THORNDIKE PLACE

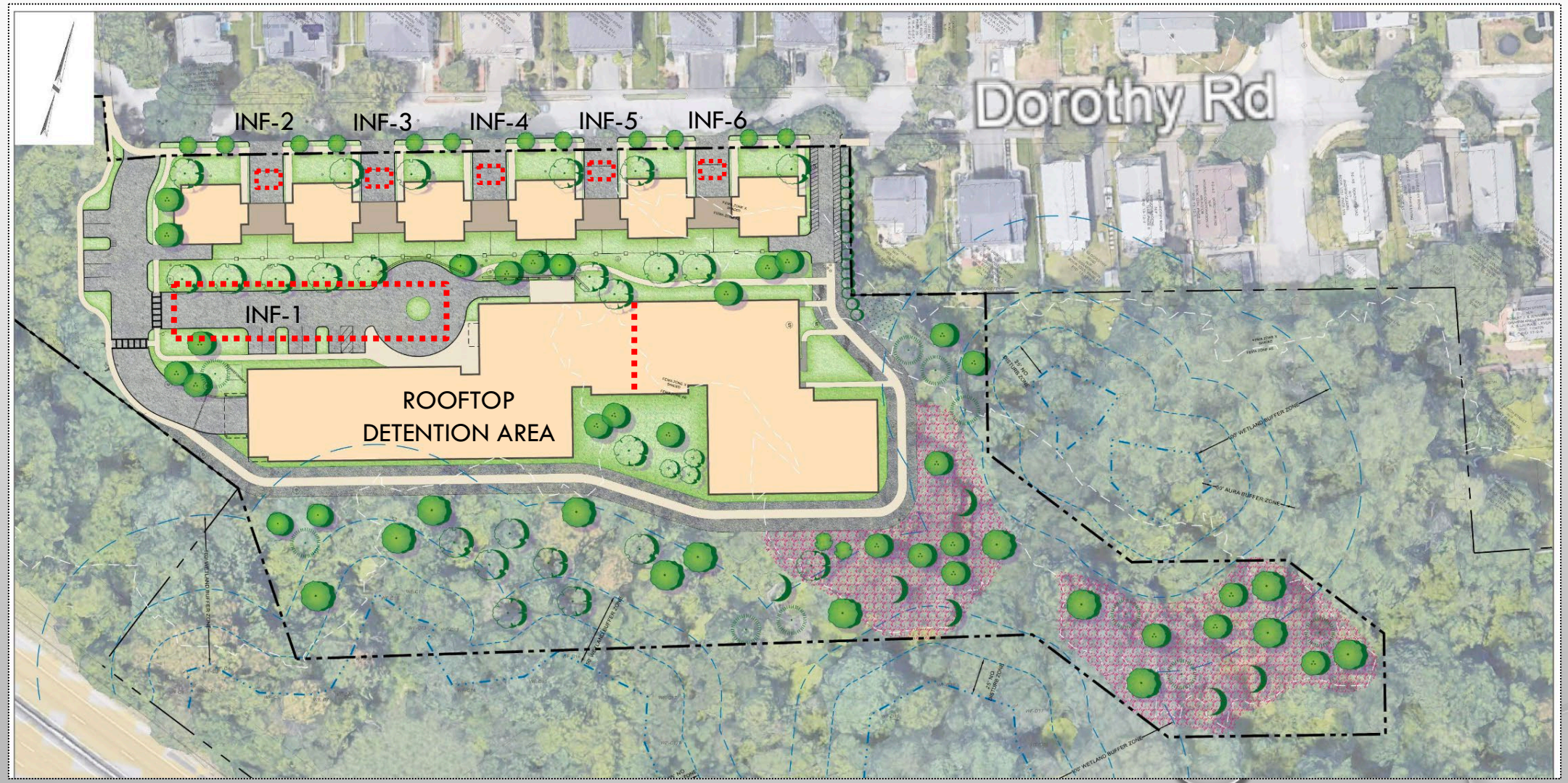
PRESENTATION TO ARLINGTON CONSERVATION COMMISSION

FEBRUARY 6, 2025

PROJECT MEETS OR EXCEEDS MASSACHUSETTS STORMWATER STANDARDS

- PROJECT'S STORMWATER MANAGEMENT DESIGN HAS RECEIVED INDEPENDENT 3RD PARTY PEER REVIEW BY BOTH HATCH AND GZA ON BEHALF OF ARLINGTON CONSERVATION COMMISSION
- HATCH PEER REVIEW DEMONSTRATED COMPLIANCE WITH STANDARDS 1, 2, 4, 5, 6, 7, 8, 9, & 10
- INITIAL GZA PEER REVIEW DEMONSTRATED COMPLIANCE WITH SEASONAL HIGH GROUNDWATER REQUIREMENTS AND GROUNDWATER MOUNDING METHODOLOGY OF STANDARD 3, BUT RAISED CONCERNS REGARDING 72 HOUR DRAW DOWN OF FULL RECHARGE VOLUME
- RECHARGE SYSTEMS REVISED BASED UPON GZA REVIEW. SUBSEQUENT GZA REVIEW CONFIRMED COMPLIANCE WITH STANDARD 3 DRAW DOWN REQUIREMENT AND REVISED GROUNDWATER MOUNDING ANALYSIS AND RECONFIRMED SEASONAL HIGH GROUNDWATER DETERMINATION
- GZA REVIEW REQUESTED MOUNDING BE PERFORMED BASED ON 100-YEAR STORM TOTAL RECHARGE VOLUME. SYSTEMS REVISED TO MEET THIS REQUIREMENT. FINAL GZA REVIEW CONFIRMED COMPLIANCE WITH THIS REQUEST AND CONTINUED COMPLIANCE WITH ALL STORMWATER STANDARDS.
- COMPLIES WITH EACH OF THE 10 STORMWATER STANDARDS IN MA WPA

ORIGINAL DESIGN



REVISIONS TO ADDRESS AUGUST 1REVIEW COMMENTS

REVISED DESIGN

REVISIONS TO ADDRESS DECEMBER REVIEW COMMENT

REVISED DESIGN

INITIAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED AUGUST 1, 2024

- ESTIMATED SEASONAL HIGH GROUNDWATER SELECTED FOR PROJECT (4.0)
  - GZA CONCLUDED THAT GROUNDWATER ELEVATION USED FOR DESIGN IS APPROPRIATE
