Kirk v. Li, 2019 Mass. LCR LEXIS 2

Massachusetts Land Court

January 7, 2019, Decided

MISCELLANEOUS CASE NO. 17 MISC 000281 (RBF)

Reporter

2019 Mass. LCR LEXIS 2 *

PETER KIRK, BRYAN JOHNSON, and MAXINE BREEN, Plaintiffs, v. WINIFRED I. LI, JANE FISHER CARLSON and STEPHEN J. LAROCQUE, as they constitute the WESTON BOARD OF APPEALS, and 269 NORTH AVE, LLC, Defendants.

Judges: [*1] Robert B. Foster, Justice.

Opinion by: Robert B. Foster

DECISION

Fundamental to state and local stormwater regulations is the principle that any development of property should not cause an increase in the amount of storm water currently running off the property. In this case, the defendant 269 North Ave, LLC (Developer) sought and obtained a comprehensive permit under G.L. c. 40B, § 21, from the defendant Weston Zoning Board of Appeals (Board) for a 16-unit affordable housing project on a 1.46-acre parcel at 269 North Avenue, Weston (Developer property). The Developer property presented somewhat unique challenges to satisfying the requirement that the project not result in an increase in stormwater runoff. The Developer property is severely sloped at the rear, and is the low point of a 16-acre watershed lying uphill. As a result, all the stormwater from these 16 acres accumulates on the Developer property. Because of the particularly porous soils on the property, all of this stormwater recharges into the ground, with none of it running off. Construction of the project would result in an increase in the impermeable surfaces on the Developer property (i.e., buildings and parking lots), which would in turn decrease the [*2] open land available to recharge stormwater. This means that, in order to satisfy stormwater regulations, the Developer was required to design a system that would collect and discharge all this stormwater into the ground. The Board was satisfied with the Developer's proposed system for handling and recharging stormwater, and issued the comprehensive permit.

The plaintiffs Peter Kirk (Kirk) and Bryan Johnson (Johnson), abutters to the south and north of the Developer property, respectively (together, the Abutters), disagreed. They believe that the Developer's stormwater system will not handle the stormwater flow onto the Developer property after it is developed, resulting in flooding on their properties. They are further concerned that the

development will harm or kill trees that straddle the boundary or are on their properties. They have appealed the Board's decision. Several counts were dismissed; the rest were tried. After trial, I find that, while the Abutters have standing to bring this action, the Board did not act unreasonably or arbitrarily or capriciously in accepting the Developer's stormwater management plan or its measures for protecting the trees. The comprehensive permit [*3] will be affirmed.

Procedural History

The complaint was filed on May 22, 2017. The Answer of Defendant Weston Zoning Board of Appeals was filed on June 20, 2017. The Answer and Counterclaim of 269 North Ave, LLC was filed on July 21, 2017. The Affidavit of Daniel C. Hill and Memorandum of Law In Support of Plaintiff Bryan Johnson's Special Motion to Dismiss were filed on September 15, 2017. The Plaintiff's Special Motion to Dismiss was filed on September 18, 2017. The Defendant 269 North Ave. LLC's Motion to Dismiss Counts II and III of the Complaint and Defendant 269 North Ave. LLC's Statement of Material Facts in Support of Motion to Dismiss Counts II and II of the Complaint were filed on September 18, 2017. The Defendant 269 North Ave, LLC's Opposition to Plaintiff Bryan Johnson's Special Motion to Dismiss Counterclaim and Plaintiff Maxine Breen's Memorandum in Opposition to Defendant 269 North Ave. LLC's Motion to Dismiss Counts II and III of the Complaint and Cross-Motion for Relief under Rule 56 as to Count II were filed on October 18, 2017. The Defendant Weston Zoning Board of Appeals Joinder in Defendant 269 North Ave, LLC's Motion to Dismiss was filed on October 19, 2017. The motions [*4] to dismiss were heard on October 20, 2017, Count II of the Complaint was dismissed, and the remainder of the motions were taken under advisement. In a Memorandum and Order dated October 30, 2017, the remainder of the parties' motions to dismiss were denied.

The Stipulation of Dismissal as to Maxine Breen and Count III was filed on January 16, 2018. The Pre-Trial conference was held on March 20, 2018. A view was taken on May 25, 2018. Trial was held on May 31, and June 6, 2018. The court reporter was sworn. Exhibits 1-66 were admitted. Testimony was heard from William Doyle (Doyle), Sean Reardon (Reardon), Peter Kirk, Brian Johnson, Michael Boucher (Boucher), Edward Ionata (Ionata), and John Coppinger (Coppinger). The trial transcript was filed on July, 3, 2018. The Defendant 269 North Avenue, LLC's Post-Trial Brief and Plaintiff's Post-trial Memorandum of Law were filed on August 3, 2018. I heard the closing arguments on August 8, 2018. At that time I found that the Abutters' presumption of standing had been rebutted and took the remainder of the case under advisement. This Decision follows.

Facts

Based on the view, the undisputed facts, the exhibits, the testimony at trial, and my assessment [*5] of credibility, I make the following findings of fact.

The Parties and Their Properties

1. The Developer is a Massachusetts limited liability company, a limited dividend organization, and owns the Developer property. Exh. 57, ¶¶ 1, 3.

2. Johnson owns property located at 287 North Avenue, Weston, Massachusetts (Johnson property) which abuts the Developer property to the north. Exh. 57, ¶¶ 7-8. Johnson also owns and resides at property located at 293 North Avenue, Weston, Massachusetts but is currently building a residence on and intends to permanently reside at the Johnson property. Exh. 57, ¶¶ 7-10.

3. Kirk owns property located at 263 North Avenue, Weston, Massachusetts (Kirk property) which abuts the Developer property to the south. Exh. 57, ¶¶ 11-12. The Johnson property and the Kirk property are referred to together as the "Abutter properties."

4. The Developer property is approximately 1.46 acres in size. The front half is relatively flat meadow land with some trees. The back half is forested, sloping upward significantly. View; Exh. 57, ¶¶ 15-17.

5. The Developer property is situated on a boundary line dividing the Residence District A and Residence District B zoning districts of the [*6] Town of Weston, Massachusetts (Town) with 60,000 and 20,000 square feet of lot area in each district respectively. Exh. 57, ¶ 20.

6. The Johnson property, Developer property, and the Kirk property are identified as parcels numbered 61, 63, and 64 respectively on the Fiscal Year 2017, Tax Map 8 (Tax Map) of the Town of Weston (Town). Exh. 13. The Tax Map is attached for reference as Exhibit A.

7. The Developer property is the low point in a 16 acre watershed such that all of the stormwater runoff resulting from a storm event anywhere in the watershed flows onto the Developer property where it collects and soaks into the ground. Tr. 1:162-163.

8. The Developer property is unique in that, in its current condition, owing to highly permeable soil and a well-defined basin, there is no discharge or flow of water off of the property during storm events. Tr. 1:162-163.

9. The Town's housing stock, as of December 5, 2014, was comprised of only 3.5 percent affordable housing. Exh. 48. General Laws c. 40B requires a minimum ten percent of a municipality's housing stock be affordable. Johnson and Boucher, the Developer's project manager, both testified to the existence of a need for affordable housing in the Town. Tr. [*7] 2: 350, 357-358.

Permitting History

10. On February 12, 2016, the Developer received a project eligibility letter from MassHousing for a 16-unit affordable housing project under G.L. c. 40B (the Project). Exh. 57, ¶ 22.

11. On March 3, 2016, the Developer filed a comprehensive permit application for the Project with the Board. The Board opened the public hearing after proper notice, publication, and posting on April 4, 2016. After 14 sessions the Board closed the public hearing on April 28, 2017. The Board voted on the application on April 28, 2017, and approved a comprehensive permit (Comprehensive Permit or the Permit) for the project by a vote of two to one. The Board filed its written decision approving the Comprehensive Permit with the Weston Town Clerk on May 3, 2017 (Decision). Exhs. 31, 57, ¶¶ 23-28. A "Site Layout Plan" for the Project is attached for reference as Exhibit B. Exh. 18.

12. The Comprehensive Permit allows construction of five buildings on the Developer property, to include 16 rental units consisting of two one-bedroom units, 12 two-bedroom units, and two three-bedroom units. Four of those units will be restricted as permanently affordable, to be rented to eligible households [*8] with annual income not in excess of 80 percent of the area median income. The remaining 12 units are to be rented at market rate. Exhs. 31; 57, ¶¶ 30-36.

13. The Decision, which spans 33 pages, includes 25 findings, approximately 69 conditions, approximately 30 waivers, and a dissenting statement by the member of the Board who voted against approval of the Comprehensive Permit. Exh. 31.

14. The conditions in the Decision that are relevant to this appeal read as follows:

Conditions for 269 North Ave, LLC ("Kendal Village") Comprehensive Permit

B. Site Development/Construction Conditions...

20. The following conditions must be adhered to prior to any construction activities and during construction...

d. No grading or excavation shall disturb, or undermine the ground of, the adjacent properties. The ZBA requires that the Applicant adjust plant locations whenever existing roots are encountered during excavation for root balls...

f. Any excavation within ten (10) feet of the property line that might affect trees on the property line or on the adjacent properties shall be performed using an air spade, either directly by or under guidance of a certified Arborist. The air spade should be used to [*9] determine and define the limit of excavation.

g. During construction of the Project, any exposed roots within (10) feet on either side of the property line shall be protected as directed by a Certified Arborist.

h. Any required root pruning of abutters' trees, if necessary, shall be performed either directly by or under the guidance of a Certified Arborist. Any such root cutting shall occur only on the Applicant's property (unless there is permission or legal right to enter onto abutting property) and shall occur only in accordance with all of the requirements of Massachusetts state law.

i. The Applicant shall use an air spade to excavate for plant pits for any plantings proposed within ten (10) feet of the property line where existing trees abut it. In the event roots are encountered, applicant shall adjust planting locations in the field to minimize root disturbance.

j. The Applicant shall comply with the provisions of the following memoranda: "Kendal Village—Tree Protection," and "Kendal Village—Proposed Tree Protection Condition," referenced in Sections I.J and I.K under "Background," above. The escrow sum left blank in Paragraph 5 of the "Offsite Trees" section of the "Kendal Village—Proposed [*10] Tree Protection Condition" memorandum shall be $25,000...

G. Drainage Conditions

1. On-site stormwater disposal and management shall conform in all respects to the Massachusetts DEP Stormwater Management Program and all applicable provisions of DEP's Stormwater Management Policy, and to the Town of Weston Department of Public Works ("DPW") standards and requirements with regard to stormwater, whichever is the most restrictive and protective of the environment and abutting properties. A final drainage plan, duly sealed and signed, certified by an engineer licensed in the Commonwealth of Massachusetts shall be submitted to the Board prior to the issuance of any building permit. The plans shall contain certification by the engineer that the stormwater disposal and management system shall meet all requirements of DEP's Stormwater Management Policy and Town of Weston's Stormwater By-Laws and Regulations thereunder.

