www.vhb.com

February 25, 2020

Ref: 10865.03

Mr. Barney Heath, Director
City of Newton Planning & Development
1000 Commonwealth Avenue, Room 202
Newton, Massachusetts 02459

Re: Riverside Station Redevelopment – Peer Review Response to Stormwater Comments

Dear Mr. Heath:

On behalf of our client, Mark Development, we respectfully submit the following responses to comments provided by the Horsley Witten Group, Inc. (HW) in a letter dated January 16, 2020 regarding the Riverside Station Stormwater Peer Review. For clarity, the peer review comments have been repeated in italics preceding each response in bold type.

General

1. *The Applicant states that it has reduced the overall impervious area however the HydroCAD model does not support this statement. The overall watershed area of 30.95 acres appears to increase the total impervious area by 1.29 acres and the project site also appears to have a slight increase. HW recommends that the Applicant clarify its statement and document the impervious area within the total project area under existing and proposed conditions.*

   VHB has taken a conservative approach to the Project's stormwater management system by assuming all areas between the roadway curb and the buildings are impervious, rather than a mix of impervious and pervious material as shown on the detailed landscape design plans. Thus, much of the proposed surface types that are listed as impervious in the proposed HydroCAD models are a mix of porous pavement, sidewalk, pavers, planters, and tree pits. The existing impervious area is approximately 11.8 acres. Based on the proposed design as shown on the Site Plans dated December 9, 2019, the proposed impervious area within the Site is approximately 11.2 acres resulting in a net reduction of approximately 5%. It is also important to note that there is a substantial reduction in impervious paved areas as a result of the construction of the parking structures and buildings which will now occupy the site. The reduction in paved area will result in significant water quality benefits.

2. *The majority of the site will be piped towards the existing 60-inch culvert, crossing the site in a drainage easement controlled by the City of Newton. The 60-inch culvert conveys Runaway Brook and discharges into the Charles River. HW recommends that this culvert be videoed prior to any earth disturbance to verify it is structurally sound and has ample capacity. If maintenance or repairs of this culvert are*

Engineers | Scientists | Planners | Designers

101 Walnut Street
PO Box 9151
Watertown, Massachusetts 02471
P 617.924.1770
F 617.924.2286

required, the work should be conducted prior to any land disturbance. HW recommends that the culvert be videoed at the end of construction as well to verify that the culvert has not been negatively impacted during construction.

So noted. The culvert will be videoed before and after construction. An associated note will be added to the plans.

3. *The Applicant is proposing three subsurface infiltration systems to recharge stormwater beneath the site. HW recommends that the Applicant investigate other opportunities to implement green infrastructure within the project limits, including:*
    - *Bioretention basins, planters and curb bump-outs*
    - *Permeable pavement*
    - *Street trees with sand based structural soil*
    - *Cisterns to enable rainwater harvesting*
    - *Reducing impervious surfaces*
    - *Increasing the tree canopy to reduce the heat island effect*
    - *Landscape with drought resistant plants*

    The various practices are dependent on-site conditions including soils, topography, depth to groundwater, and proposed surface uses. The final design will need to consider functionality, constructability and long-term maintenance requirements

    The Project will restore the ecological and hydrologic functions that have been lost due to an expansive paved parking area and bus depot while adopting best practices and principles of green infrastructure consistent with MassDEP regulations and the City of Newton Street Guide. The design team has developed a green infrastructure concept design that will exceed stormwater management regulatory requirements while creating public amenities, reducing urban heat island effect, enhancing natural habitat and reconnecting Newton residents to Charles River Basin. Sustainability, livability and resilience are used as guiding principles used throughout the design.

    The Project's green infrastructure approach will integrate small-scale, decentralized stormwater practices throughout the site, in locations where those practices best fit site conditions and can generate the highest benefits. The proposed green infrastructure practices include water-receiving landscapes, permeable hardscapes and water conservation practices.