  - *"THEREFORE, WE CONCLUDE THAT THE SEASONAL HIGH WATER TABLE ELEVATION OF 4.0 FEET USED BY BSC IS FOR "ABOVE NORMAL" GROUNDWATER CONDITIONS AND IS SUITABLE TO BE USED FOR STORMWATER DESIGN FOR THIS PROJECT. AS NOTED ABOVE, GZA'S OPINION ON DESIGN GROUNDWATER ELEVATION FINDINGS ARE CONSISTENT WITH THE OPINION EXPRESSED BY HATCH AND BSC."*
  - *"NOTE THAT WE DID NOT USE USGS WELL LEXINGTON MA-LTW-104 (WHICH WAS USED BY MMA AND HORSLEY) IN OUR ANALYSIS BECAUSE THAT WELL IS IN A SAND AND GRAVEL AQUIFER WITH A VERY SHALLOW WATER TABLE. THOSE CONDITIONS ARE NOT PRESENT AT THE SITE. IN ADDITION, THAT USGS WELL IS MORE EFFECTED BY INDIVIDUAL RAINFALL EVENTS THAN BY SEASONAL VARIATIONS OF THE GROUNDWATER TABLE, WHICH IS NOT TYPICAL OF OTHER USGS WELLS IN THE AREA."*

INITIAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED AUGUST 1, 2024 (CONT.)

- GROUNDWATER MOUNDING ANALYSIS
  - GZA CONCURRED WITH BSC METHODOLOGY AND THAT REQUIRED RECHARGE VOLUME COULD BE INFILTRATED WITHOUT EXCESSIVE GROUNDWATER MOUNDING. HOWEVER, DETERMINED THAT THE FULL VOLUME OF THE RECHARGE SYSTEM WOULD NOT.
  - *"IT IS GZA'S OPINION THAT THE REQUIRED RECHARGE VOLUME OF 1,638 CUBIC FEET CAN BE INFILTRATED INTO THE GROUND, WITHOUT CAUSING EXCESSIVE GROUNDWATER MOUNDING. HOWEVER, FOR STORMWATER VOLUMES LARGER THAN 1,638 CUBIC FEET THE RATE OF GROUNDWATER INFILTRATION WILL DECREASE SIGNIFICANTLY, AND THE GROUNDWATER MOUND WILL EXTEND INTO THE BOTTOM OF THE INFILTRATION SYSTEM."*

INITIAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED AUGUST 1, 2024 (CONT.)