2. All stormwater drainage basins shall be located so as to facilitate the maintenance and operation of the basins and drainage utility.

3. Before any construction may begin, the Applicant shall drill two (2) groundwater monitoring wells in the locations determined by the Weston [*11] DPW. Each well shall be drilled to a depth of ten (10) feet below the groundwater level, or until refusal, whichever is reached first. Each well shall be monitored weekly for a total of four (4) weeks, and the results of the monitoring shall determine whether or not the design of the Applicant's drainage structures and stormwater management system must be modified before construction may go forward.

4. The Applicant, or its successors and assigns, as allowed by this Decision, shall maintain and repair the drainage structures and storm water management system on the Site as shown on the

Plan of Record, as amended to comply with this Decision. The stormwater management system includes but is not necessarily limited to, detention basins, retention basins, sediment forebays, and water quality swales. A plan for the maintenance of the stormwater management system shall be provided to the Board by the Applicant prior to the issuance of any building permit. In the event that the Weston DPW determines at any time that the stormwater management system on the site is not being properly maintained or in in need of repair, the DPW shall provide notice to the Applicant or the Applicant's successor [*12] in interest. If necessary work has not been completed within thirty (30) days of the date of such notice, the Town may, but shall not be required to, undertake the necessary maintenance and/or repairs, and the Applicant and its successors and assigns hereby agree to promptly reimburse the Town for any and all costs associated with these repairs.

5. The final site plans shall include a final design of the stormwater management system as well as an operation and maintenance plan therefor, and design of the system shall comply with the Massachusetts DEP Stormwater Guidelines and the Weston Stormwater By-Laws. The system shall also comply with the following conditions:

a. Construction: The stormwater infiltration facilities shall be constructed as shown on the Plan of Record, as amended to comply with this Decision.

b. Inspection: Prior to backfilling of the system, a representative of the Weston DPW shall inspect the construction of the stormwater infiltration facilities. It is the Applicant's responsibility to contact the DPW for inspection of the work.

c. Ongoing Maintenance: All portions of the stormwater management system shall be inspected at a minimum of twice per year, following construction, [*13] to ensure that they are in proper working order. All sumps are to be cleaned once one quarter (1/4) of their working depth is full of sediment and debris. At a minimum, sumps shall be cleaned once each year, regardless of the depth of accumulated sediment and debris. These requirements shall be incorporated into the Operation and Maintenance Agreement following peer review.

Exh. 31.

15. The relevant waiver(s) in the Decision read as follows:

Article XXVII Stormwater and Erosion Control By-Law

Sections I-X; Stormwater and Erosion Control. Local procedural requirements. VOTED 3-0: GRANTED. The Board has acted in place of the Stormwater Permitting Authority to grant the necessary relief as shown on the Plan of Record, as amended to comply with this Decision.

Town of Weston Stormwater and Erosion Control Regulations

Sections 1.0-11.0. Local procedural and substantive requirements. VOTED 3-0: GRANTED. The Board has acted in place of the Stormwater Permitting Authority to grant the necessary relief as shown on the Plan of Record, as amended to comply with this Decision.

Exh. 31.

Harm to Abutters' Trees

16. The Abutters have identified three trees situated on the Kirk property or on the common boundary line dividing [*14] the Kirk and Developer properties which they assert will be adversely affected by the Project. Exh. 57, ¶ 64.

17. The Abutters have identified five trees on the Johnson property or on the common boundary line dividing the Johnson and Developer properties which they assert will be adversely effected by the Project. Exh. 57, ¶ 65.

18. A set of plans entitled "Tree Impact Plan 269 North Avenue in Weston Mass" identifies the scope of the area surrounding the eight trees (the Abutter trees) which the Abutters argue must remain undisturbed to avoid damaging or destroying the Abutter trees. Exh. 55.

19. A set of plans entitled "Tree Impact Response Plan" identifies the Abutters' proposed tree protection areas and shows the extent to which the proposed construction and grading changes will intersect with those delineated areas. Exh. 56.

20. Ionata testified that a tree protection zone is an area within which disturbing a tree's roots will cause damage to the tree. Tr. 2:385. He testified that two ways to measure the tree protection zone are by the drip line of the tree and by taking the diameter of the tree at breast height in inches and multiplying that number by one or one and a half feet. Tr. [*15] 2:385-386.

21. Ionata further testified that roots can be harmed by cutting them or by adding more than one to three inches of soil above the existing surface grade. Tr. 2:388-389. Ionata identified the eight trees at issue on a set of plans, in evidence as Exhibit 55, which also show tree protection zones based on a one-and-a-half-foot multiplier. Tr. 2:382-387. Ionata testified that construction and grading changes in some portions of the calculated tree protection zones would result in the addition of a foot or more of soil. Tr. 2:393-395.

22. Ionata testified that all of the eight trees are Norway maples, which are rated as moderate for tolerating root pruning or removal but are shallow rooted and in his opinion would be sensitive to overfilling. Tr. 2:396. He further testified that "[t]here's likely to be impact, how likely death or destruction will occur is extremely variable...every time you damage a root system, you cause

damage and you increase the chances for the tree to become diseased, to become impacted, to eventually die, to either shorten its life slowly or shorten its life quickly. I think the more protective larger tree protection zone that we have shown would be more [*16] applicable to this site because these trees are likely to have large root systems and Norway maple is relatively shallow rooted and susceptible to overfilling." Tr. 2:400.

23. Ionata testified that he is not a certified arborist, a qualified tree risk assessor, or a registered consulting arborist, but has about twenty years of experience with large development projects involving trees. Tr. 2:380-382, 401-402.

24. Ionata testified that impacting 25-50 percent of a tree protection zone can have some negative impact on a tree and that an impact exceeding 50 percent of the zone creates a likelihood of mortality. Further, Ionata testified that under the Developer's tree protection plan, in evidence as Exhibit 56, there would not be more than 50 percent disturbance of the tree protection zone of any of the eight trees where the tree protection zones were determined by using a 0.7 foot multiplier. Tr. 2:405.

25. Ionata testified that "[t]here's uncertainty about what the root system of any tree actually looks like, where it's really growing, which direction it's growing in, particularly in open field growing situations like we have here. There's variability [] of the soil conditions, there may [*17] be variability of moisture conditions, so these root systems could run all over. That's returning to the point that I made very early in the discussion about all these things are guidelines. So bearing in mind that there is variability of what the root system looks like, the impact by the shaded area could be extremely severe if the roots are favoring that side of or that area of periphery of the tree trunk. Conversely, it could be less severe if there are fewer roots there...So using the 25 to 50 percent of a tree protection zone as the area where you're likely to have some impact has some variability to it." Tr. 2:407-409.

26. Finally, Ionata testified that "[e]ven small injuries to a tree the root zone or injury to a tree could have an effect over a longer period of time. Particularly, in my direct experience, overfilling or slight overfilling or compaction of trees, generally doesn't kill the tree immediately, but over a longer period of time, the cumulative effect of less root system and then, perhaps a few years of dry conditions with a compromised root system, years later you may see a tree decline or suffer mortality. And it's difficult to directly tie it to the damage that [*18] was done or to the concrete mixer that drove over the edges of its roots ten years ago, but it could conceivably be attributable. So, as I said earlier, there's a lot of variability in these guidelines...and it often depends on the wishes of the owner as to how much risk is to be taken with damaging a tree in order to build something or to change the grade of a landscaped area." Tr. 2:409-410.

27. Coppinger testified that he is a certified arborist and a registered consulting arborist and has worked in that capacity for over 20 years. Tr. 2:410-411.

28. Coppinger corroborated Ionata's description of tree protection zones but stated that in calculating the size of one he would use a 0.5 foot multiplier for young trees and a 0.75 foot multiplier for mature trees rather than the 1 to 1.5 foot multipliers suggested by Ionata. Tr. 2: 412-

414. Coppinger further testified that a tree is considered to be young if its age represents less than 20 percent of the lifespan for that tree and mature when it is between 20 and 80 percent of the lifespan. Tr. 2:414. Coppinger further agreed with Ionata that Norway maples can have shallow roots. Tr. 2:427.

29. Coppinger testified that based on the tree [*19] protection zones he calculated for the eight trees there would be no more than a 39 percent disturbance of the tree protection zone for any single tree. Tr. 2:417-424. Coppinger testified that in his opinion the Project would not cause the death of any of the eight trees. Tr. 2:424.

30. Coppinger testified that the tree protection zones he calculated were informed by the species and ages of the trees, their diameters at breast height, and his experience and observations of Norway maples growing in New England. Tr. 2:414-420, 432, 441-442.

Local Stormwater Standards

31. Section seven of the Town of Weston Stormwater & Erosion Control Regulations, established pursuant to Section VI (C) of the Town's Stormwater and Erosion Control By-law, provides in relevant part:

7.0 Design Standards

A. Stormwater Management Design and Performance Criteria

1. At a minimum all projects subject to a Stormwater Management Permit (SMP) shall comply with the performance standards of the most recent version of the Massachusetts Stormwater Standards and accompanying Stormwater Management Handbook, as well as the criteria contained herein. The following criteria shall be used in the submittal of an application for a Stormwater [*20] Management permit under the Town of Weston By-Laws:

a. The design of the project shall, to the maximum extent feasible, employ environmentally sensitive site design as outlined in the DEP handbook and shall attempt to reproduce natural hydrologic conditions with respect to ground and surface waters...

d. Stormwater Management systems designed to accept runoff from impervious areas, e.g., infiltration devices for roof and driveway runoff, shall be sited in acceptable areas and shall be evaluated on the basis of the following criteria.

e. Projects are to be designed such that the peak rates of stormwater runoff and volume in the post development conditions are less than in the pre-development conditions (See #2 below.)

2. Design for mitigation of peak stormwater runoff rates:

a. A hydrologic analysis using TR-55/TR-20 methodology or other acceptable analysis method shall be performed on the entire project site and include any off site areas that drain to or through the project site.

i. The analyses shall be conducted for the 1 inch, and the 2, 10, 25 and 100-year design storms under pre-development and post-development conditions. The 24-hour rainfall amounts for the 2, 10, 25 and 100 year [*21] storms are to be based on the Northeast Regional Climate Center "Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada." For Weston, the 24 hr. rainfall amounts are as follows (rounded to the nearest one-tenth of an inch):

1. 2 yr. - 24 hr. event = 3.2 inches

2. 10 yr. - 24 hr. event = 4.7 inches

3. 25 yr. - 24 hr. event = 6.0 inches

4. 100 yr. - 24 hr. event = 8.5 inches

5. 1-inch - 24 hr. event = 1.0 inches

ii. The analysis is to be performed on a pre-development and post development sub-watershed basis with designated control points at each location where runoff leaves the site.

iii. The same land area shall be used in the analysis to facilitate comparison of pre-development and post development conditions.

iv. The total volume of discharge as well as peak rate of runoff shall be evaluated at each control point. The analysis must demonstrate that the design achieves a net reduction of volume and peak flow rate in all design storms when comparing existing with proposed conditions.

b. Stormwater infiltration systems may be needed to provide stormwater storage to mitigate peak stormwater runoff and volume in the proposed conditions to be less than the peak [*22] runoff in the existing conditions.

i. Infiltration systems must be located 2 feet above high ground water and be constructed in an area surrounded by existing pervious material to ensure drainage from the proposed drainage structures.

ii. High ground water and depth of pervious material must be established on the site by a Licensed Soil Evaluator prior to the construction of any drainage structures which discharges through infiltration.

iii. Systems must be designed so that inspection and maintenance can be readily performed.