    Situated within the Charles River Watershed and Runaway Brook sub-watershed, the Project provides a unique opportunity to mitigate the impacts that past development and urban stormwater runoff have had on these waterbodies. To improve upon existing conditions, the Project aims to restore groundwater recharge, which has been lost through prior development. To do this, the Project will reduce impervious cover, increase tree canopy, store and reuse roof runoff for irrigation and integrate green infrastructure throughout the site to slow, filter, collect, and infiltrate rainwater.

The Charles River Watershed is impaired in part due to phosphorus carried by urban stormwater runoff to the river. The Final TMDL for Nutrients in the Upper/Middle Charles River establishes targeted reductions in phosphorus loading to the Charles River. Per Table ES-3 of the TMDL Technical Report (CN 272.0), Commercial/Industrial and High Density/Multi-Family Residential uses require a 65% reduction in annual average phosphorus loading. The Project commits to meeting this phosphorus reduction target, as detailed below.

The Project site has been historically mined for gravel and subsequently occupied by expansive paved parking areas supporting the MBTA bus and rail operations. Under existing conditions, the Site is developed and is predominately impervious, except for a small wooded areas or planted areas along the perimeter of the site.

The Project proposes to remove existing paved parking areas and a bus depot facility and replace the majority of existing utility and roadway infrastructure. In their place, the Project proposes new buildings, roadways, sidewalks, streetscape, a consolidated parking area within a new parking structure and green space, as illustrated in detail on the project landscape plans.

In selecting the conceptual stormwater practices, the design team aimed to maximize benefits by matching stormwater practices to the best setting and site conditions. The conceptual design prioritizes infiltration practices where subsurface conditions allow.

The overall principles of the conceptual green infrastructure plan are:

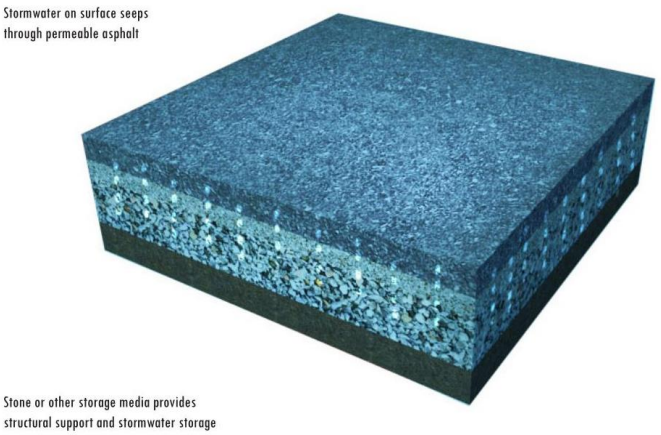
1. Prioritize infiltration facilities where conditions are most amenable. Infiltration facilities maximize groundwater recharge and phosphorus reduction.
2. Divert runoff from sidewalks, bike path, and streets into permeable pavement and recharge facilities and bioretention areas integrated into the streetscape and transportation design.
3. Capture portions of the roof runoff in rainwater cisterns, to be used for landscape irrigation.
4. Maximize tree canopy, and support tree health by extending sand-based structural soil under the sidewalk adjacent to tree wells.
5. Design with maintenance and longevity in mind.
6. Reduce runoff volume and peak discharge rates to the municipal drainage system.

Bioretention basins, planters and curb bump-outs

Gutter flow, sidewalk runoff, and parking lot runoff will be diverted into bioretention basins, curb bump-outs, and planters distributed throughout the Site. While facility designs will be tailored to each location, each bioretention facility will feature an inlet directing runoff into a sediment forebay for pretreatment. After passing through the forebay, runoff will infiltrate through layers of mulch, bioretention media, and peastone into a reservoir layer of open-graded crushed stone. Once ponding reaches the desired ponding depth, an outlet or standpipe with beehive grate will drain each bioretention facility to the next downstream catch basin or manhole. Where conditions preclude infiltration, these facilities will be designed with a waterproof liner and perforated underdrain to fully drain the facility within 72 hours.

Permeable Pavement

The on-street parking, office and hotel plazas will feature permeable pavement. Rain falling on the pavement or running onto it from adjacent surfaces will infiltrate through the pavement and choker stone into a reservoir layer of open-graded crushed stone. Where conditions preclude infiltration, these facilities will be designed with a sand filter layer (for phosphorus reduction), a waterproof liner, and a perforated underdrain to fully drain the facility within 72 hours.