- 72 HOUR DRAWDOWN OF INFILTRATION SYSTEM
  - GZA CONCLUDED THAT REQUIRED RECHARGE VOLUME WOULD DRAIN WITHIN REQUIRED 72 HOUR PERIOD BUT THAT THE FULL VOLUME OF THE SYSTEM WOULD NOT
  - *"AS NOTED ABOVE, THE REQUIRED RECHARGE VOLUME IS 1,638 CUBIC FEET, BUT THE MAIN STORMWATER INFILTRATION SYSTEM HAS A STORAGE VOLUME OF 10,497 CUBIC FEET. IT IS GZA'S OPINION THAT THE LARGE MAIN STORMWATER INFILTRATION SYSTEM WOULD NEED TO BE REDESIGNED TO ALLOW DRAINAGE OF THE SYSTEM WITHIN 72-HOURS TO MEET THE REQUIREMENTS OF THE MASSDEP STORMWATER HANDBOOK, AND TO ACCOUNT FOR THE IMPACTS OF GROUNDWATER MOUNDING DURING STORM EVENTS WHICH RESULT IN GREATER THAN 1638 CUBIC FEET OF STORMWATER RUNOFF. THE REDESIGN SHOULD ALSO ADDRESS PEAK FLOW RATES THAT DISCHARGE TO THE STORMWATER OUTFALL CONTROL SYSTEM."*

REVISIONS TO ADDRESS AUGUST 1REVIEW COMMENTS

- R-TANK UNDERGROUND CHAMBERS IN TOWNHOUSE DRIVEWAYS ELIMINATED
  - DRIVEWAY TRENCH DRAINS REROUTED TO LARGE INFILTRATION SYSTEM
- MAIN BUILDING ROOF DETENTION SYSTEM EXPANDED
- INFILTRATION SYSTEM 1 (LARGE SYSTEM) REVISED
  - BOTTOM ELEVATION RAISED 6”
  - STORMTRAP UNITS 6” SHORTER
  - OUTLET CONTROL REVISED TO INCLUDE MANHOLE WITH WEIR WALL & ORIFICE
  - RESULTS IN LOWER VOLUME OF STORMWATER INFILTRATING
  - REQUIRED RECHARGE VOLUME AND WATER QUALITY VOLUME STILL MET
  - PEAK RUNOFF RATES STILL REDUCED FROM EXISTING FOR ALL STORM EVENTS

REVISIONS TO ADDRESS AUGUST 1REVIEW COMMENTS

REVISED DESIGN

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED OCTOBER 22, 2024

- ESTIMATED SEASONAL HIGH GROUNDWATER SELECTED FOR PROJECT (4.0)
  - GZA CONCLUDED THAT GROUNDWATER ELEVATION USED FOR DESIGN IS APPROPRIATE
  - *"IT IS GZA'S OPINION THAT BSC'S DESIGN GROUNDWATER ELEVATION FINDINGS ARE CONSISTENT WITH THIS DEFINITION (IN ITS ENTIRETY). REDOX FEATURES WERE NOT PRESENT; THEREFORE, WELLS WERE INSTALLED, WATER LEVELS WERE MEASURED IN THE SPRING (WHEN THE GROUNDWATER WAS HIGHEST), AND THE WATER LEVELS WERE COMPARED TO HISTORIC USGS GROUNDWATER LEVELS FOR A RELATIVE COMPARISON OF THE TYPE OF SPRING CONDITIONS PRESENT AT THE TIME THAT THE MEASUREMENTS WERE RECORDED AT THE SITE. AS PREVIOUSLY REPORTED BY GZA, THE USGS WATER LEVELS WERE WELL ABOVE NORMAL AT THE TIME OF THE SITE RECORDED GROUNDWATER ELEVATION MEASUREMENTS (I.E., THE HIGHEST SEASONAL WATER TABLE OBSERVED OVER THE PAST 10 YEAR)."*