Exhs. 50-51.

State Stormwater Standards

32. The State Stormwater Management Standards (Stormwater Standards) "address water quality (pollutants) and water quantity (flooding, low base flow and recharge) by establishing standards that require the implementation of a wide variety of stormwater management strategies." Exh. 49. The Stormwater Standards are found in the Massachusetts Stormwater Handbook (Handbook) and are issued by the Massachusetts Department of Environmental Protection (MassDEP) under its authority provided by the Wetlands Protection Act, G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53. The second Stormwater Standard (Standard 2) requires a stormwater management [*23] system design that will prevent an increase in the post-development peak rate of stormwater runoff. Exh. 49. The third Stormwater Standard (Standard 3) is concerned with preventing a decrease in groundwater recharge due to a post-development increase in impervious surface area. Exh. 49. Standards 2 and 3 state in relevant part:

The Stormwater Management Standards...

2. Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed the pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

3. Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts [*24] Stormwater Handbook...

Exh. 49.

33. In a section under Standard 3 entitled "Explanation of the Standards," the Handbook states that "... Infiltration structures must be able to fully drain within 72 hours." Exh. 49.

34. Volume 3, Chapter 1 of the Handbook, entitled "Documenting Compliance," describes, in part, the calculations that must be performed to document compliance with the Stormwater Standards. With respect to Standard 2, the Handbook directs the reader to the MassDEP's Hydrology Handbook for Conservation Commissioners. See Exh. 62. With respect to Standard 3 the Handbook details calculations necessary to determine (1) the required recharge volume, (2) the size of storage volume necessary to hold the required recharge volume, and (3) whether an infiltration structure will fully drain within 72 hours. Exh. 49.

35. The required recharge volume (*Rv*) necessary to satisfy Standard 3 is determined by multiplying the area of impervious surface on the site by a target depth factor (*F*). The target depth factor is defined in terms of inches based on the type of soil present at a given project site. Exh. 49. The resulting volume is determined by the impervious area on site and by the local [*25] soil conditions but not by any other local factors. Exh. 49.

36. The Handbook provides that with respect to Standard 3, "Storage Volume is the volume of the basin, chamber, or voids that must be constructed in order to hold the *Required Recharge Volume*," and that it may be calculated by the *"Static" Method*, the *"Simple Dynamic" Method*, or the *"Dynamic Field" Method*. Exh. 49 (emphasis supplied). The Handbook further provides that the saturated hydraulic conductivity rate—the rate at which water flows through a given soil—used in calculations for the static and simple dynamic methods is the Rawls rate. By contrast, the dynamic field method uses a hydraulic conductivity rate that is determined through additional field testing. The Handbook explicitly states, however, that "[a] Title 5 percolation test is not an acceptable test for *saturated hydraulic conductivity*. Title 5 percolation tests overestimate the *saturated hydraulic conductivity* rate." Exh. 49 (emphasis supplied).

37. The Handbook further provides that when calculating storage volume by either the simple dynamic or dynamic field methods, only the recharge system bottom, but not its sidewalls, should be used as the maximum [*26] infiltrative surface area. Exh. 49.

38. The Handbook provides that the period of time it takes the infiltration structures to empty, or the drawdown time, is equal to the required recharge volume divided by the product of multiplying the hydraulic conductivity rate of the surrounding soils by the bottom area of the infiltration structure. Exh. 49. A footnote to the section of the Handbook on drawdown calculations further provides that "[i]n some cases, the infiltration structure may be designed to treat the *Required Water Quality Volume* and/or to attenuate peak discharges in addition to infiltrating the *Required Recharge Volume*. In that event, the storage volume of the structure must be used in the formula for determining drawdown time in place of the *Required Recharge Volume*." Exh. 49 (emphasis supplied).

39. HydroCAD is a computer program which engineers use to model stormwater runoff, collection, retention, and infiltration or exfiltration. See Tr. 1:54-58, 107-108. The terms "infiltration" and "exfiltration" are used somewhat interchangeably by Doyle and Reardon and refer to the same process but from different perspectives. "Infiltration" refers to water moving into the ground, expressed [*27] as a rate. "Exfiltration," also expressed as a rate, refers to water moving out of a stormwater management system, retention chamber, or basin and into the ground. Tr. 1:66-68, 70-71, 181-182.

40. Excerpts from the HydroCAD instruction manual provide the following guidance in connection with exfiltration calculations:

The exfiltration area (Ay) may be defined in three ways. A) If all exfiltration is assumed to be downward (none through the sides of the pond), use the pond's *surface* area. B) For downward exfiltration with in-sloping sides, you may prefer to use the *horizontal area*, which includes the

largest surface area at or below the given elevation. C) If exfiltration occurs through all exposed surfaces regardless of slope (including vertical surfaces), you should use the pond's *wetted area*. For further details, read about pond areas. [Exh. 59.]

Embedded Storage

When using embedded storage, (such as a chamber in a stone bed) water is assumed to move freely between the chamber and the outer storage volume, such that they maintain essentially the same water surface elevation through the routing. (A "level pond" routing.) Any exfiltration is based on the *outer* storage volume only, since [*28] this is the only surface through which water can actually leave the pond. [Exh. 59.]

When using embedded chambers, any exfiltration calculations are based strictly on the *outermost* storage volume. For each embedded chamber, the "Allow Exfiltration" box will be grayed-out and pre-set according to the outer storage volume. To change this setting you must edit the outer storage definition. [Exh. 60.]

HydroCAD identifies three distinct parameters for describing the areas of a pond:

1) The surface area is the area of the pond's surface at any given elevation. This value does not consider side-areas and is not influenced by the depth of the pond. Ponds are frequently described by using surface areas obtained from a contour map.

2) The horizontal area is the full area occupied by the pond volume. For out-sloping ponds, this is always the same as the surface area. When the sides slope inwards, the horizontal area considers the full area occupied by the stored water, even when this occurs *below* the current water surface. For example, a full horizontal pipe has a surface area of zero, but a (larger) horizontal area that is defined at the mid-point of the pipe.

3) The wetted area is the total area [*29] of all wetted surfaces, regardless of their angle. This includes all horizontal, vertical, and intermediate surfaces. For a natural with low side-slopes, the wetted and surface areas will be similar. On the other hand, the wetted area of a vertical-sided chamber may be much greater than the surface area....[Exh. 61.]

Exhs. 59-61.

The Stormwater Management System

41. Stated generally, the proposed stormwater management system designed by Doyle (stormwater management system or the system) consists of numerous surface level collection points which collect storm water and funnel it into an underground chamber from which it then dissipates into the ground. Tr. 1:51-52; Exhs. 18, 37. The chamber is a large pre-cast concrete structure which

sits below the graded surface and above the level of the ground water. It is designed by the Storm Trap company and consists of two bathtub-shaped concrete chambers, open on one side, that are set on top of one another to create a larger chamber that is entirely closed but for drainage holes cored into the bottom. Tr. 1:51-53, 106-107, 196-197. The chamber is encased in a layer of gravel which separates it from the existing soils. Tr. 1:51-54; Exhs. 18, 37. [*30]

42. The system is designed so that during a storm event, water will flow across the property to the collection points and be directed into the chamber. The chamber has cored openings through which water will flow into the gravel envelope surrounding the chamber and then into the surrounding soil. Because water flows more easily through the porous gravel envelope than through the more dense surrounding soils, as water enters the chamber and then flows into the gravel, the void space in the gravel envelop will fill with water. During a significant storm event, collected stormwater will fill the concrete chamber and fully saturate the surrounding gravel envelope. In effect, the capacity of the system to hold storm water as it dissipates into the ground is the volume of the chamber together with the void space in the gravel envelope. Tr. 1:51-54, 77-78; Exhs. 18, 37.

43. The system's design is based on the premise that the surrounding soils are the most restrictive layer that the stormwater will flow through. In effect, the chamber will fill up, and as it does so, water exiting the bottom of the chamber will fill the gravel envelope and then dissipate into the ground. While operational, [*31] water in the system will, at once, flow into the chamber, out of the chamber and into the gravel envelope, and out of the gravel envelope into the surrounding soil. Because the slowest rate of flow exists at the boundary between the gravel and the surrounding soils, in a severe storm the effect of water flowing into the chamber and then into the gravel envelope is that the relative "level" of the water in the system will rise nearly uniformly in both the gravel envelope and the concrete chamber. This is based on the premise that the stormwater will flow almost without restriction from the chamber into the gravel envelope. Tr. 1:51-54, 77-78, 106.

44. As explained by Doyle, because the surrounding soils are the most restrictive medium, as long as the rate of flow from the chamber into the gravel envelope is greater than the rate of water dissipation into the surrounding soils, the gravel envelope will fill with water as intended. This will increase the storage volume and increase the rate at which the chamber will empty, in contrast to a model where the chamber sits directly in the soils. Tr. 1:76-84.

45. The rate of flow from the chamber into the gravel envelope depends on the number [*32] and size of the holes drilled into the chamber through which water will flow. The two engineers, Doyle and Reardon, dispute the number, size, and location of holes that can be cored into the chamber. Each engineer purports to have spoken with the same representative of the company which produces the concrete chamber and each claims to have received diametrically opposite guidance on the placement of holes in the chamber. Reardon argues that additional holes cannot be added to the chamber and the total area of the opening, 107 square feet, through which water may exit the chamber is too small to allow for the water to flow into the surrounding gravel at the necessary rate for the system to operate as designed. Tr. 1:177-184. Doyle's calculations do not account for the rate of flow from the chamber into the gravel because he says there will be enough openings in

the chamber that the rate of flow has no restrictive effect on the operation of the system. Doyle did testify that if the openings in the chamber could not be larger than 110 square feet, the rate of water exiting the chamber would be too slow to allow the rest of the system to operate as designed. Tr. 1:84. The concern expressed [*33] by Reardon in this critique is, in essence, that if the outlet holes in the chamber are too small, it will not be able to empty as quickly as designed. As a result the system will back up, the chamber will overfill, and stormwater will collect on the surface, ultimately flooding the Abutter properties.

