumulative impact of the quarry on the immediately adjacent area.

As we stated in *Tinicum Township v. DEP*, 2002 EHB 822, 835, while an application for a permit renewal does not require the Department to reexamine whether the initial permit issuance was proper, "[i]t does, however, require the Department to ensure that a *continuation* of the permitted activity is appropriate based upon up-to-date information. Similarly, our review focuses upon the *continuation,* not the historical initiation, of the activity in question." (emphasis in original).

In *Wheatland Tube Co. v. DEP*, 2004 EHB 131, 135-36, we further explained our decision in *Tinicum Township* and adopted the same analysis:

> [E]ven in the absence of changes to permit terms, the five-year renewal requirement required the Department to ensure that a permit issued years earlier was still appropriate based upon what was known at the time of the proposed renewal. The determinative

> issue was not whether the permit was appropriate in the first place; it was whether it should have continued in place for another five years. Challenges related to the former were barred; challenges related to the latter were held to be properly the subject of Departmental consideration and Board review.

See also Angela Cres Trust v. DEP, 2009 EHB 342, 359. Here, the issue is not whether it was appropriate to issue New Hope's 1976 permit, but rather, in the context of a depth correction, whether it is appropriate to let the permitted activity continue in light of the current information that shows that mining is causing hazardous conditions at Solebury School. "The doctrine of administrative finality was never intended to insulate a permit from any changes or review of those changes for all of time." 2004 EHB at 133.

Aside from being legally incorrect, we doubt there is any scientific basis for evaluating the effect of only one small band of mining in a deep pit. The Department never explains the scientific justification for or validity of its artificially circumscribed review. It also never explained the basis for what determines the size of the increments of the depth corrections. Of course, the smaller the increment, the less likely it would be to pin any particular harm to that increment, but again, we fail to see how this artificially narrowed approach comports with either law or reality. A death by a thousand cuts is still a death. There is no logical, legal, or scientific justification for ignoring the first 999 cuts and limiting the review to the effect of the latest cut.

The third and arguably most serious defect in the Department's review of the depth correction application was its requirement that New Hope's permit amendment could only be denied if New Hope's mining would increase "the frequency and severity of sinkhole formation." We fundamentally disagree that the odds of someone getting hurt must increase before the Department does something about it. If the current level of risk is unacceptable—and it clearly is—the Department has an obligation not to perpetuate and enable it. The Department

says the situation must get worse, but the School has convinced us that, in terms of risk, it cannot get much worse than it already is.

Not only is the Department asking the wrong question, the question is ill defined, at best. For instance, what does it mean to increase the frequency or severity of collapse sinkhole formation at the School? Despite two weeks of testimony, not a single witness answered that question. With regard to "severity," the Department never defined whether the sinkholes needed to get larger or deeper. Many of the sinkholes have been quite large and deep, more than capable of causing harm to human life or damage to property. The swallet in Primrose Creek has completely swallowed up the stream. The Department never elucidated at what point it would be satisfied that the situation was sufficiently severe. Would an injury need to occur or a building collapse? With respect to frequency, Solebury School has averaged two to three sinkholes a year since 1989 and it suffered 19 sinkholes from 2009 through 2011. Must sinkholes be shown to appear once a month to satisfy the Department? The Department clung to its ill-conceived standard as if the sinkhole problem at the School were not already severe.

We seriously doubt that the Department's manufactured standard could even be met. The Department created an *ignis fatuus* that the School had no hope of satisfying. Predicting where, when, and how serious future collapse sinkhole occurrences will be is usually impossible. (*See* T. 475-76; S. Ex. 245.) Their unpredictability is precisely why they are so dangerous. If even one sinkhole cannot be predicted with accuracy, how can scientists working on behalf of the School be expected to predict the precise extent to which sinkhole formation at the School will increase "in frequency or severity"? We cannot imagine any scientist credibly opining, for example, that collapse sinkholes will now be deeper or they will now occur once a month instead of once every couple of months. The Department's standard asks the impossible and the Department then

criticizes the School's experts for not being able to predict the exact extent to which sinkhole occurrences will "get worse."

New Hope's Mining Is Causing a Serious Risk to Health, Safety, and Welfare and the Depth Correction Should Have Been Denied

Implicit in everything the Department has said and done in this matter is the notion that "what's done is done": quarrying has been going on for decades; the quarry may be nearing the end of its life anyway; the School never complained before and it should bear up and allow the mining to be completed. The School quite properly responds that what's done is far from done, and enough is enough. We agree with the School.