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED OCTOBER 22, 2024

- GROUNDWATER MOUNDING ANALYSIS
  - GZA CONCURRED WITH BSC'S GROUNDWATER MOUNDING ANALYSIS
  - *"THE REVISED GROUNDWATER MOUND ESTIMATE FOR THE 100 YEAR DESIGN STORM IS APPROXIMATELY 2.34 FEET (USING THE SAME AQUIFER PARAMETER VALUES THAT GZA USED IN OUR PREVIOUS PEER REVIEW LETTER). THIS REVISED GROUNDWATER MOUND ELEVATION IS APPROXIMATELY 6.34 FEET AND DOES NOT REACH THE BOTTOM OF THE INFILTRATION BASIN (ELEVATION 6.5 FEET)."*

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED OCTOBER 22, 2024 (CONT.)

- RECOMMENDATION FOR BUILDING UNDERDRAIN
  - *"WE NOTE THAT THE BOTTOM OF THE STORMWATER INFILTRATION SYSTEM IS NOW HIGHER THAN THE PROPOSED GARAGE FLOOR LEVEL OF THE NEW BUILDING THAT IS PLANNED TO BE LOCATED 15 FEET FROM THE STORMWATER INFILTRATION SYSTEM. THE PROPOSED GARAGE FLOOR LEVEL IS ELEVATION 6.0 FEET. IT IS GZA'S OPINION, THAT A GROUNDWATER UNDERDRAIN SHOULD BE DESIGNED AND CONSTRUCTED BENEATH THE GARAGE FLOOR LEVEL IN THIS AREA TO ADDRESS POTENTIAL WATER INFILTRATION ISSUES."*
  - APPLICANT AGREES TO THIS RECOMMENDATION AS A CONDITION OF APPROVAL FOR SUBMISSION WITH BUILDING PERMIT PLANS

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED OCTOBER 22, 2024 (CONT.)

- 72 HOUR DRAWDOWN OF INFILTRATION SYSTEM
  - GZA CONCLUDED THAT REVISED SYSTEM WOULD DRAIN WITHIN REQUIRED 72 HOURS
  - *"IT IS GZA'S OPINION THAT THE REVISED STORMWATER MOUND EVALUATION PROVIDED IN BSC'S OCTOBER 4, 2024 REPORT ADEQUATELY ADDRESSES THE IMPACTS OF GROUNDWATER MOUNDING DURING LARGE STORM EVENTS AND ADDRESSES THE 72 HOUR DRAINAGE REQUIREMENT FOR THE INFILTRATION SYSTEM. THE REVISED PREDICTED GROUNDWATER MOUND BENEATH THE STORMWATER INFILTRATION SYSTEM IS NOT EXPECTED TO ADVERSELY IMPACT THE ABILITY OF THE INFILTRATION SYSTEM TO EMPTY IN LESS THAN 72 HOURS."*

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED OCTOBER 22, 2024 (CONT.)

- COMPLIANCE WITH STORMWATER STANDARD 2
  - GZA CONCLUDED THAT REVISED SYSTEM WOULD COMPLY WITH STORMWATER STANDARD 2
  - *"IN ADDITION, WE BELIEVE THE STORM WATER REDESIGN ADEQUATELY ADDRESSES THE MASSDEP STORMWATER STANDARD 2- PEAK RATE ATTENUATION REQUIREMENTS."*

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW QUESTION FROM OCTOBER 24, 2024 PUBLIC HEARING

- GROUNDWATER MOUNDING ANALYSIS
    - GZA REQUESTED THAT THE GROUNDWATER MOUNDING ANALYSIS BE PERFORMED USING THE TOTAL VOLUME OF STORMWATER INFILTRATED DURING THE 100-YEAR, 24-HOUR DESIGN STORM (“DISCARDED” VOLUME FROM HYDROCAD)