46. Thus, the system would not work if it is not possible to place holes in the chamber such that the area of the openings exceeds 110 square feet. Reardon's critiques of the proposed system model a concrete chamber which has only 107 square feet of openings.

47. Reardon further testified that he believed it would not be possible to maintain and clean the system and that the chamber would fill with debris causing the rate of water flowing out of the chamber to be reduced to the rate at which water flows into the surrounding soils. Tr. 214-216.

48. Functionally, what Reardon modelled is a system which removes the gravel envelope entirely and instead dissipates water directly from the chamber into the ground, through only those openings to which he argues the chamber is limited. To accept Reardon's analysis requires a finding that no additional holes can be cored into the concrete chamber [*34] and further that the system cannot and will not be cleaned and maintained. The testimony of each engineer is detailed more fully below.

Doyle's Testimony

49. Doyle testified that he has been a practicing civil engineer for 23 years, has been a registered soil evaluator since 1998, and is a Registered Professional Engineer in Massachusetts and Maine. Tr. 1:25-26.

50. Doyle testified that he used HydroCAD computer software to perform all of the calculations involved with the design of the system. Tr. 1:27-29.

51. Doyle testified that the peak discharge rate for the system under the most intense storm conditions is 3.53 cubic feet per second. Tr. 1:55-56.

52. Doyle further testified that the system with a concrete chamber inside a gravel envelope is referred to as an embedded system. Tr. 1:57-58.

53. Doyle testified that the Rawls rates, seen in the table in Exhibit 41, are standard empirical rates which describe the rate at which water infiltrates or moves through a given type of soil. Tr. 1:66-67. Doyle further testified that the surface soils consisted of sandy loam which has a Rawls rate of 1.02 inches per hour, but that this was a conservative assessment and that the surface likely infiltrates [*35] stormwater at a higher rate. Tr. 1:67-68. The effect of designing the system with

the lower rate is that less water is infiltrated at the surface, creating more runoff, and that the underground system must therefore be larger to accommodate the greater amount of surface runoff. Tr. 1:68-70.

54. Doyle testified that the subsurface soils, those surrounding the gravel envelope and the concrete chamber, consist of a gravelly sand. Tr. 1:75-76. Doyle further testified that the gravelly sand has a much higher Rawls rate than that of sand alone, which is 8.27 inches per hour, but that by limiting the subsurface infiltration rate to 8.27 the analysis was more conservative. Tr. 1:75-76, 92.

55. Doyle testified that three catch basins, labeled CB-207, CB-208, and CB-212, on a plan entitled "Grading and Drainage Plan" are set at elevation 129.9 and serve as emergency outlets for the stormwater management system. Doyle testified that during a 500-year storm event, there will be flooding on all properties, as there would be in the current conditions, but that when the system backs up excess water will flow out of the lowest elevation catch basins and be directed to North Avenue by the grading on [*36] the site rather than onto the Abutter properties. Tr. 1:93-95; Exh. 18.

56. Doyle testified that the concrete chamber used in the design of the system is referred to as the Double Trap and is produced by the Storm Trap company. Tr. 1:51-53. Doyle further testified that water collected in the Double Trap infiltrates into the gravel envelope and the surrounding soils through holes cored in the concrete which may be on the bottom and sides of the chamber. Tr. 1:53.

57. Doyle testified that his HydroCAD analysis does not account for the size of the holes cored into the Double Trap chamber because "[t]he model takes into account that it's free-flowing into the gravel." Tr. 1:106. Doyle testified that other than doing a back check after running the model, the size of outlet holes in the Double Trap are not accounted for. Tr. 1:106. He further testified that when speaking with a Patrick Gordon from Storm Trap he was told that it is possible to core additional and larger holes in the bottom and sides of the Double Trap chamber. Tr. 1:106-107.

58. Doyle testified that his HydroCAD model uses the wetted area, in this case meaning the surface area of the gravel envelope through which water will [*37] infiltrate into the surrounding soils, to calculate the rate at which water will flow out of the system into the ground. Tr. 1:72-73. Doyle testified that when the system is operating at full capacity the wetted area through which stormwater is flowing into the ground is approximately 8,000 square feet. Tr. 1:107-108, 123-124.

59. At trial, Doyle was asked to perform a calculation of the peak discharge from his system design by hand, multiplying the hydraulic capacity of the surrounding soils—at the Rawls rate of 8.27 inches per hour—by the wetted area, for the purpose of comparing the result against Doyle's HydroCAD analysis which provided a peak rate of discharge of 3.53 cubic feet per second (cfs). Tr. 1:124-127. Doyle's calculation at trial resulted in a peak discharge rate of 1.58 cfs. Tr. 1:126. Doyle explained that the discrepancy is the result of the more complicated dynamic calculations performed by the HydroCAD software which accounts for the additional effect of the height and

pressure of the water in the storage system, which is not accounted for by the simple equation multiplying the wetted area by the Rawls rate of the surrounding soils. Tr. 1:127-129.

60. Doyle testified that [*38] groundwater elevation testing was performed at the site and that the highest measured groundwater was at an elevation of 110.3 feet. He further testified that the lowest elevation of the gravel envelope is at about 119 feet, making the space between the bottom of the system and the groundwater about 8.7 feet. Tr. 1:131-132. Doyle further testified that he performed a mounding analysis which resulted in a mound of dissipating water approximately 10.41 feet high, originating in the bottom of the gravel layer. Tr. 1:132-135. Doyle testified that the top of the mound is coincident with the bottom of the gravel layer because that is the location which the water is flowing from. He testified that the concern with a mounding analysis is whether a basement or similar structure would intersect the mound because it would then have water in it. Tr. 1:133-135.

61. Doyle testified that Standard 3 of the Stormwater Standards relates to the amount of water that must be recharged into the ground as a result of an increase in impervious surface area. He testified that the required recharge volume under the conditions present at the site is approximately 1,000 cubic feet of water. Tr. 1:139. He testified [*39] that this volume was calculated as "0.6 feet over the impervious area for a Type A soil." Tr. 1:139. The Handbook identifies a target depth factor for sand of ".6-inch." Exh. 49. Doyle's most recent recharge volume calculation identifies an impervious area of 20,038 feet. Doyle, using the .6-inch target depth factor, calculated a required recharge volume of 1,002 cubic feet. Exh. 38. Doyle testified that the HydroCAD calculations prove that the designed system recharges much more than the required recharge volume into the ground. Tr. 1:139.

62. Doyle testified that the methods described in the Handbook for calculating the volume of a storage chamber necessary under Standard 3 are inapplicable to compliance with Standard 2 or the present system design because those methods are "used to determine the infiltration rate of [the] specific recharge volume" and "does not take into consideration how the larger system would work." Tr. 1:146. Doyle further testified that the HydroCAD analysis is not the same as the calculations described in the Handbook section on Standard 3 because, "[it's] a different standard. It's calculating volumes that are completely different. This has nothing to do with [*40] peak rate, this has to do with the specific volume to infiltrate into the ground and they calculate it a different way. It's a completely different calculation. A completely different reason for doing that calculation." Tr. 1:146-147.

63. Doyle testified that the system is maintained by cleaning grates and sumps on the surface that will collect larger debris and sediment and by cleaning or vacuuming out the inside of the concrete chamber. Doyle testified that there should be no sediment collecting in the chamber if it is maintained properly. The chamber can be entered by a manhole and manually cleaned. Tr. 1:148-150.

64. As required by the conditions in the Decision, Doyle prepared a management plan for the system entitled "Stormwater Best Management Practices (BMP's) Operation and Maintenance Plan" (OMP). Exh. 40. The OMP details the system's components, provides procedures for

required inspection and maintenance, provides further ongoing maintenance requirements relating to snow and trash removal and landscaping, and requires documentation of compliance with the OMP. Exh. 40.

Reardon's Testimony

65. Reardon testified that he has worked as a civil engineer since 1999, and is a Licensed [*41] Professional Engineer in Maine, Connecticut, Massachusetts, Rhode Island, New Hampshire, and Vermont. Tr. 1: 157-158.

66. Reardon testified that he contacted Patrick at Storm Trap, and when asking about the limits of the size of opening that could be put in the Double Trap chamber, was told that the system was limited to two 2-foot round holes in each base module. Tr. 1:178. Reardon further testified that he calculated the maximum size of the openings that could be cored into the Double Trap system to be 107 square feet. Tr. 1:183-184; Exh. 36. Reardon subsequently testified that he did not specifically ask if the maximum opening were two 2-foot holes but that the limitation was implicit in the conversation he had with Patrick at Storm Trap. Tr. 2:253-255. Reardon also conceded that the Double Trap modules can be modified to some extent; however, he offered no testimony on the scope of possible modifications. Tr. 2:252-253.

67. Reardon testified that the Double Trap system used in Doyle's design is a composite of two Single Trap chambers which have holes in an otherwise solid top and an open bottom. To create the Double Trap, a Single Trap chamber is turned upside down and another Single [*42] Trap chamber is placed on top of it so that the two open ends of the chambers face each other. Tr. 1:196-197. The result is essentially a large concrete chamber that is solid on the top and bottom with cored holes for water to enter and exit.

68. Reardon testified that he modeled the stormwater system differently from Doyle because he disagrees with Doyle's belief that the system can be maintained in such a way that the holes in the Double Trap chambers and the gravel in the surrounding envelope do not become clogged with sediment and other debris. Reardon testified that he believes that "over a short amount of time [the gravel is] going to end up being similar to the soils around the system." Tr. 184-187.

69. Reardon testified that his model used 107 square feet for the exfiltration area in contrast to Doyle's approximately 8,000 feet, and used the same Rawls rate of 8.27 inches per hour to calculate a discharge rate of 0.02 cubic feet per second. Tr. 1:187-188.

70. Reardon testified that infiltration systems almost always degrade to a point of failure. Tr. 1:190. He further testified that the Handbook states that infiltration systems like the one applied here should be used in watersheds [*43] smaller than 2 acres. He did not identify where in the Handbook that is stated. Tr. 1:190.

71. Reardon testified that under the assumptions used in his model, 107 square feet of infiltrative area and a Rawls rate of 8.27 inches per hour, it would take the chamber in Doyle's design 66 days to fully drain the volume of water associated with a 100-year storm. Tr. 1:192-193.

72. On the subject of Doyle's mounding analysis, Reardon testified that he thought it would be a problem if the mound shown was going to be in the area of the infiltration basin itself. Tr. 1:203. Reardon subsequently testified that the Handbook does not require that the mound not fall within the basin. Tr. 2:284-285.

73. Reardon testified that the surface level catchment areas would not be as effective as Doyle believes at preventing the intrusion of trash, leaves, mulch, and other materials into the pipes and subsequently the Double Trap chamber. Tr. 1:204-211.