The Department should have evaluated New Hope's application to assess whether continued mining will unavoidably perpetuate a health and safety hazard. Had it done so, it would have found that mining will perpetuate the hazard, and as a result, the depth correction should not have been issued.

Despite a hearing on the merits lasting ten days, there was a remarkable lack of disagreement among the credible experts regarding many of the key facts in this case. As previously mentioned, there was no disagreement that the School is enduring a severe sinkhole problem, and that the problem presents a significant risk to the health, safety, and welfare of the children and adults who live, work, and go to school on its campus. Perhaps somewhat surprisingly, none of the credible experts disagree that New Hope's mining is at least a contributing factor that is causing the hazard.[2] While we think that alone is enough to justify

[2] William Kochanov, P.G. of the Department of Conservation and Natural Resources was brought in by the Department of Environmental Protection to testify in support of the permit issuance. Kochanov is well-regarded in Pennsylvania as an expert on karst geology. Although we find him to be qualified to testify as an expert, the opinions he rendered in this case were often at odds with that of every other expert in the case. For example, although every other expert acknowledged some connection between the quarry and the sinkholes, Kochanov's basic position is that more study is needed. (T. 1855-58; DEP Ex. 196.) However, despite claiming that the current evidence is inconclusive, he still somehow was able to

rescission of the depth correction, in the interest of a complete record we credit the expert opinions of the School's expert witnesses, Ira Sasowsky, Ph.D. and Michael Byle, P.E., that New Hope's mining is the *only* significant cause of the collapse sinkholes. In other words, but for the quarry, the sinkholes would not be forming.

The weight that we lend to an expert's opinion depends on a variety of factors, including the expert's qualifications, presentation and demeanor, preparation, knowledge of the field in general and the facts and circumstances of the case in particular, and the quality of the expert's data. *Pine Creek Valley Watershed Ass'n, Inc. v. DEP*, 2011 EHB 761, 780 (citing *UMCO v. DEP*, 2006 EHB 489, *aff'd*, 938 A.2d 530 (Pa. Cmwlth. 2007)). We also look to the opinion itself to assess whether it is coherent, cohesive, objective, persuasive, and grounded in the relevant facts of the case. *Pine Creek*, 2011 EHB at 780.

An important aspect to any expert analysis of the Primrose Creek Basin is the underlying issue of karst geology. The existence of karst geology is an extremely important factor that pervasively influences any scientific study undertaken and expert opinion rendered regarding such an area. In this respect, the School's experts, Dr. Ira Sasowsky, P.G. and Michael Byle, P.E., must be viewed with an elevated credibility given their career specializations in the field of karst geology.

Dr. Sasowsky has devoted his career to studying karst geology. He is a well-recognized expert in karst geology, both nationally and internationally. He has conducted field studies in karst regions in more than 25 states, South America, the Caribbean, and Europe. He has edited textbooks on the subject and published numerous peer-reviewed articles and abstracts on karst.

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opine, employing the Department's standard, that quarrying 50 feet deeper will not exacerbate the sinkhole problem. Furthermore, if more study is needed to assess whether the School's serious sinkhole problem is being caused by the quarry, why is the Department allowing quarrying to continue pending the results of that study? By and large, we do not credit Kochanov's opinions in this case.

(S. Ex. 245.) Above all other experts in this case, Sasowsky is eminently qualified on the subject of karst geology and we accept his opinions as highly credible.

Mr. Byle has specialized in geotechnical engineering. He has more than thirty years of experience in karst geology issues, more than fifteen of which are specific to the karst geology of Pennsylvania. (S. Ex. 247.) Byle has conducted analyses, developed technical reports, and proposed engineering designs for karst regions across the United States. His specialized and expansive experience makes him a compelling expert for opining on geologic issues that form a key part of engineering solutions to challenges associated with karst geology.