Street Trees with Sand-Based Structural Soil

Sand-Based Structural Soil (SBSS) is a non-propriety mix of stone and soil that supports the sidewalk while allowing tree roots to grow normally. A SBSS system, located adjacent to a tree wells, will include sidewalk set on a minimum of six inches of open graded crushed stone over a minimum of 30 inches of SBSS. Where appropriate for each site, the tree wells and SBSS will be paired with permeable pavement or diversion of gutter flow into a depressed tree well.

Rainwater Harvesting and Infiltration Chambers.

Roof runoff from all buildings will be routed to a prefabricated stormwater chambers. This system will serve two functions: 1) storage for rainwater harvesting, and 2) infiltration for groundwater recharge, water quality treatment, and peak rate reduction.

Regulatory Compliance

Through the integrated green infrastructure approach described above, the Project will exceed stormwater management regulatory requirements while providing broad environmental and community benefits. Regulatory requirements applicable to the Project stormwater management plan include:

- Final TMDL for Nutrients in the Upper/Middle Charles River, CN 272.0 (May 2011);
- Massachusetts Stormwater Management Standards; and
- City of Newton Requirements.

Proposed work within jurisdictional resource area buffers will be documented in a Notice of Intent that will be prepared and filed in due course.

At the conceptual design level, the Project is focused on designing for four primary regulatory objectives:

- Protecting receiving waterbodies;
- Peak Rate Attenuation;
- Groundwater Recharge; and
- Water Quality: total suspended solids and phosphorus reduction.

The Project proposes to a significant reduction in paved surfaces (parking lots and drive aisles) from approximately 68% to 37%, not accounting for areas with porous pavement. When including the approximately half an acre of proposed permeable pavers as pervious area within limits of vehicular accessible pavement, the impervious cover is reduced to 33% of the site area. When

combined with other BMPs, the reduction in paved surface will dramatically reduce the potential sediment load. Under proposed conditions, new pervious surfaces will also infiltrate rainwater where it falls, thereby increasing groundwater recharge and reducing peak discharge rates compared to existing conditions. In addition, all runoff from the site will be collected in or passed through one or more BMPs, as described above, designed specifically to recharge groundwater and/or remove TSS and phosphorus to levels prescribed by MassDEP, prior to connecting into the municipal drainage system.

4. *The proposed contours adjacent to Grove Street appear to need adjustment. It does not appear that the height of the curb has been properly incorporated.*

   The elevations depicted within Grove Street are not final and the design of the off-site improvements, including that of Grove Street, are still in progress. The proposed contours shown along Grove Street will be adjusted as the profile of Grove Street is further developed.

5. *An existing concrete vault is noted on the 60-inch culvert adjacent to Grove Street. HW recommends that the Applicant discuss this vault and whether it will remain under proposed conditions.*

   The existing vault will remain under proposed conditions. The proposed bike path will be running over the vault, leveling the surrounding area and physical modifications will be completed such that the rim is flush with the proposed conditions. Also, please note that an intermediate structure will be provided at the site connection location to improve access pursuant to a comment by the Assistant City Engineer. A note and corresponding details will be added to the plans indicating the structure the measures to maintain the structure.

6. *HW recommends that the Applicant confirm that the catch basins at the low point of Grove Street in the vicinity of the 60" culvert will remain.*

   The existing catch basins at the low point of Grove Street by the 60-inch culvert are to remain. Rim elevations may be adjusted as the final profile of the Grove Street mill and overlay is developed.

7. *HW recommends that additional soil testing be conducted in the exact locations of the infiltration chambers prior to installation however the assumptions made by the Applicant for the StormTech chambers P102 and P103 appear reasonable.*

   Soil tests were previously performed within the limits of P101 and P102, which were included in the Stormwater Report. Additional soil testing will be scheduled within the limits of P103 (if necessary) to be performed by Sanborn Head. As discussed, we are contemplating an adjustment of the current system that may introduce a new LID feature and/or expansion of the main recharge system to replace the P103 system.