74. Reardon further testified that he believes the OMP for the system will not be effective because these types of systems are constantly degrading and that "these systems, which require a great deal of maintenance, historically have not been maintained, which [*44] means they degrade almost immediately and stop serving their function within a year of their installation." Tr. 1:214-215; Exh. 40. Reardon further testified that he disagreed with Doyle's assertion that the Double Trap chamber could be cleaned because it is difficult and dangerous to physically put a person in the chamber and he has never heard of a vacuum truck that would be large or powerful enough to be used in the chambers proposed here. Tr. 1: 215-216. Reardon subsequently testified that there are at least hundreds of underground concrete basins in Massachusetts which require some kind of maintenance, which is governed by regulations relating to work in confined spaces. Tr. 2:294-295.

75. Reardon testified that his model relied on the Rawls rate for the hydraulic conductivity of the soils on the site and not percolation tests. Tr. 2:284.

76. A review of the analyses performed by Doyle and Reardon shows that their models relied on slightly different configurations of the Double Trap modules to be used in the system. Reardon's model anticipates 17 Double Trap modules which would in turn have a minimum of 34 two-foot diameter holes, representing approximately 106.76 square feet of [*45] surface area. Exh. 36. Doyle's model anticipates 20 Double Trap modules, with at least 40 of such holes representing approximately 125.60 square feet of surface area. Exh. 37.

Discussion

The Abutters seek to have the Decision granting the Comprehensive Permit for the Project annulled. The Abutters make three arguments for annulment: (1) the Project will likely harm or destroy the Abutter trees; (2) the Project's stormwater management system is materially flawed and will likely cause environmental damage; and (3) the Project does not comply with the Stormwater Standards. The Developer seeks to have the Abutters' appeal dismissed, arguing that they do not have standing to appeal the comprehensive permit and that the Decision was properly issued. I address the Abutters' standing first.

I. Standing

Pursuant to G.L. c. 40B, § 21, a person aggrieved by the grant of a comprehensive permit may appeal the board's decision to the Land Court in the manner prescribed in G.L. c. 40A, § 17. "Specifically a 'person aggrieved' as that term is used in both statutes must assert 'a plausible claim of a definite violation of a private right, a private property interest, or a private legal interest.'" *Standerwick v. Zoning Bd. of Appeals of Andover*, 447 Mass. 20, 27-28 (2006), quoting *Harvard Sq. Defense Fund, Inc. v. Planning Bd. of Cambridge*, 27 Mass. App. Ct. 491, 493 (1989). "Of particular importance, [*46] the right or interest asserted must be one that the statute under which the plaintiff claims aggrievement intends to protect." *Id.* at 28. Generally, "standing to challenge a zoning decision is conferred only on those who can plausibly demonstrate that a proposed project will injure their own personal legal interests *and* that the injury is to a specific interest that the applicable zoning statute, ordinance, or bylaw at issue is intended to protect." *Id.* at 30. Here the applicable statute is G.L. c. 40B (Chapter 40B), and its primary purpose is "the expansion of affordable housing throughout the Commonwealth." *Id.* However, pursuant to Chapter 40B, "the interest in the provision of critically needed affordable housing must be balanced against the statutorily authorized interests in the protection of the safety and health of the town's residents, development of improved site and building design, and preservation of open spaces." *Id.* at 31.

Abutters are "entitled to a rebuttable presumption that they are 'persons aggrieved' under [G.L. c. 40B]." *Id.* at 33. "[T]o rebut the presumption, the defendant must offer evidence 'warranting a finding contrary to the presumed fact' [of aggrievement]."*Id.* at 34, quoting *Marinelli v. Board of Appeals of Stoughton*, 440 Mass. 255, 258 (2003). I have already found that the Abutters' presumption [*47] of standing has been rebutted. "'Once a defendant challenges the plaintiff's standing and offers evidence to support the challenge...the jurisdictional issue is to be decided on the basis of the evidence with no benefit to the plaintiff from the presumption.'" *Reynolds v. Zoning Bd. of Appeals of Stow*, 88 Mass. App. Ct. 339, 345 (2015), quoting *Jepson v. Zoning Bd. of Appeals of Ipswich*, 450 Mass. 81, 89 (2007). "'[A] review of standing based on 'all the evidence' does not require that the factfinder ultimately find a plaintiff's allegations meritorious. To do so would be to deny standing, after the fact, to any unsuccessful plaintiff.'" *Jepson*, 450 Mass. at 91, quoting *Marashlian v. Zoning Bd. of Appeals of Newburyport*, 421 Mass. 719, 721 (1996).

"Thus, '[t]he findings of fact a judge is required to make when standing is at issue...differ from the findings of fact the judge must make in connection with a trial on the merits. Standing is the gateway through which one must pass en route to an inquiry on the merits. When the factual inquiry focuses on standing, therefore, a plaintiff is not required to prove by a preponderance of the evidence that his or her claims of particularized or special injury are true. Rather, the plaintiff must put forth credible evidence to substantiate his allegations. [It is] in this context [that] standing [is] essentially a question of fact for the trial judge.'" *Reynolds*, 88 Mass. App. Ct. at 345-346, quoting *Butler v. City of Waltham*, 63 Mass. App. Ct. 435, 440-441 (2005).

The Abutters have [*48] alleged that they are aggrieved by the Decision of the Board because the stormwater management system proposed for the Project will cause stormwater and runoff to enter

their properties from the Developer property and because excavation, grading, and construction in connection with the project on the Developer property will harm or kill trees situated on the Abutter properties or on their property lines shared with the Developer property. "[U]der *Standerwick*, flooding constitutes an injury to an interest that Chapter 40B was intended to protect." *Jepson*, 450 Mass. at 89. Both sides have provided voluminous evidence on the issue of whether the stormwater management system will cause flooding on the Abutter properties. On the evidence, and without reaching the merits—of which this issue lies at the very heart—I find that the Abutters have established their standing. Reardon's testimony, while not necessarily conclusive, was more than sufficient to provide credible evidence to substantiate the Abutters' claims that the proposed stormwater management system will cause flooding on their properties.

The Abutters' claim of aggrievement arising from the potential impacts of the Project on their trees fares less well. [*49] The Abutters have identified no authority under which harm to trees situated entirely or in part on the Abutters' properties is deemed an interest protected by Chapter 40B, the Bylaws, or any other zoning authority which could be used to ground their claim of aggrievement. While G.L. c. 87 and c. 242 provide causes of action for injury to trees, neither of such claims are germane to the interests that G.L. c. 40B is intended to protect.

II. Merits

The Abutters seek to have the Decision granting the Developer the Comprehensive Permit for the Project annulled. As a preliminary matter, although it is not disputed, the Developer must have been eligible for a comprehensive permit under Chapter 40B and 760 Code Mass. Regs. 56.04(1) (CMR 56.04(1)) in order to have obtained the Comprehensive Permit under the Decision. CMR 56.04(1) requires that "(a) The Applicant shall be a public agency, a non-profit organization, or a Limited Dividend Organization; (b) The Project shall be fundable by a Subsidizing Agency under a Low or Moderate Income Housing subsidy program; and (c) The Applicant shall control the site." 760 Code Mass. Regs. 56.04(1); *Indian Brook Cranberry Bogs, Inc. v. Board of Appeals of Plymouth*, 17 LCR 646, 649 (2009), *aff'd*, 78 Mass. App. Ct. 111 (Dec. 1, 2010) (Rule 1:28 Decision), citing *Ranney v. Board of Appeals of Nantucket*, 11 Mass. App. Ct. 112, 118 (1981) ("the burden rests upon the applicant for zoning relief to produce evidence at trial that the statutory prerequisites [*50] for relief have been met."). Here the Developer owns the Developer property, is a limited dividend organization, and has received a project eligibility letter from MassHousing. Further, it is undisputed that there is a need for affordable housing in the Town, which has not met the minimum affordable housing stock of ten percent required by Chapter 40B. The Developer was eligible to receive a comprehensive permit for the Project.

In an appeal of the grant of a comprehensive permit brought under G.L. c. 40B, § 21, as is the case with appeals under G.L. c. 40A, § 17, the court finds the facts *de novo* and gives no weight to the findings of the local board. The court's role is to assess the validity of the board's decision in light of the facts as they are found after trial. This review is highly deferential and "the board's decision 'cannot be disturbed unless it is based on a legally untenable ground, or is unreasonable,

whimsical, capricious or arbitrary.'" *Reynolds*, 88 Mass. App. Ct. at 344-345, quoting *Jepson*, 450 Mass. at 96.

It has previously been "made clear that it [i]s open to [a] board to justify denying an application for a comprehensive permit by identifying a health or other concern that (i) supports denial, (ii) is not adequately addressed by compliance with State standards, [*51] and (iii) outweighs the regional housing need." *Reynolds*, 88 Mass. App. Ct. at 348, citing *Zoning Bd. Of Appeals of Holliston v. Housing Appeals Comm.*, 80 Mass. App. Ct. 406, 417-419 (2011). In evaluating the validity of a board's decision to grant a comprehensive permit where such a local concern is identified, the local concern is balanced against the local need for affordable housing. *Id.* at 350. The board's decision to grant a comprehensive permit is unreasonable where, based on the facts found at trial, the identified local concern outweighs the local need for affordable housing. *Id.* Further, "the municipality's failure to meet its minimum housing obligations, as defined in § 20, will provide compelling evidence that the regional need for housing does in fact outweigh [] objections to the proposal." *Board of Appeals of Hannover v. Housing Appeals Comm.*, 363 Mass. 339, 367 (1973).

A. Harm to the Abutters' Trees

The Abutters argue that Project, including construction and changes in the grading of the Developer property, will damage or destroy trees situated either on the shared property lines between the Developer and Abutter properties or solely on the Abutter properties. The Abutters argue that the Project will harm the roots of the Abutter trees, ultimately damaging or destroying them, in violation of G.L c. 87, § 11, which provides that "[w]hoever wilfully, [*52] maliciously or wantonly cuts, destroys or injures a tree, shrub or growth which is not his own, standing for any useful purpose, shall be punished by imprisonment for not more than six months or by a fine of not more than five hundred dollars. *Id.* The Abutters advance this argument as grounds for annulment of the Decision. They further seek a declaration that the Project will violate G.L. c. 87, § 11, and to enjoin the Developer from going forward with the Project on those grounds.

The Abutters overstate the Commonwealth's statutory and common law protections for trees whose roots and branches cross into neighboring properties. I attempt here to briefly distill the somewhat convoluted rules that have been discussed in *Michalson v. Nutting*, 275 Mass. 232 (1931), *Levine v. Black*, 312 Mass. 242 (1942), and most recently in *Shiel v. Rowell*, 480 Mass. 106 (2018), property owners have an absolute right, within the bounds of their properties, to prune or cut back the roots and branches of trees found on their properties, even where the tree from which such roots and branches issue is situated on a neighbor's land. Where a tree is situated on a property line, both property owners have an interest in the tree and neither may unilaterally cut down or dispose of the tree. Together these rules establish a difference between [*53] the act of cutting invading roots and branches and acting to wholly remove or destroy the tree itself. If a tree dies only as a result of the exercise of a property owner's lawful right to cut back roots and branches, such death is, to the owner of the tree, *damnum absque injuria*. See *Shiel*, 480 Mass. at 107, 110-112; *Levine*, 312 Mass. at 243-244; *Michalson*, 275 Mass. at 233-234.