At the hearing, the Department raised objections to Byle's testimony, arguing that he was conducting the unlicensed practice of geology. (T. 794-96.) The Department has reiterated similar objections in its post-hearing brief. The Department's objections to Byle's testimony and work in this case are essentially directed at the field of geotechnical engineering itself, due to either a fundamental misunderstanding of the study and practice of geotechnical engineering, or a misguided grievance with its existence as a discipline. We do not agree with the Department that in order to engage in the study and practice of geotechnical engineering that one must, as a necessary precursor, be both a licensed professional engineer and a licensed professional geologist. The Department has pointed us to no such requirement. An expert understanding of geology is a necessary component of geotechnical engineering. The standard for expert testimony in Pennsylvania is that the expert must possess knowledge beyond that of a layperson, the knowledge must assist the trier of fact in understanding evidence or an issue of fact, and the expert's methodology must be generally accepted in the field. Pa.R.E. 702; *Fisher v. DEP*, 2010 EHB 46, 47-48; *Rhodes v. DEP*, 2009 EHB 237, 238-39. Byle certainly qualifies under that standard and we find his opinions to be credible.

Louis Vittorio, Jr., P.G. has spent his career focusing on hydrogeology. His firm, EarthRes Group (ERG), has had New Hope as a client since 2002. (T. 1015-16.) He has the most direct experience working in the Primrose Creek Basin and in the quarry. (T. 1231.) Vittorio has also worked on numerous projects involving karst geology. (N.H. Ex. 176.) Although Vittorio is well-qualified, on balance, to the extent they disagreed, we find the opinions of Sasowsky and Byle more credible.

Michael Kutney, P.G. was the Department's lead permit reviewer for the New Hope depth correction. Mr. Kutney was a very sincere and credible witness and we found him to be a qualified geologist. However, although Kutney is generally familiar with karst geology and collapse sinkhole formation, he acknowledged that he has limited expertise in the field of karst geology and sinkhole formation. (T. 2169, 2206, 2301.) He testified that he involved Kochanov to assist him in assessing the karst geology of the region. (T. 2122.) Although Kutney also testified that he formed his own opinion regarding the effect of the quarry on sinkholes, his close work with Kochanov over the course of a year and a half indicates that Kutney's opinions were heavily influenced by Kochanov, whose opinions in this case we do not credit. (T. 2122-26, 2301.)

In short, the School assembled a top-notch team of experts for evaluating the karst geology of the Primrose Creek Basin and the hydrogeologic connection between the quarry's dewatering and the sinkhole development on the School's campus, the key issues in the case. Although Sasowsky, Byle, Jennifer Wollenberg, Ph.D., Kutney, and Vittorio were all qualified, sincere, and credible, Sasowsky and Byle's specialized knowledge uniquely qualifies them to opine on karst geology and the development of collapse sinkholes within the basin, which is the crux of this case. We weigh their opinions accordingly.

The evidence is overwhelming that New Hope's mining is the predominant cause of the sinkhole problem at Solebury School. The quarry pumps an average of between two and three million gallons of water per day out of its pits. Before New Hope's dewatering, the groundwater table underneath the School was about ten feet below the surface. It is now about 100 feet below the surface as a result of the quarry dewatering. The quarry is essentially draining all of the in-basin groundwater from the basin, and it is now pulling groundwater originating from outside of the basin as well. Since the basin itself has nothing left to give, future effects will be muted, but groundwater levels will continue to go down. No expert testified that groundwater levels will return to natural levels so long as dewatering continues. No expert testified that groundwater levels will go up, or that sinkholes will stop forming.

The drop in groundwater caused by the quarry is what is in turn causing the sinkholes. The absence of water causes an immediate destabilizing effect as a result of a loss of cohesion, but the bigger problem is that the quarry opening, including the opening of high conductivity groundwater pathways, coupled with lower groundwater in general and a more extreme hydraulic gradient, induces regolith that formerly filled voids in the soluble karstic rocks to wash away. If this happens from the bottom up as it does under the School, the unconsolidated materials at the surface hold for a while with nothing but air beneath them. Then suddenly, the arch collapses and the School is left with a collapse sinkhole. This process will continue unabated until the quarry stops pumping. A lot of damage has already been done, but when the quarry stops pumping, the pit will fill up and the sinkholes will eventually stop.

The Department and New Hope spent a good deal of effort attempting to deflect attention away from the quarry's obvious role in causing the collapse sinkhole problem within the Primrose Creek Basin. The Department and New Hope assert that rain and flooding as well as

Solebury School's campus development have contributed to sinkhole formation. The Department and New Hope also tell us, unhelpfully, that sinkholes form from a combination of water and karst geology. This is like telling us that you cannot have a broken bone without a bone. This is, of course, true, but something more than the presence of water and karst is needed to explain why the School is suffering from so many sinkholes. The karst geology has existed for millions of years. The School did not start to experience rain and floods for the first time in 1989. Yet there is no evidence of sinkholes forming on the School's campus until 1989.