REVISIONS TO ADDRESS GZA COMMENT

- R-TANK UNDERGROUND CHAMBERS IN TOWNHOUSE DRIVEWAYS RECONFIGURED
  - OVERFLOWS TO INFILTRATION SYSTEM 1
  - GROUNDWATER MOUNDING USING "DISCARDED" VOLUME FROM 100-YEAR, 24-HOUR STORM
- MAIN BUILDING ROOF DETENTION SYSTEM ELIMINATED
- INFILTRATION SYSTEM 1 (LARGE SYSTEM) REVISED
  - BOTTOM ELEVATION RAISED TO ELEVATION 8.0 TO PROVIDE 4-FEET SEPARATION TO ESHGW
  - 72-HOUR DRAWDOWN BASED ON FULL VOLUME BELOW LOWEST OUTLET
  - 4-FEET OF SEPARATION TO ESHGW DOES NOT REQUIRE MOUNDING ANALYSIS
  - OVERFLOW TO REAR OF SITE PER ORIGINAL DESIGN
  - REQUIRED RECHARGE VOLUME AND WATER QUALITY VOLUME STILL MET
  - PEAK RUNOFF RATES DO NOT EXCEED EXISTING FOR ALL STORM EVENTS

REVISIONS TO ADDRESS GZA COMMENT

- INFILTRATION SYSTEM 7 ADDED
  - SYSTEM COLLECTS RUNOFF FROM DRIVEWAY CATCH BASIN AND TRENCH DRAIN
  - 72-HOUR DRAWDOWN BASED ON FULL VOLUME BELOW LOWEST OUTLET
  - GROUNDWATER MOUNDING USING “DISCARDED” VOLUME FROM 100-YEAR, 24-HOUR STORM
  - OVERFLOW TO REAR OF SITE
  - REQUIRED RECHARGE VOLUME AND WATER QUALITY VOLUME MET
  - PEAK RUNOFF RATES DO NOT EXCEED EXISTING FOR ALL STORM EVENTS

REVISIONS TO ADDRESS DECEMBER REVIEW COMMENT

REVISED DESIGN

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED JANUARY 28, 2025

- COMPLIANCE WITH STORMWATER STANDARD 2
  - GZA CONCLUDED THAT REVISED SYSTEM WOULD COMPLY WITH STORMWATER STANDARD 2
  - *"THE STORMWATER REDESIGN APPEARS TO ADEQUATELY ADDRESSES THE MASSDEP STORMWATER STANDARD 2- PEAK RATE ATTENUATION REQUIREMENTS."*

ADDITIONAL PEER REVIEW BY GZA

GZA INDEPENDENT 3RD PARTY PEER REVIEW LETTER DATED JANUARY 28, 2025 (CONT.)

- COMPLIANCE WITH STORMWATER STANDARD 3
  - GZA CONCLUDED THAT REVISED SYSTEM WOULD COMPLY WITH STORMWATER STANDARD 3
  - *"WITH THE IMPLEMENTATION OF BUILDING UNDERDRAINAGE AND PEAT REMOVAL AS SUMMARIZED ABOVE, THE REVISED STORMWATER MOUND EVALUATIONS PROVIDED IN BSC'S JANUARY 3, 2025 REPORT ADEQUATELY ADDRESSES THE MASSACHUSETTS STORMWATER HANDBOOK'S REQUIREMENTS TO EVALUATE IMPACTS OF GROUNDWATER MOUNDING DURING LARGE (100-YEAR) STORM EVENTS AND ADDRESSES THE 72-HOUR DRAINAGE REQUIREMENT FOR THE INFILTRATION SYSTEMS. THE REVISED PREDICTED GROUNDWATER MOUND BENEATH THE STORMWATER INFILTRATION SYSTEMS IS NOT EXPECTED TO ADVERSELY IMPACT THE ABILITY OF THE INFILTRATION SYSTEMS TO EMPTY IN LESS THAN 72 HOURS. WE PREMISE THESE CONCLUSIONS ON THE ASSUMPTION THAT AN UNDERDRAIN SYSTEM WILL BE INSTALLED BENEATH THE BUILDING LOCATED NEAR INFILTRATION SYSTEM 1 AND THE ORGANIC DEPOSIT (PEAT LAYER) UNDERLYING INFILTRATION SYSTEM 1 IS REMOVED AND REPLACED WITH CLEAN SAND UP TO THE BOTTOM OF THE INFILTRATION SYSTEM 1."*
  - *"IF THE NEARBY BUILDING'S GROUNDWATER UNDERDRAIN SYSTEM IS INSTALLED BESIDE INFILTRATION SYSTEM 1 AND IF THE ORGANIC DEPOSIT (PEAT LAYER) IN THE EASTERN PORTION OF THE INFILTRATION SYSTEM 1 IS REMOVED AND REPLACED WITH CLEAN SAND UP TO THE BOTTOM OF THE INFILTRATION SYSTEM 1, THEN WE DO NOT ANTICIPATE THAT THE ADJACENT MOUNDING DUE TO INFILTRATION SYSTEM 1 WILL ADVERSELY IMPACT THE MOUND CONDITIONS AT INFILTRATION SYSTEM 7."*
  - APPLICANT AGREES TO REQUIREMENT FOR A BUILDING UNDERDRAIN AND REMOVAL OF ALL PEAT/ORGANIC LAYER MATERIALS AND REPLACEMENT WITH CLEAN SAND AS A CONDITION OF APPROVAL FOR SUBMISSION WITH BUILDING PERMIT PLANS