This regime may be less applicable in a situation where it could be shown that a landowner cut roots and branches of a tree straddling its property line for the sole purpose of killing the tree, thereby securing its removal. Such an act would contravene the nature of the common ownership, as between abutting neighbors, of a tree situated on their property line. In *Levine*, the SJC observed that "[i]t has generally been said that under these circumstances both parties own the whole tree as tenants in common...[and in] other cases, in an attempt at a more exact application of the ordinary principles of real estate law, it has been held that each party has title only to that part of the tree on his side of the line but has a right to prevent his neighbor from so dealing with his part as unreasonably to injure or destroy the whole." *Levine*, 312 Mass. at 243-244. Without adopting either view the court observed that "[e]ven under [*54] the latter view it is difficult to see why either owner should have any less right to cut off branches and roots than he would if the trunk stood entirely upon the other's land." *Id.* at 244.

This court in *Bassin v. Fairley*, 22 LCR 251 (2014), considering a case where a neighbor wanted to wholly remove a tree, opined that "Plaintiff is seeking to remove more than just the roots and branches; she wishes to remove the trunk of the tree. The more drastic consequences of removing essential parts of the tree make it clear why it is necessary that the self-help rights given to parties in this situation be more restrictive [than in a situation where the tree stands wholly on one individual's property]. Otherwise, the party wishing to remove the tree would essentially have absolute power over the tree, by being able to cut the tree to the point of death, leaving the party wishing to keep the tree helpless." *Id.* at 253. More recently in *Shiel*, the SJC was asked to reconsider whether a land owner could be held liable for damage caused by the roots or branches of its healthy tree which intruded into a neighbor's property. *Shiel*, 480 Mass. at 107-108. As part of its discussion, the SJC stated that "[o]ur resolution has been and remains to authorize the cutting back of overhanging [*55] roots and branches." *Id.* at 112.

To coin a phrase, this is a tangled area of law. There is no bright line delineating what unilateral actions regarding a shared tree are or are not permitted. Read together, the cases on this subject suggest that a property owner cannot act to intentionally destroy a shared tree without the consent of the others who share an ownership interest therein. See *Shiel*, 480 Mass. at 110-112; *Levine*, 312 Mass. at 243-244; *Michalson*, 275 Mass. at 233-234; *Bassin*, 22 LCR at 253. That being said, the growth of roots and branches into a neighbor's land, no matter how essential to a tree's survival, cannot vest in the tree's owner some indomitable nonpossessory interest in the space the tree occupies.

Here, the Developer does not seek to remove the Abutter trees. As a matter of law it appears that the Developer is entirely within its rights to pursue the Project even if it has the effect of harming some of the roots of the Abutter trees and thereby causing the trees themselves some harm. It appears that with respect to trees situated entirely on the Abutter properties, the Developer has an unfettered right to cut the roots and branches of such trees back to the property line. With respect to the trees situated on shared property lines, the Developer similarly has the right to cut [*56] roots and branches situated on the Developer property; however, it may not do so with the intent of killing those trees.

Notwithstanding the legal conclusion that the Abutters have no present or future claim against the Developer stemming from the Developer's lawful exercise of its rights, for the sake of completeness and because of the ambiguity in the law on this subject I consider the testimony of Ionata and Coppinger concerning the effects of the Project on the Abutter trees. The Decision conditioned the Comprehensive Permit on the Developer's compliance with a variety of limitations on construction activities occurring within ten feet of the Developer property line. The Abutters argue that the conditions are insufficient to prevent the death or destruction of some or all of the Abutter trees. Together the testimony of Coppinger and Ionata is instructive, generally stating that tree roots will grow outwards from a tree in all directions and that a tree may be harmed if its roots are damaged by cutting them or by the effect of adding additional soil to modify the surface grade of the overlying land. Their testimony further states that the likelihood of harm to a tree is greater where [*57] roots are disturbed closer to the trunk of that tree. Both arborists testified that there are a variety of ways to calculate that critical area in which disturbing roots must be avoided, referred to as the tree protection zone. Factors included in determining the tree protection zone variously include age, species, and trunk diameter at breast height. The experts disagreed on the necessary size of the tree protection zones for the Abutter trees concerned here; I credit Coppinger's reasons for setting a smaller tree protection zone. Notwithstanding these differences, their testimony was consistent that in some locations, the construction and grading activities coincident with areas in which there *may* be roots from the Abutter trees *could* have a negative impact on the health of roots and their associated trees. The testimony puts it beyond doubt that some level of activity within the area immediately surrounding the trunks of the Abutter trees could have the effect of killing them. However, the testimony does not speak to where the roots of the Abutter trees are actually located or what harms to the Abutter trees are certain or even reasonably certain. Neither of them could state with [*58] any degree of certainty what harms to the roots would be fatal. Here, where the applicable law makes it doubtful that the Abutters have a claim to demand any protections for the Abutter trees, the level of speculation in the resulting harms renders these risks too remote to bear on whether the Board's Decision was improper. By establishing additional protections for the Abutter trees, the Board has reasonably expanded the safeguards available to the Abutters beyond those which exist at law, and I defer to the Board's discretion that the tree conditions will be effective.

The Abutters separately, in Count IV of the Complaint, seek a declaration that "the Developer does not have the legal right to damage or destroy the existing trees along the property boundaries of the" Abutter properties. Complaint. Consistent with the above discussion, the Abutters are entitled to a declaration that the Developer may not unilaterally damage or destroy the identified trees, subject, however, to the caveat that the Developer has an unfettered right to cut or prune roots and branches where they appear on the Developer property irrespective of the effect that such actions have on the health of the trees. [*59] There is no evidence supporting a finding that the Project will violate any rights that the Abutters have to protect the at-risk roots of the Abutter trees and the Abutters are therefore not entitled to injunctive relief to prevent the project from going forward.

B. The Stormwater Management System

The Abutters' arguments for annulment of the Decision relating to the stormwater management system can be broadly placed into two categories: (1) the system will not function as intended and will cause flooding and (2) the system does not comply with the state Stormwater Standards. More specifically, the Abutters argue that the system will not function as intended because (1) it overestimates the area through which stormwater can dissipate into the surrounding soils, and (2) it fails to account for degradation of the system. Further, the Abutters argue that the system does not comply with the Stormwater Standards because (1) it relies on an incorrect measure of hydraulic conductivity; (2) the system will not fully drain in the 72 hours as required by Standard 3; (3) the Developer's mounding analysis violates Standard 3; (4) it relies on a variable rate of exfiltration rather than one that [*60] is constant; and (5) it relies on the an incorrect measure of the area through which stormwater can recharge into the ground.

Each side has presented expert testimony and a panoply of technical data that they each claim proves that the stormwater management system does not comply with state and local requirements and will or will not function as intended without causing flooding on the Abutters properties. My task is not so much to determine if the system will function as claimed, but rather to determine the credibility of the parties' experts and, based on the balance of credible testimony, to further determine whether the Board's Decision was based on a legally untenable ground or is unreasonable, whimsical, capricious or arbitrary. *Reynolds*, 88 Mass. App. Ct. at 344-345.

i. Functionality of the Stormwater Management System

The Abutters' argument that the system will not attenuate the risk of stormwater flooding on their properties hinges on the proper measurement of the wetted area for the infiltration basin through which collected stormwater will dissipate into the ground. Notwithstanding the complexity of the HydroCAD models prepared by Doyle and Reardon, the testimony of the two experts suggests that the single factor [*61] affecting whether the system will work effectively on day one is which engineer's calculation of the wetted area is correct. Doyle calculated the wetted area to be approximately 8,000 square feet. Reardon, by contrast, calculated it to be only 107 square feet. The monumental difference between the two is the result of a fundamentally different interpretation of how the system will function.

Doyle's analysis models a system in which the stormwater is funneled into the Double Trap chambers, flows freely into the surrounding gravel envelope, and then infiltrates into the surrounding soils at the interface between the soil and the gravel. In this model the assumption that water flows freely out of the chamber and into the gravel envelope results in the level of water both in the gravel and in the chamber rising at nearly the same rate. The void space in the gravel envelope functions as storage volume that is in addition to the chamber itself. It increases the storage volume of the system and substantially increases the area through which collected water may dissipate into the ground.

Reardon's model makes two different assumptions. First, it assumes that the openings in the Double Trap will [*62] be so small that the flow of water into the gravel envelope will be sharply

restricted. The result of this sharply restricted flow will be that the storage of water in the gravel envelope will have no effect on the infiltrative capacity of the system—the water will not flow into the gravel fast enough for it to store and infiltrate water in any measurable capacity before the entire system is filled. By modeling a system with only 107 square feet of wetted area Reardon effectively tested a system as if the Double Trap chambers were set directly in the surrounding soils and did not have the benefit of the storage capacity or infiltrative area of the gravel envelope.

Reardon's reliance on 107 square feet was based on his belief, informed by a conversation with a Storm Trap representative, that each Double Trap chamber is limited to two two-foot diameter round holes in the bottom. Doyle, also purportedly relying on a conversation with the same Storm Trap representative, testified that he could core more and larger holes in both the bottom and the sides of the chamber. The exhibits and the testimony support a finding that the Double Trap chambers can be modified to some degree. The evidence [*63] is silent, however, on the scope of such modifications and whether they are as limited as Reardon believes or as permissive as Doyle believes.

Reardon's critique is that with only 107 square feet of openings in the chambers, the flow of water into the gravel is so limited that the area of the interface between the chamber and the gravel—the holes in the Double Trap—will be the limiting factor in the discharge rate rather than the area of the gravel-soil interface. Basically, he asserts that the holes in the chamber are so small that the flow of water will be bottlenecked where it exits the chamber, making the rest of the surrounding media irrelevant. In effect, Reardon argues that the gravel envelope will not be able to fill with water as intended and that under those conditions the system will fail. Doyle did not dispute that at 107 square feet the flow of water would be restricted but testified that holes totaling an area of 110 square feet would be the threshold requirement for the flow of water into the gravel layer to be sufficient for the system to operate as designed.