8. *HW recommends that the Applicant provided the invert and top of culvert elevations to verify that the proposed grades and inlets are reasonable.*

   The Plans will be updated to show the invert and top of culvert elevations at the proposed connection points to the 60-inch culvert.

9. *The Applicant has indicated that the roof runoff from the various buildings will be directed into the infiltration systems. HW recommends that a condition be including in any approvals requiring that the Applicant infiltrate the roof runoff from all proposed buildings.*

   The proposed infiltration system P101 within the Building 9 garage has been designed to collect the roof runoff from all ten proposed buildings, which will allow roof runoff from all proposed buildings to infiltrate. Roof drain connection locations will be added to the plans as the building and associated plumbing designs are further developed.

Subcatchment 1S and Subsurface System P101:

10. *The Applicant has referenced the test borings and infiltration rates recommended by Kevin Stetson in an email dated November 8, 2019. The email recommends that 1.02 in/hour be utilized for proposed systems P101 and P102. For the proposed StormTrap system (P101) the Applicant is proposing to over excavate 4 feet of material corresponding to the slower infiltration rate of 1.02 inches/hour and utilize the faster infiltration rate of the sandy gravel soil beneath the sandy loam of 8.27 inches/hour. HW recommends that a condition be included in any approvals requiring that the Applicant remove the layer of existing unsuitable material and back fill the area beneath the Storm Trap system with well graded washed crush stone. A letter with photographs certified by a professional engineer should be provided to the City confirming that the StormTrap system was properly installed as designed.*

    So noted. A certified letter will be provided to the City after installation, if such a condition is included.

11. *The rim of drain manhole (DMH) 13 is listed as 56.11, however the adjacent garage entrance is listed at elevation 62.8. HW recommends that the Applicant revisit the DMH rim.*

    The rim of DMH-13 was interpreted from the 3D model incorrectly. The plans will be updated to reflect a rim of 62.8.

12. *HW recommends that the Applicant confirm that the drainage structures inside the parking garage will not be connected to the stormwater system.*

    The drainage structures that service the garage will connect to oil-gas separators within the garage and discharge into the sanitary sewer system and reflected on the plumbing plans that accompany the Building Permit submission. Only internal roof drains will connect to the drainage infrastructure associated with the subsurface infiltration system P101. The drains servicing the garage will connect to the sanitary sewer system.

13. *The StormTrap Details provided on Sheet C-11.3 are samples only and not specific to this design. HW recommends that the Applicant provide site specific details consistent with the HydroCAD model.*

    As the Project is further developed and as Building Permit and construction drawings are progressed, site specific details for the proposed StormTrap will be included. We are coordinating with the manufacturers to confirm the size, location, and design of the systems.

14. *The Applicant has provided values for water quality volume required and provided for subcatchment area 1S. HW is in agreement the water quality volume required however we were not able to confirm the volume provided. HW recommends that the Applicant document the provided water quality volume below the outlet weir elevation.*

    The weir elevation of P101 was adjusted up to elevation 57.0. This increased the water quality volume below the weir, as shown in the attached revised BMP Sizing Calculations. The volume below the weir was extracted from the HydroCAD storage table for System P101, which has been added to the BMP Sizing Calculations.

Subcatchment 2S and Subsurface System P102:

15. *The rims and inverts for the outlet control structure (OCS-2) for subsurface infiltration system P102 is not consistent between the Site Plans (sheet C-9.2), Detail (sheet C-11.4), and proposed HydroCAD model (page 35). HW recommends that the Applicant revisit the design and verify that all documents are consistent.*

    The weir elevation shown in the HydroCAD model is correct. The plans and detail will be updated to reflect a weir elevation of 57.0.

16. *It appears that the Applicant has provided the required water quality volume however HW recommends that the calculations provided in Appendix C of the Stormwater Report be reviewed once the final outlet control elevations are determined.*

    The provided water quality volume has been adjusted to reflect the corrected weir elevations.

17. *The Applicant has proposed a trench drain along the property boundary in the transit area south of Building 7. The location of this trench drain will need to be coordinated between the landscaped area and the sidewalk. Routine maintenance will be critical for long term functionality.*

    The trench drain is located within an area of proposed pavers, not in conflict with any proposed landscaping. The Applicant will ensure that maintenance is performed regularly.