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FEBRUARY 5, 2025

Town of Arlington Conservation Commission
c/o Mr. David Morgan, Environmental Planner + Conservation Agent
Robbins Memorial Town Hall
730 Massachusetts Avenue
Arlington, Massachusetts 02476

RE: Response to January 28, 2025 GZA Peer Review
Thorndike Place Residential Development

Dear Members of the Arlington Conservation Commission,

On behalf of the Applicant, Arlington Land Realty, LLC, BSC Group, Inc. (BSC) is pleased to submit this response to the peer review comments provided by GZA GeoEnvironmental, Inc. (GZA) in a letter dated January 28, 2025, for the above referenced project. GZA's peer review letter provided the following conclusions:

GZA's opinion is as follows:

1. *If the nearby building's groundwater underdrain system is installed beside Infiltration System 1 and if the organic deposit (peat layer) in the eastern portion of the Infiltration System 1 is removed and replaced with clean sand up to the bottom of the Infiltration System 1, then we do not anticipate that the adjacent mounding due to Infiltration System 1 will adversely impact the mound conditions at Infiltration System 7.*
2. *With the implementation of building underdrainage and peat removal as summarized above, the revised stormwater mound evaluations provided in BSC's January 3, 2025 report adequately addresses the Massachusetts Stormwater Handbook's requirements to evaluate impacts of groundwater mounding during large (100-year) storm events and addresses the 72-hour drainage requirement for the infiltration systems. The revised predicted groundwater mound beneath the stormwater infiltration systems is not expected to adversely impact the ability of the infiltration systems to empty in less than 72 hours. We premise these conclusions on the assumption that an underdrain system will be installed beneath the building located near Infiltration System 1 and the organic deposit (peat layer) underlying Infiltration System 1 is removed and replaced with clean sand up to the bottom of the Infiltration System 1.*
3. *The stormwater redesign appears to adequately addresses the MassDEP Stormwater Standard 2- Peak Rate attenuation requirements.*

The Applicant agrees to both of GZA's recommendations to install an underdrain system for the building and to remove the organic deposit (peat layer) beneath the infiltration systems and replace this material with a clean sand to the bottom of the infiltration systems. We request that the Conservation Commission include these requirements in an Order of Conditions for the project with final design of each to be performed as part of the building design and submitted to the Town as part of the building permit application.

BSC GROUP

We believe this information fully responds to all comments from GZA's extensive peer review. We look forward to discussing this project further with you at the upcoming public hearing. Please feel free to contact me at (617) 896-4386 or drinaldi@bscgroup.com should you have any questions on this matter.

Sincerely,
BSC Group, Inc.

Dominic Rinaldi, PE
Senior Associate

803 Summer Street, Third Floor / Boston, MA 02127 / 617-896-4300

PROJECT MEETS OR EXCEEDS MASSACHUSETTS STORMWATER STANDARDS

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- COMPLIES WITH EACH OF THE 10 STORMWATER STANDARDS IN MA WPA