The Department and New Hope's effort to saddle the School with part of the blame is entirely unconvincing. First, in terms of the School's development, the School constructed a number of buildings between 1948 and 1968 without any sinkholes forming. (S. Ex. 288.) Between 1978 and 1997 the School engaged in no campus development, yet saw eight sinkholes form from 1989 through 1997. (*Id.*) In addition, the development that the School has engaged in from 1998 to the present has been done in a cautious and responsible manner, seeking out geotechnical consultants to ensure that development and post-construction drainage pathways would be done in ways that would not exacerbate the sinkhole problem. (S. Ex. 42-56.) The School has taken all reasonable precautions to ensure that it did nothing to contribute to sinkhole formation. Furthermore, collapse sinkholes have formed both on and off the School's campus, in areas of long-existing buildings and in forested areas, such as the swallet in Primrose Creek. Sasowsky and Byle credibly opined that the School's development has not contributed in any meaningful way to sinkhole formation.

Putting aside its lack of technical merit, the Noncoal Act was not intended to elevate the right to mine above the right of the mine's neighbors to the quiet enjoyment of their property. As discussed above, the Act expresses the opposite intent. Through no fault of its own, Solebury

School is now constrained in the lawful use of its property as an educational institution for children. There is no support in the law for the Department's decision to allow this situation to go forward.

The Department impressed upon us the fact that the quarry and the School are located in a sinkhole-prone area. The Department did not explain the legal relevance of this fact. If the Department is suggesting that New Hope is somehow more entitled to cause a hazardous condition because the area is prone to sinkholes, we completely disagree.

The Department and New Hope point to a number of natural and permit conditions that they believe will protect the School. The School's response is that none of these conditions are working now, so they are largely irrelevant. We agree. The conditions will not eliminate or even reduce the existing, ongoing hazard to health and safety. The Department and New Hope argue that the conditions will prevent the situation from getting worse, but as previously mentioned, that is an entirely inappropriate question and, in any event, in terms of risk to health and safety the situation cannot get any worse. Nevertheless, we will touch on a few examples of how the School has convinced us that the Department's allegedly protective measures will not provide any comfort.

The Department and New Hope point to geologic features such as a shale layer underneath the School, a diabase dike east of the School, and tighter bedrock at depth beneath the School as natural features working in concert to restrict groundwater flow, thereby protecting the School from the effects of mining. At the risk of belaboring the point, the simple fact of the matter is that these features have done nothing to prevent collapse sinkholes from forming at an alarming rate at the School to date. There is no basis for the claim that the natural features will do anything in the future to quell the ongoing sinkhole problem. The conditions giving rise to

the sinkholes are already in place and an unacceptable number of sinkholes have formed while all of these alleged hydrogeologic barriers have been in place. There has been no evidence to suggest that there is anything in place now that will stop this ongoing problem.

As a technical matter, no expert could tell us exactly where the shale layer and tighter bedrock are located, if at all, under the School. There is photographic evidence of visible portions of the shale layer presenting itself in the bed of Primrose Creek, suggesting that the shale layer is very near the surface at some points. No comprehensive studies have been undertaken of the shale layer and no party could exactly pinpoint the defined extent of the shale layer. New Hope acknowledged that the shale layer pinches out and the Department testified that it comes and goes at points. We have a very difficult time accepting concrete assertions that the shale layer is an effective hydrogeologic barrier when no one even knows its westward extent toward the School and if it is a continuous, unbroken stratum.

Likewise, there has been no comprehensive study of Dike 1. For instance, Dike 1, even if it is functioning as a hydrogeologic barrier, has done nothing to stem the formation of collapse sinkholes thus far. Even now, it is undisputed that water is still finding a way around the dike and making it into the quarry, meaning the dike is still allowing the quarry to dewater the area under the School.

More than any other natural feature, the Department and New Hope rely heavily on the concept that the rock the quarry is mining becomes tighter with depth, meaning in their view that it is unlikely that karst conduits will be encountered. At the hearing, when the other natural geologic features were exposed as having a speculative effect as hydrogeologic barriers, the Department and New Hope continually fell back on the rock becoming tighter at depth. They lean on this premise to assert that there will be no further lowering of the groundwater table

beneath the School and then contend that consequently the quarry does not present a harm to the School. Not only are the Department and New Hope incorrect in this contention, but it also misses the point. New Hope has been mining this tighter rock for years and yet collapse sinkholes continue to develop on the School's campus. Furthermore, there is significant evidence of voids in the deeper rock based on well logs and blasting logs. Statistically, some of these voids are likely to be water-bearing zones. Still further, many sinkholes have formed in areas of the campus where it appears that there is nothing but the tighter formation, which runs directly counter to the assertion that the tighter strata are protective of the School.