Subcatchment 3S and Subsurface System P103:

18. *The delineation of the proposed subcatchment area of 3S is confusing as well as the area east of 3S and north of Recreation Road. This area appears to be included in subcatchment area 1S. The grading and proposed surface materials in this area are not clear on the Site Plans.*

    The design of the area west of Building 1, noted as the MBTA as the "Southern Yard" may be used for a variety of needs to be established by the MBTA. This area is outside the limits of the development parcel. It is assumed that a portion of the Southern Yard will contribute runoff to the Site, as delineated by 3S and 1S. The Southern Yard will consist of a mix of surface parking spaces and landscaped areas. For the HydroCAD model, a conservative assumption was made to make the Southern Yard entirely impervious. The preliminary concepts of the Southern Yard graded the area with a high point that focused a small amount of the lot to drain to the loading area of Building 1, which is delineated as 3S. The design of the Southern Yard will be included on the plans as the area moves beyond its current conceptual phase. As the Southern

Yard continues to be developed, the proposed stormwater management system to treat this area will be revised accordingly.

19. *The HydroCAD for subcatchment area 3S states that the entire area is paved roads w/curbs. The time of concentration calculation lists grass in the description of the flow path. HW recommends that the Applicant revisit the HydroCAD model for subcatchment area 3S.*

    To be conservative, the cover type for subcatchment area 3S was considered entirely impervious, even though landscaped areas are proposed within the area. The time of concentration will be updated to be consistent with the assumption that the subcatchment is entirely impervious.

20. *The subsurface infiltration chambers listed as P103 located behind Building 1 does not have an emergency overflow. HW recommends that the Applicant clarify where the water will pond if the system fails.*

    If the system fails, the runoff will pond within one of the entrances to the Southern Yard parking lot. As the Southern Yard is further developed and coordinated with the MBTA, additional stormwater infrastructure will be proposed to mitigate any potential ponding in the area.

21. *The Applicant has included 6-inches of stone beneath the subsurface infiltration system P103. This is a relatively large system 138 feet long with 76 chambers. HW suggests that the Applicant consider increasing the depth of stone.*

    So noted. The depth of stone beneath subsurface infiltration system P103 will be increased to 12-inches.

Recharge Calculations:

22. *The Applicant has provided Recharge Calculations in Appendix C of the Stormwater Report. HW was not able to confirm the Proposed impervious area by area. HW recommends that the Applicant clarify how these values were determined.*

    The "Net Proposed Impervious Areas" were calculated by subtracting the existing impervious area found within each proposed subcatchment from the proposed impervious areas. These area takeoffs were performed using AutoCAD.

23. *The Applicant has provided the Provided Recharge Volume calculations in Appendix C of the Stormwater Report. HW was not able to confirm the values listed and the values do not appear to be consistent with the values provided under the Water Quality Calculations. HW recommends that the Applicant clarify how the Provided Recharge Volumes were calculated.*

    The Provided Recharge Volumes were determined by using the stage storage volume for each subsurface system at the respective weir elevation in HydroCAD. The volume provided at the weir elevation was used for the Provided Recharge Volume. Because no weir is proposed as part of subsurface infiltration system P103, the total provided volume of the system was used.

The BMP sizing calculations have been revised to reflect the same provided volume for both recharge and water quality.

Phosphorus Removal:

24. *The Applicant has provided Phosphorus Loading and Phosphorus Removal calculations in Appendix C of the Stormwater Report. HW is in agreement that the proposed development will reduce the proposed phosphorus loading by approximately 85%. This is a reduction of 80% over the existing phosphorus load. In accordance with the MS4 permit the City of Newton is required to reduce its phosphorus load to the Charles River by 50%.*

    So noted.

We trust the comments have been addressed satisfactorily and we are available at your convenience if you wish to discuss further.