Reardon's model further assumed that the hydraulic conductivity rate at the interface between the chamber and [*64] the gravel—assuming that the area of that interface is 107 square feet—was 8.27 inches per hour. This assumption imputes the Rawls rate of the surrounding soils to the gravel layer in which the chamber sits. Reardon testified that he used this rate based on his belief that the surface level pretreatments would not be effective. Sediments and other larger debris would enter the chamber, which could not be cleaned, and ultimately fill the void space in the gravel envelope such that the proper Rawls rate for the calculations would be that of the surrounding soils. Reardon justified his use of the more restrictive Rawls rate by arguing that these systems are difficult to maintain and are therefore rarely maintained, causing their ability to infiltrate stormwater to degrade over a very short period of time.

The Board was therefore presented with two very different representations of how the system would operate. Doyle designed a system which he has shown through HydroCAD modeling will effectively prevent any stormwater from leaving the Developer property. Testing the limits of the system, Reardon assumed that the openings in the Double Trap chamber will be limited to only 107 square feet, [*65] and that the OMP for the system will be ineffective, together causing the system to fail. Given the complexity of the many factors which influence the way the system will work it is nearly impossible to pass judgment on whether the system will definitively work as

designed. However, it appears that Doyle relied on his years of experience and sound engineering principles to design a system which should meet the requirements of the comprehensive permit and will not cause flooding on the Abutter properties, and I credit his testimony. That being said, Reardon's concerns do not fall on deaf ears, particularly where the effects of climate change will likely require reassessing the rainfall totals associated with 10, 25, and 100 year storm events. However, here, the limitations which Reardon placed on the system in his HydroCAD model misrepresent the likely conditions in which the system will operate. While it is difficult to say with certainty that the system will work, I have not been convinced by Reardon's testimony and calculations that it will not work. Moreover, lingering concerns with respect to the operating conditions of the system are somewhat ameliorated by Doyle's testimony, [*66] which I credit, that the soils in which the infiltration system sits are more porous than the sand associated with the Rawls rate of 8.27 inches per hour used in Doyle's model. A higher hydraulic conductivity rate at the interface between the gravel and the surrounding soils would have the effect of allowing the system to infiltrate stormwater more efficiently than in Doyle's model.

Further, while not highlighted by the testimony of the experts, Doyle's model for the system on which the Decision is based contemplates an infiltration chamber comprised of 20 Double Trap modules, while Reardon's model used only 17. Exhs. 36-37. This difference is meaningful in light of Reardon's testimony that 107 square feet of openings will be too small, and Doyle's testimony that 110 square feet would be sufficient. Assuming, for the moment, that the Double Trap modules are limited to two two-foot round holes in the bottom of each, Doyle's design with three extra Double Trap chambers would, under Reardon's most restrictive conditions, have approximately 125 square feet of openings. Considering all of the foregoing evidence, I am convinced that the Board was not unreasonable, arbitrary, or capricious [*67] in finding that the system will likely operate as intended, causing no flooding on the Abutter properties.

While a component of Reardon's modeling—the Rawls rate applied to the interface between the Double Trap and the gravel envelope—was predicated on the near immediate degradation of the system, the Abutters also make the broader argument that the system is destined to fail because it cannot be maintained, and will ultimately cause flooding on their properties. As discussed above, Reardon testified that this type of infiltration basin can be subject to the intrusion of sediments, leaf litter, trash, and other surface debris that over time will, if unmitigated, cause a decrease in the hydraulic conductivity of the infiltrative media—this is true of both the gravel envelope and the existing soils—and decrease the rate of stormwater discharge from the system. Over time, if unchecked, the clogging of the system with detritus would cause it to fail. Reardon testified that in his opinion the surface level treatments are insufficient to prevent this degradation and further that it would be dangerous, such that it would likely be difficult or impossible, to clean out the inside of the Double [*68] Trap chambers. Reardon testified that chambers like the Double Trap are confined spaces that can be dangerous and difficult to enter for a variety of reasons including the possibility that the interior may be devoid of oxygen. On cross-examination, however, Reardon conceded that there are at least hundreds of such concrete chambers throughout Massachusetts which require cleaning and that are subject to safety regulations to protect those performing work in those environments.

I credit Reardon's testimony that cleaning a confined space such as the Double Trap chamber requires careful consideration of safety concerns. I cannot, however, find that the conditions are so dangerous as to make doing so impracticable. Further, considering testimony from both Doyle and Reardon on the maintenance of the surface level pre-treatments designed to prevent the intrusion of waste material into the Double Trap chamber, I find it likely that the system will operate as intended if it is regularly inspected and maintained as prescribed in the OMP. The Project requires that the stormwater management system be able to drain the entirety of a 16-acre watershed. Under the circumstances present here, I appreciate [*69] that this is not a system which can be installed and then ignored. Rather, it will require ongoing maintenance to ensure it is operating effectively. This is a concern which the Board considered when it conditioned the grant of the Comprehensive Permit, in part, as follows:

2. All stormwater drainage basins shall be located so as to facilitate the maintenance and operation of the basins and drainage utility...

4... In the event that the Weston DPW determines at any time that the stormwater management system on the site is not being properly maintained or in in need of repair, the DPW shall provide notice to the Applicant or the Applicant's successor in interest. If necessary work has not been completed within thirty (30) days of the date of such notice, the Town may, but shall not be required to, undertake the necessary maintenance and/or repairs, and the Applicant and its successors and assigns hereby agree to promptly reimburse the Town for any and all costs associated with these repairs.

5. The final site plans shall include a final design of the stormwater management system as well as an operation and maintenance plan therefor, and design of the system shall comply with the Massachusetts [*70] DEP Stormwater Guidelines and the Weston Stormwater By-Laws. The system shall also comply with the following conditions...

a. Ongoing Maintenance: All portions of the stormwater management system shall be inspected at a minimum of twice per year, following construction, to ensure that they are in proper working order. All sumps are to be cleaned once one quarter (1/4) of their working depth is full of sediment and debris. At a minimum, sumps shall be cleaned once each year, regardless of the depth of accumulated sediment and debris. These requirements shall be incorporated into the Operation and Maintenance Agreement following peer review.

Exh. 31.

Based on Reardon and Doyle's testimony I cannot find that the OMP will be wholly ineffective or that it will be impossible to maintain the system. Further, it appears that the Board appreciated the risks associated with the ongoing maintenance requirements for the system and required conditions that it believed necessary to balance the local need for affordable housing against the risks inherently associated with the stormwater management system. I must assume that the Developer will follow the OMP and the conditions set by the Board.

In light [*71] of these conclusions, the concerns raised over the stormwater management system are insufficient to support a finding that the concern for flooding on the Abutter properties outweighs the local need for affordable housing or that the Decision granting the Comprehensive Permit was based on a legally untenable ground, or was unreasonable, whimsical, capricious or arbitrary. Considering all of the evidence on the functionality and maintenance of the stormwater management system, the Board could reasonably and lawfully have granted the appropriately conditioned Comprehensive Permit set forth in the Decision.

ii. Compliance with the Stormwater Standards

The Abutters further argue a more procedural issue, namely, that the Decision should be annulled because the stormwater management system does not actually comply with the Stormwater Standards. The Abutters have argued at length that for a variety of reasons, discussed below, the system does not comply with Standard 3 as required by the conditions in the Decision. The Abutters additionally attempt to argue that the alleged failures of the system to comply with Standard 3 will cause the system to fail, resulting in flooding on the Abutters [*72] properties.

Standard 3 of the Stormwater Standards requires that where development will result in an increase the area of impermeable surface, loss of annual recharge to ground water must be eliminated or minimized. Exh. 49. "At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type." Exh. 49. Practically, what this means is that a development that is likely to increase runoff due to an increase in the area of impervious surfaces must include design elements to ensure that the amount of precipitation which infiltrates the soils and recharges the groundwater on site is not reduced by the post-development conditions. As applied to the Project, and stated more simply, the amount of rainwater which soaks into the ground on the Developer property in its post-development condition must be no less than the amount that soaks into the ground now. More specifically, Standard 3 sets forth a calculation to determine the required recharge volume of water based on the increase in the area of impervious surfaces and the type of soils present at the development site. In this Project, the impervious surfaces [*73] will increase by 20,038 square feet, in an area with sandy soils. The target depth factor associated with sandy soils, 0.6 inches, converted to feet and multiplied by the increased surface area, results in a required recharge volume of about 1,002 cubic feet of water. This 1,002 extra cubic feet of water has to go somewhere to be stored until it is recharged into the ground. The Handbook's explanation of documenting compliance with Standard 3 provides several methods of calculating the necessary size of an infiltration chamber to hold the required recharge volume as it infiltrates into the ground. These suggested calculations, however, are unnecessary if a system has been designed to handle more stormwater than the minimum required by Standard 3. The infiltration chambers Doyle has proposed for the system have a capacity of 37,376.1 cubic feet and adding the void space in the gravel envelope brings the total storage capacity to 43,262.2 cubic feet. Exh. 37. Here, where the system, by either engineers' calculations, will be recharging in excess of 100,000 cubic feet of water during a 100-year storm, see Exhs. 36, 38, the intent of Standard 3 is satisfied as long as the system operates [*74] as designed.

In their challenge to the system's compliance with Standard 3 the Abutters argue that Doyle failed to comply with specific parameters of the Documenting Compliance section of the Handbook. First, they argue that Doyle used a percolation test to determine the hydraulic conductivity of the subsurface soils into which the stormwater will recharge in violation of Standard 3. The Handbook forbids the use of Title 5 percolation tests to establish the hydraulic conductivity of soils when performing the storage sizing calculations in one of the three ways discussed in the Handbook. Notwithstanding the attenuated applicability of the Standard 3 storage sizing calculations to this project, Doyle used the Rawls rate rather than the results of any percolation test for all of his calculations.

Second, and more salient, the Abutters argue that the system will not fully drain within 72 hours as required by Standard 3. Whether or not the other calculations are necessary, there is logic in the requirement that the system be able to fully drain within 72 hours. Further, a footnote to the drawdown calculations in the Handbook under Standard 3 reads:

In some cases, the infiltration structure [*75] may be designed to treat the *Required Water Quality Volume* and/or to attenuate peak discharges in addition to infiltrating the *Required Recharge Volume*. In that event, the storage volume of the structure must be used in the formula for determining drawdown time in place of the *Required Recharge Volume*.