In addition to the natural features doing nothing now or in the future to prevent sinkholes, there is nothing contained within the permit that is adequately protective of the School. The Department points to the Sinkhole Minimization and Mitigation Plan that it required New Hope to prepare and implement as a protective measure. The essence of this plan is that New Hope must now repair sinkholes *after* they form within the quarry's zone of influence. The plan is misleadingly named because it does nothing to prevent the formation of collapse sinkholes in the first place. Mr. Kutney acknowledges this in his expert report. (DEP Ex. 197 at 3.) Even Mr. Vittorio admitted that the Plan does nothing to prevent the occurrence of future sinkholes; it only sets forth measures to prevent existing sinkholes from reopening after they have been repaired. (T. 1642-43.) This plan is not protective of the School.[3]

Under Special Condition #21, New Hope is required to report to the Department when it encounters mud seams or voids coupled with down hole loss or decrease in return water, or when it encounters "sustained high yield artesian conditions" while conducting pre-blast drilling or any mining of the quarry. Drilling is then to cease until the Department can conduct an investigation

[3] *Cf. Solebury Twp. v. DEP*, 2004 EHB at 120-21 (the fact that New Hope was required to restore or replace water supplies after the fact does not excuse an unreasonable impact upon the hydrologic balance in the first place).

and determine whether further mining will adversely affect the hydrologic balance. This permit condition, which was essentially written by New Hope's consultant, is, perhaps not surprisingly, not particularly protective. First, the permit lacks definitions that would provide adequate meaning to the terms "sustained high yield artesian conditions." There is no guidance provided to New Hope on what constitutes sustained high yield artesian conditions or how to recognize such conditions that would require reporting to the Department.

Once one of these seams is encountered, stopping or controlling the inflow of water may be difficult. In addition, there was testimony that an encountered mud seam may at first seem insignificant, but may soon develop into a more serious condition with seeping water becoming an in-rush of water with accompanied sediment flushing. (T. 415-17, 484-85, 565, 617, 660.) Further, it seems that corrective action may only be required if the sustained high yield artesian conditions are coupled with the likewise undefined "major unanticipated change in the predicted groundwater inflow into the pit" from Special Condition 19.

The Department also refers us to New Hope's quarterly monitoring obligation. It says that if significant changes in the hydrogeology of the basin manifest, the data from the monitoring well network will give it an opportunity in the future to react. Once again, monitoring is already underway, but it has obviously done nothing to eliminate the ongoing sinkhole problem at the School. Like the Sinkhole Minimization and Mitigation Plan, groundwater monitoring does nothing to prevent sinkholes from forming in the first place. The Department has not explained what measures it might or might not take if it detects something in the groundwater monitoring results. A sudden collapse of groundwater levels is not necessarily a precursor or a prerequisite to sinkhole formation. It is unclear how another dewatering event like the one experienced in the early 1990s would impact sinkhole formation within the basin and

how long it would take for that impact to materialize. No program has yet been designed that can predict sinkhole formation. New Hope's monitoring well network contains no wells at the School. In short, New Hope's monitoring network provides no protection against the ongoing formation of sinkholes and no demonstrated value in stopping them from continuing into the future.

In order to detect abrupt changes in the groundwater, the Department relies in part upon New Hope's groundwater computer modeling, which has an integral reliance upon the monitoring well network. Interestingly, the Department in *M & M Stone Co. v. DEP*, 2008 EHB 24, *aff'd*, No. 383 C.D. 2008 (Pa. Cmwlth. Oct. 17, 2008), attacked the conclusions reached as a result of computer-generated groundwater modeling using the same model because the model was premised upon the inaccurate assumption that the fractured bedrock in the study area reacted to pumping more like a uniform porous media than a system controlled by irregular and variable fractures. 2008 EHB at 47. We agreed with the Department's criticism of M & M Stone's experts for basing conclusions on modeling that treated the study area as if it were a veritable sandbox in which water flows in a uniform pattern between all points. 2008 EHB at 61.