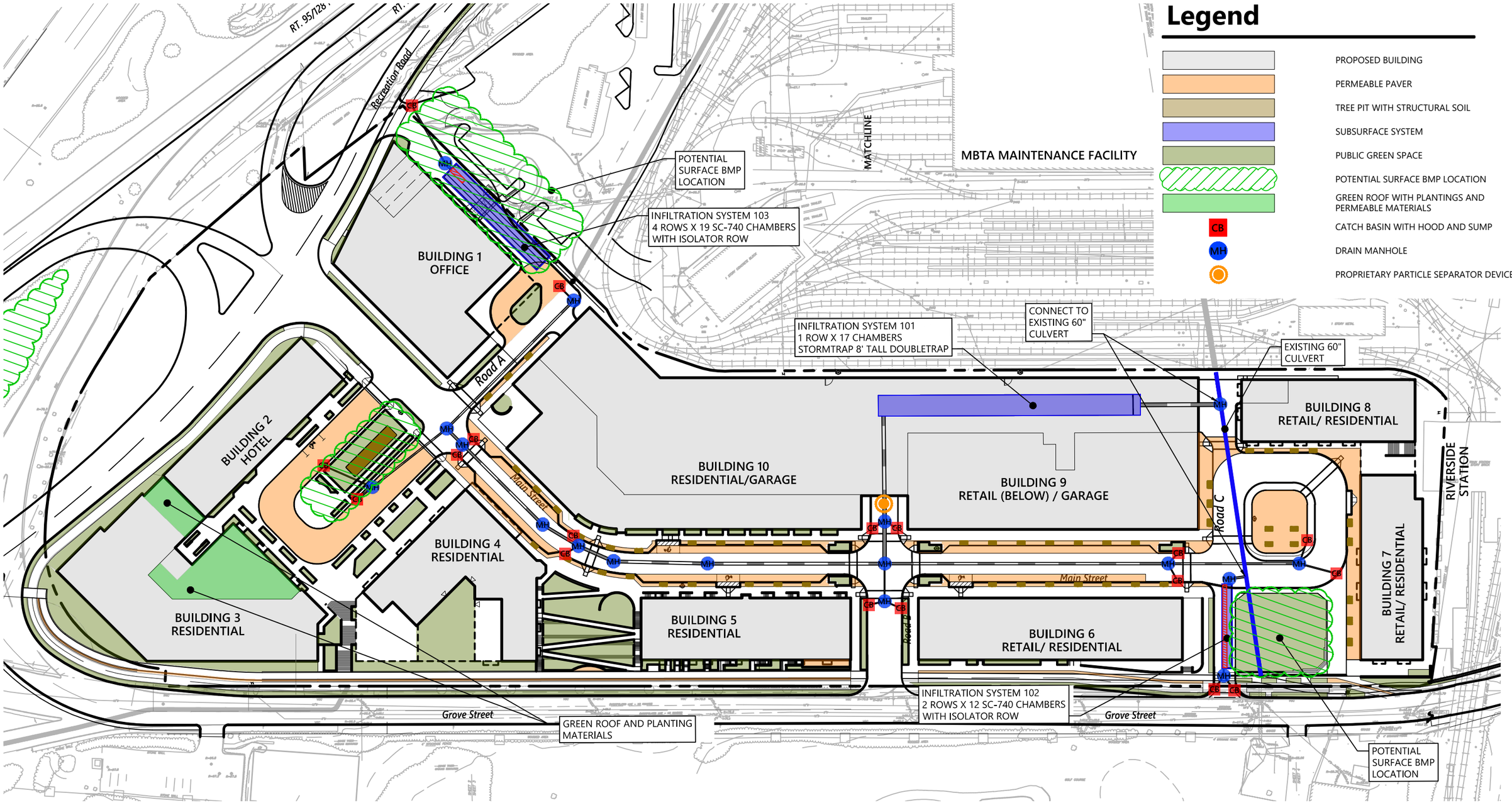
Sincerely,
VANASSE HANGEN BRUSTLIN, INC.

Richard S. Hollworth, PE

Principal
rhollworth@vhb.com

cc: Mark Development

Schlesinger and Buchbinder



0 50 100 200Feet

Figure 7.3.1
Proposed Green Infrustructure

Riverside Station Redevelopment
Newton, Massachusetts