Exh. 49 (emphasis supplied). In this footnote the Handbook explicitly accounts for the possibility that, as here, the system may be designed to handle more than simply the required recharge volume. Notwithstanding that difference, the system must still be able to drain fully in 72 hours. Doyle's drawdown calculations concluded that the system would fully drain in 32.7 hours while Reardon calculated a drawdown time of 66 days. The two calculations rely on slightly different storage volumes; Doyle used 114,824 cubic feet and Reardon used 116, 175 cubic feet. The wide divergence in drawdown calculations comes from the engineers' very different estimation of the bottom area of the recharge structure. Reardon used 107 square feet and Doyle used the actual bottom surface area of the Double Trap chamber, 5,098 square feet. The dramatic difference between these two is again a result of the engineers' [*76] differing interpretations of how the system will function. As discussed above, Reardon believes that owing to the combination of limited openings in the Double Trap chambers of 107 square feet, and the rapid degradation of the system, the proper analysis limits the infiltrative area to the most conservative estimate of the possible openings in the Double Trap and the hydraulic conductivity rate at those openings to 8.27 inches per hour. Doyle, consistent with the guidance in the Handbook, used the area of the bottom of the recharge structure, 5,098 square feet, in his calculations. It appears that Doyle's calculations are consistent with the guidance in the Handbook, and that the system will drain in less than 72 hours as required by Standard 3. Moreover, as discussed above, Reardon's restrictive drawdown analysis is based on an interpretation of the system which does not account for the dissipation of water through the gravel envelope but rather forces the calculations to produce a result as though the chamber is emptying directly into the surrounding soils. The testimony of Reardon and Doyle together with the other evidence suggests that the system will function as intended as long [*77] as there are at least 110 square feet of openings in the Double Trap chamber, and that, based on Doyle's most recent design and the possibility of further modifications to the chamber, there will actually be at least 110 square feet of openings in the chamber. Where the openings in the Double

Trap chamber are not going to be the limiting factor in the drawdown of water in the chamber, it is consistent with the Handbook and the engineering principles described by both engineers that the entire bottom area of the chamber be used to calculate the drawdown time.

Third, the Abutters argue that there is an error in Doyle's mounding analysis, as it shows that the top of the mound will coincide with the bottom of the basin. Reardon testified that this is a problem. The only mounding requirement in Standard 3 is that the mound not break above ground. The mounding analysis does not show that this will be the case. Moreover, a mounding analysis is not required at all under Standard 3 where the separation between the seasonal high groundwater and the bottom of the infiltration system is greater than four feet. Here, the separation exceeds eight feet, and no mounding analysis was therefore required [*78] under Standard 3.

The Abutters' final two arguments that the system fails to comply with Standard 3 are essentially that Doyle performed different calculations than those detailed in the Handbook in the section on compliance with Standard 3. As discussed briefly above, the calculations provided in the Handbook explain how to determine the required size of an infiltration chamber that will hold *only* the required recharge volume. The Abutters argue that Doyle's design violates Standard 3 because (1) he used a variable exfiltration rate in his HydroCAD analysis rather than one that is constant and (2) his HydroCAD analysis used a measure of the infiltrative area of the system which included the sidewalls of the gravel envelope in addition to its bottom. The suggested calculations for Standard 3 do state that a constant exfiltration rate should be used and that only the surface area of the bottom of the system should be used.

This argument would carry more weight if the system had only been designed to infiltrate the required recharge volume. However, Doyle designed the system to infiltrate more than 100 times the required recharge volume in the event of a 100 year storm. While the calculations [*79] Doyle performed do not strictly comply with the suggested parameters for documenting compliance with Standard 3, they were performed for a different purpose, and it does not necessarily follow that Standard 3 has not been satisfied. As with the drawdown calculations, it is necessary to vary the calculations performed when the system is designed to serve more than one purpose—in this case infiltrating the entire watershed rather than just the additional runoff from impervious surfaces on the Developer property. Doyle's system complies with Standard 3 because it is capable of holding far in excess of the required recharge volume and emptying completely within 72 hours as required.

Considering the foregoing critiques, and to the extent that it is applicable to the unique design required by the Project, the system, as designed, complies with the requirements of Standard 3 as it will not diminish the annual recharge of stormwater on the Developer property. To the extent that the Abutters articulate a concern that variations in Doyle's design required different calculations than those in the Handbook applicable to Standard 3, none of the alleged violations of Standard 3 appear to bear on [*80] the likelihood of the system's success or failure. Standard 3, applied to the Project, requires the infiltration of approximately 1,000 cubic feet of stormwater onsite. The system has been designed to infiltrate in excess of 100,000 cubic feet of stormwater. Certainly the Project as required by the conditions in the Decision and state regulations must comply with Standard 3. That a variety of different calculations were required to design a system

which serves multiple purposes does not, however, amount to a violation of Standard 3. Rather, as discussed, as long as the system will function to prevent flooding, Standard 3 is necessarily met because there will be no stormwater leaving the property before it is infiltrated into the ground. As such, the Abutters' argument that the Decision should be annulled because the stormwater management system does not comply with the Stormwater Standards is without merit, because the Board could reasonably have found that the proposed system complied with all necessary regulations and standards.

Conclusion

For the foregoing reasons, while the Abutters had standing to maintain this action, the Decision granting the comprehensive permit must be affirmed [*81] and Count I of the Complaint shall be dismissed with prejudice. Further, with respect to Count IV the Abutters are entitled to a declaration that the Developer may not unilaterally destroy trees on the shared property lines or on the Abutter properties with the caveat that the Developer has the right to cut back roots and branches on its property irrespective of the effect such actions have on living trees. Consistent with that declaration, the Abutters are not entitled to relief enjoining the Developer from proceeding with the project. Judgment shall enter consistent with this Decision.

Judgment accordingly.

Robert B. Foster, Justice

Dated: January 7, 2019

EXHIBIT A

EXHIBIT B

JUDGMENT

This action is an appeal of a decision of the Weston Board of Appeals, filed with Weston Town Clerk on May 3, 2017, granting 269 North Ave, LLC (Developer) a Comprehensive Permit for the construction of a sixteen unit affordable housing development on property it owns located at 269 North Avenue, Weston, Massachusetts (Comprehensive Permit Decision). The Complaint was filed on May 22, 2017. The Answer of Defendant Weston Zoning Board of Appeals was filed on June 20, 2017. The Answer and Counterclaim of 269 [*82] North Ave, LLC was filed on July 21, 2017. The Plaintiff's Special Motion to Dismiss was filed on September 18, 2017. The Defendant 269 North Ave. LLC's Motion to Dismiss Counts II and III of the Complaint was filed on September 18, 2017. The Defendant Weston Zoning Board of Appeals Joinder in

Defendant 269 North Ave, LLC's Motion to Dismiss was filed on October 19, 2017. The motions to dismiss were heard on October 20, 2017, Count II of the Complaint was dismissed (Dismissal), and the remainder of the motions were taken under advisement. In a Memorandum and Order dated October 30, 2017, the remainder of the parties' motions to dismiss were denied.

The Stipulation of Dismissal as to Maxine Breen and Count III was filed on January 16, 2018 (Stipulation of Dismissal). The Pre-Trial conference was held on March 20, 2018. A view was taken on May 25, 2018. Trial was held on May 31, and June 6, 2018. The court reporter was sworn. Exhibits 1-66 were admitted. Testimony was heard from William Doyle, Sean Reardon, Peter Kirk, Brian Johnson, Michael Boucher, Edward Ionata, and John Coppinger. The trial transcript was filed on July, 3, 2018. The Defendant 269 North Avenue, LLC's Post-Trial Brief [*83] and Plaintiff's Post-trial Memorandum of Law were filed on August 3, 2018. I heard the closing arguments on August 8, 2018. At that time the court found that the Abutters' presumption of standing had been rebutted and took the remainder of the case under advisement. In a Decision of even date, the court (Foster, J.) has made findings of fact and rulings of law.

In accordance with the October 29, 2017 Dismissal, the January 16, 2018 Stipulation of Dismissal, and the court's Decision issued today, it is

ORDERED, ADJUDGED, and DECLARED that the Comprehensive Permit Decision is AFFIRMED. It is further

ORDERED and ADJUDGED that Count I of the Complaint is DISMISSED with prejudice. It is further

ORDERED and ADJUDGED that Count II of the Complaint is DISMISSED without prejudice. It is further

ORDERED and ADJUDGED that Count III of the Complaint is DISMISSED with prejudice as to a claim seeking prospective declaratory relief against the Developer for trespass or nuisance on Maxine Breen's property at 266 North Avenue, Weston from stormwater runoff from the Project, but does not preclude Maxine Breen from appealing the issuance of a permit from the Town of Weston to the Developer to connect the [*84] Project's stormwater management system to the drainage system in Route 117 (the Connection Permit), or from bringing any other claims against the defendants arising from the connection of the Project's stormwater management system into the Route 117 drainage system. It is further

ORDERED and ADJUDGED that Count IV of the Complaint as to Maxine Breen is DISMISSED with prejudice. It is further

ORDERED, ADJUDGED, and DECLARED under Count IV of the Complaint that the Developer may not unilaterally destroy trees situated either on the property lines that it shares with Peter Kirk and Bryan Johnson or on their properties, with the caveat that the Developer has the right to cut roots and branches on its property irrespective of the effect such actions have on living trees. It is further

ORDERED and ADJUDGED that 269 North Ave, LLC's Counterclaim is DISMISSED with prejudice except to the extent that there is an appeal of the Connection Permit or the initiation of any other claims arising from said connection. It is further

ORDERED and ADJUDGED that a copy of this judgment may be filed with the Middlesex Registry of Deeds and marginally referenced on all relevant documents.

By the Court (Foster, [*85] J.)

Attest:

Deborah J. Patterson, Recorder

Dated: January 7, 2019

Footnotes

- The required recharge volume is the amount of water which a stormwater management system must be able to infiltrate into the ground to prevent a reduction in groundwater recharge due to surface runoff resulting from an increase in impervious surface area. Exh. 49.
- The target depth factor is based on the soil type present, whether sand, loam, silty loam, or clay, and is "indicative of the minimum infiltration obtained for a soil after prolonged wetting." Exh. 49.
- Rawls rates, discussed more fully *infra*, are standard measures of the rates at which water flows through varying soil types, typically expressed in terms of inches per hour. Exh. 49; Tr. 1: 66, 70-72.
- "Pond" is the term used for any natural or constructed basin container into which stormwater runs and which holds the stormwater pending exfiltration. See Exhs. 36-37; Tr. 1:53-55.
- Reardon's model assumes there will be 17 double trap modules, with two holes each. Each hole is a circle of two feet in diameter or having a one foot radius. Applying the formula for the area of a circle, πr^2, each hole has an area of approximately 3.14 square feet. Thirty-four holes would result in approximately 106.76 square feet of openings. Exh. 36. Doyle's final model assumes 20 chambers which would add six additional 3.14-square-foot openings to bring the total area of the openings to approximately 125.60 square feet. Exh. 37.
- This is a criminal statute, but G. L. c. 242, § 7, provides that a "person who without license willfully cuts down, carries away, girdles or otherwise destroys trees, timber, wood or underwood on the land of another shall be liable to the owner in tort for three times the amount of the damages assessed therefor; but if it is found that the defendant had good reason to believe that the land on which the trespass was committed was his own or that he was otherwise lawfully authorized to do the acts complained of, he shall be liable for single damages only." *Id.*

- Given the growth and distribution of roots among neighboring trees, the Developer may not be able to discern from which tree a given root issues.
- In any event, as discussed above it appears there is no zoning authority to support additional protections.