In this case, Dr. Sasowsky challenged Mr. Vittorio's conclusions for similar reasons. Karst favors irregular preferential groundwater flow at least as much as and likely more than other geologic settings. Sasowsky credibly opined that Vittorio's modeling was not designed to adequately account for that. (T. 389-97; S. Ex. 245.) Vittorio's defense on that point is not very specific or satisfying. (T. 1420-27, 1452, 1485-88.) The primary response seems to be that the groundwater levels generated by the model "contoured fairly well." (*See, e.g.,* T. 1427.) Sasowsky vigorously disagreed. He pointed to wildly crenellated contour lines, lines not supported by adequate data, lines that depict "crazy flow paths," and contour lines extending

through known hydrogeologic barriers. (T. 398-405, 452-55; S. Ex. 329.) We find Sasowsky's characterization far more credible. The bizarre results of the quarry's modeling should have been seen as a red flag suggesting that the model was not showing a real picture of what groundwater is actually doing at this particular site. This is not at all surprising in any karst system, let alone the Primrose Creek Basin, which has known conduit flow. The reliance on a model that does not account for the karst geology of the basin is a significant flaw that undermines many of the assertions put forth by New Hope regarding its ability to detect and react to a change in groundwater levels that will conduce sinkhole formation.

The School's overarching concern is with the collapse sinkholes on its campus. However, the School has also argued that the depth correction should have been denied because New Hope's mining has and will continue to cause an unreasonable disturbance of the hydrologic balance and impairment of the stream, and its mining is causing excessive sedimentation in the reach of the Primrose Creek located below and downstream of the quarry.

Although the School has raised some legitimate points on these issues, particularly regarding the way the Department reviewed the effects of the mine on the hydrologic balance,[4] the safety hazard caused by the quarry compels us to rescind the depth correction, so we will forbear at this time from offering an opinion regarding the Department's analysis of the

[4] For example, the Department evaluated the effect of New Hope's mining on the hydrologic balance using 2005 as a baseline. (T. 2171-74, 2178, 2411-12; S. Ex. 176.) The Department ordinarily uses natural conditions that existed before mining as the baseline. (T. 2198-99.) In this case, by 2005, New Hope's mining had already had a profound impact on the hydrologic balance, so it is difficult to understand the decision to start the analysis in 2005, according to the School. The School says that the mining by 2005 had already permanently eliminated part of the stream, converted other parts of the stream from perennial to ephemeral, lowered the water table by 100 feet, required replacement of numerous wells, and so the School questions why all of these effects were ignored by the Department in its analysis.

hydrologic balance and sedimentation issues.[5] Likewise, it is not necessary at this time for us to decide whether the quarry's undisputed flow impairment of the upstream reach of Primrose Creek would independently justify a rescission of its depth correction.

Objection to Exhibits

The Department contests some of the exhibits used by the School at the hearing that were not previously produced during the discovery period itself or simultaneously with the School's pre-hearing memorandum. The exhibits at issue are Solebury School Exhibits 323–330. All eight of these exhibits were admitted at the hearing over the Department's objections. The Department continues to maintain that it was unfairly prejudiced by the School's failure to produce them earlier during the course of the appeal. The School responds that the exhibits are merely demonstrative evidence that produce no new information and merely visually depict data contained in other exhibits that were previously available to all parties during the case.

The Department fails to explain exactly how it has been prejudiced. In fact, we view the objections as bordering on the frivolous. The exhibits at issue are multicolored diagrams illustrating the geologic formations in the area including and surrounding the Primrose Creek Basin, as well as graphs illustrating water levels in monitoring wells, the water bearing zones in geologic strata, and quarry pumping as a fraction of precipitation.

The critical consideration in evaluating the admissibility of demonstrative evidence runs to one of the core tenets of evidence, namely, weighing the probative value of relevant evidence against the risk of unfair prejudice to other parties. Pa.R.E. 403; *Commonwealth v. Serge*, 896 A.2d 1170, 1177 (Pa. 2006). Demonstrative evidence has long been held as admissible as long as it accurately depicts what it purports to represent and is helpful in understanding the

[5] Because we do not reach the sedimentation issue, there is no need to address New Hope's challenge of the School's standing to address that issue.

underlying facts. *Serge*, 896 A.2d at 1177 (Pa. 2006); *see also Nyce v. Muffley*, 119 A.2d 530, 532 (Pa. 1956). While we agree that exhibits such as the School's should have been provided to the other parties, in the case before us we do not find that the opposing parties suffered unfair prejudice in not having them earlier. The key point is that the exhibits do not contain any new data. In fact, they are all comprised of data generated either by the Department or New Hope. We do not see how the parties can claim unfair prejudice regarding exhibits that do nothing more than convey their own data. The exhibits themselves do not make any broad or specific conclusions; they merely show what has been discussed and studied exhaustively in this case. In a case that includes more than 700 exhibits and voluminous amounts of data, much of which is duplicative, the challenged exhibits have been slightly helpful, but they certainly have not played any key role. The Department has made no attempt to explain how these exhibits could possibly have materially impacted the resolution of this appeal.

Some of the information shown by these exhibits is extremely basic, such as the geologic formations that have been studied extensively by all parties. There is nothing controversial in them; there is nothing that is not already contained in other exhibits. In fact, Solebury School Exhibit 323 contains nothing that is drastically different from figures E-006 and D-006A from New Hope's consultant's Hydrogeologic Investigation Report. (T. 1371-72; N.H. Ex. 178.) The parties in this case were all represented by extremely able counsel who conducted many months of discovery and exchanged thousands of pages of complex documents. It was abundantly clear that each party was fully apprised of the other parties' cases. This was not a case of trial by ambush, very much the contrary.

To the extent the Department complains that some of the exhibits do not accurately represent what they purport to depict, such as an alleged manipulation of the scale on the *x* axis,

we very often deal with complex charts and graphs at the Board. We can understand and interpret differences in scale. We do not feel that we have been misled in any way. Accordingly, the objections to the demonstrative exhibits are overruled.

Conclusion

Our fundamental issue with the depth correction is that it allows a condition to persist that endangers the health and safety of others. New Hope does not get to continue creating a safety risk by estoppel. New Hope's right to mine while causing a clear safety risk is not grandfathered. There is nothing in the law to support such a notion, quite the contrary. *See Bonzer v. DER*, 1981 EHB 34, 39 ("No one can gain a prescriptive right against the public to continue a nuisance on his property."); *Clearview Land Dev. v. Commonwealth*, 327 A.2d 202, 205 (Pa. Cmwlth. 1974) (no prescriptive right to continue a condition that is declared by statute to constitute a public nuisance); *Commonwealth v. Barnes & Tucker Co.*, 319 A.2d 871, 884 n.13 (Pa. 1974) (one cannot obtain a prescriptive right to maintain a public nuisance); *cf. Mystic Brooke Dev., L.P. v. DEP*, 2009 EHB 146, 151 (no prescriptive right to contaminate a water supply); *William J. McIntire Coal Co. v. DER*, 1986 EHB 712, 729 (no prescriptive or property right to pollute a stream).

We understand that there has already been a substantial amount of mining below -120 feet MSL both illegally before the depth correction was issued and legally after it was issued. Our Adjudication is not intended to have any retroactive effect with respect to that mining. It is also not intended to prohibit any mining that may be performed in accordance with the permit above -120 feet MSL. Although it will take quite a while for the unsafe condition to abate, movement toward that goal should commence immediately. New Hope may be able to pursue options such as the engineering solutions proposed by Mr. Byle to eliminate the quarry's effect

on the groundwater table beneath the School and help ensure that sinkhole development will abate, and nothing in this Adjudication is intended to discourage New Hope from pursuing such options. (T. 677-80.) Interestingly, New Hope (as opposed to the Department) has not argued that such alternatives do not exist. The Department claimed that Byle's proposals would be too expensive to implement and may not work, despite acknowledging that it did not bring any specific geotechnical engineering experience to bear on the issue. (T. 2302-03.) In the meantime, given the clear and present danger being caused by mining, we find it necessary to rescind the depth correction effective immediately.

CONCLUSIONS OF LAW

1. The Board reviews actions of the Department *de novo* and considers the case anew. *Dirian v. DEP*, 2013 EHB 224, 232; *O'Reilly v. DEP*, 2002 EHB 19; *Warren Sand & Gravel Co. v. Dep't of Envtl. Res.*, 341 A.2d 556 (Pa. Cmwlth. 1975).

2. In third-party appeals of Department actions, the appellant bears the burden of proof. 25 Pa. Code § 1021.122(c)(2)

3. The appellant must show by a preponderance of the evidence that the Department acted unreasonably or contrary to the law, or that its decision is not supported by the facts. *Gadinski v. DEP*, 2013 EHB 246, 269.

4. The Department acted unlawfully, unreasonably, and abused its discretion by approving New Hope's depth correction even though New Hope's continued mining pursuant to the depth correction is causing and perpetuating a hazardous condition on its neighbor's property that endangers the public health, safety, and welfare. 52 P.S. §§ 3302, 3308, 3311; 71 P.S. § 510-17(3); 25 Pa. Code §§ 77.126, 77.130(1), 77.521.

5. The Department erred by imposing a standard of review that the frequency or severity of sinkhole occurrences must increase for the depth correction to be denied.

6. The Department erred by requiring the School to demonstrate that New Hope's mining could not be reasonably accomplished rather than requiring New Hope to demonstrate that mining could be reasonably accomplished. 52 P.S. § 3308(a); 25 Pa. Code § 77.126.

7. The Department erred by limiting its review of the permit to the isolated portion of the 50 foot depth correction from -120 feet MSL to -170 feet MSL. The Department should have considered the effect of mining from the surface to -170 feet MSL. *Solebury Twp. v. DEP*, 2004 EHB 95; *Solebury Twp. v. DEP*, 2007 EHB 713; *Angela Cres Trust v. DEP*, 2009 EHB 342; *Wheatland Tube Co. v. DEP*, 2004 EHB 131; *Tinicum Twp. v. DEP*, 2002 EHB 822.

8. Solebury School proved by a preponderance of the evidence that the Department erred in granting the depth correction and allowing New Hope to create hazards to health and safety. 52 P.S. § 3302; 25 Pa. Code § 77.130; 25 Pa. Code § 1021.122(c)(2).

9. Solebury School failed to prove that the quarry demonstrated a lack of ability or intention to comply with the law as indicated by past or continuing violations, except to the extent the quarry is causing a hazardous condition on its neighbor's property. *See* 52 P.S. § 3308(b)(1); 25 Pa. Code § 77.126(a)(6).

10. The Department's failure to comply with the requirement in 25 Pa. Code § 77.126(a) that it make several written findings before issuing the permit (T. 2142-45, 2150-51, 2396-99) constitutes a harmless error.

11. New Hope failed to affirmatively demonstrate that its mining activities could be reasonably accomplished under the Noncoal Act and the regulations promulgated thereunder. 77 Pa. Code § 77.126.

12. The quarry is creating a public nuisance. 52 P.S. § 3311(b).

13. The Department has a duty to abate and remove public nuisances. 52 P.S. § 3311(b); 71 P.S. § 510-17(3).

14. The issues raised by Solebury School in this appeal are not barred by administrative finality. *Angela Cres Trust v. DEP*, 2009 EHB 342; *Wheatland Tube Co. v. DEP*, 2004 EHB 131; *Tinicum Twp. v. DEP*, 2002 EHB 822.

15. The Department erred in approving a depth correction that does not protect the quantity of surface and groundwater within the permit area and within adjacent areas. 25 Pa. Code § 77.457; *Plumstead Twp. v. DER,* 1995 EHB 741, 776-77.

16. Solebury School's demonstrative exhibits were not unfairly prejudicial to the Department or New Hope and were properly admitted. Pa.R.E. 403; *Commonwealth v. Serge*, 896 A.2d 1170, 1177 (Pa. 2006).

COMMONWEALTH OF PENNSYLVANIA
ENVIRONMENTAL HEARING BOARD

SOLEBURY SCHOOL	:	
	:	
v.	:	**EHB Docket No. 2011-136-L**
	:	
COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF ENVIRONMENTAL PROTECTION and NEW HOPE CRUSHED STONE & LIME COMPANY, Permittee	:	

ORDER

AND NOW, this 31st day of July, 2014, it is hereby ordered that the July 29, 2011 depth correction to Surface Mining Permit 7974SM3C12 authorizing New Hope Crushed Stone & Lime Company to mine to a depth of 170 feet below mean sea level at the New Hope Crushed Stone quarry is **rescinded**.

ENVIRONMENTAL HEARING BOARD

THOMAS W. RENWAND
Chief Judge and Chairman

MICHELLE A. COLEMAN
Judge

BERNARD A. LABUSKES, JR.
Judge

RICHARD P. MATHER, SR.
Judge

STEVEN C. BECKMAN
Judge

DATED: July 31, 2014

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