neponset river
WATERSHED ASSOCIATION

March 7, 2013

TO: Beta Engineering
FROM: Ian Cooke
RE: University Station, Matrix of Issues to be resolved

Thanks for another good discussion yesterday afternoon. I came back to the office planning to dash off a few quick bullet points, but the more I looked at things, the more complicated my comments got. Anyway, here goes:

A) Documentation of Recharge Volumes (Matrix #1 and #5)
One of my key outstanding questions is whether the project meets the MassDEP recharge standard. This point isn't mentioned in your matrix sheet, but potentially fits into #1 or #5 and is (in my mind) critical to both. We appreciate the addition of the two new infiltration basins, but I am concerned that the applicant keeps referencing different amounts of recharge for the site, (0.6". 2.0" and 2.5" are all still being tossed around) and we still don't have the required documentation that they have met the basic DEP recharge requirement.

To resolve this I suggest:

1) The Applicant needs to recalculate the volume of storage (in CF) needed to meet the DEP standard. I understand that more than 65% but less than 100% of the site impervious is now tributary to infiltrators. That's an improvement, but so long as we have less than 100% tributary to infiltrators, DEP requires that you calculate an adjustment factor to the storage requirement. Note, I have attached the relevant page from the handbook for everyone's convenience.

Based on the figures presented in the water balance, I deduce that there seem to be a total of 85 ac of impervious in the final project. Using the 0.6" recharge requirement, that translates to 185,130 CF of storage required if 100% of the impervious were routed to infiltration. Furthermore, it appears that 21 ac of roofs and 40.6 ac of pavement (61.6 ac in all) are now routed to infiltrators or 72% of the total site impervious. Thus, the handbook requires that an adjustment factor of 1.38 be applied to the recharge goal (i.e. 85/61.6) and therefore the total recharge requirement for the project under the handbook is 255,479 CF of infiltration by my calculation.

2) The infiltrators proposed for the site may well meet or exceed this requirement, but the Applicant hasn't presented any calculations using a DEP sanctioned method showing that they do. Therefore, the applicant needs to submit calculations (separate calcs for each infiltrator) prepared according to

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DEP procedures (presumably using the field dynamic method) showing that they have achieved this volume of recharge. If the Applicant believes they are providing more recharge than this (which would be a good thing) they should show calculations (prepared using DEP methods) showing not simply that they meet the DEP recharge volume, but showing the actual volume of recharge volume in CF being provided at each infiltrator.

3) Lastly, for the sake of clarity and to support the water balance calculations, they should provide a table summarizing the above information as shown below:

Infiltrator ID	Recharge (CF per DEP)	Tributary Pavement (ac)	Tributary Roof (ac)	Tot Tributary Imperv (ac)	Rech Depth per Trib Area (in)
xxx	xx	xx	xx	xx	xx

B) Water Demand (Matrix #1 Water Balance)

Further work is needed to demonstrate that all reasonable steps to minimize water withdrawals have been taken. This item should be added to your matrix of issues to resolve. Specifically:

1) Fixture Efficiency

The water balance calculations apply the same 15% "conservation adjustment" that was utilized in the FEIR for the old project. However, this adjustment was added to the FEIR only once the former proponents agreed to a suite of additional water conservation measures that went beyond compliance with the requirements of the plumbing code. By contrast, the current project has not made similar commitments and proposes to use the least efficient fixtures and appliances that are allowed by law.

The Applicant should commit to "better than plumbing code" practices. At a bare minimum, this commitment should include use of WaterSense labeled fixtures for all toilets, showerheads, faucets and urinals, and a commitment that any laundry equipment installed by the developer will have a water factor of 4.0 or less. However because the WaterSense standards are relatively weak, the Applicant would preferably commit to the MaP Premium standard for toilets, 1.0 GPM for all residential lavatory faucets, 1.5 GPM for showerheads and 0.25 GPF or less for urinals. The upfront cost of such a commitment is negligible and will provide direct economic and "green appeal" benefits to future residents/tenants. In addition, the Applicant should enunciate their commitment to compliance with existing federal law regarding 0.5 GPM lavatory faucets in all non-residential areas of the property. Unless such commitments are forthcoming, additional water withdrawals of 6.25 MGY (i.e. the 15% conservation adjustment) should be added back into the water balance calculation.

2) Outdoor Water Use

We would observe that the 2007 project design called for roughly the same amount of landscaped area as the current project, but expected to need approximately 75% less water than the current proposal for irrigation. The Applicants should provide a more detailed analysis of their irrigation needs and alternatives for minimizing irrigation water withdrawals. In addition, the Applicants should commit that all irrigation systems on the site will be designed, installed and annually maintained by a WaterSense certified irrigation professional and that all irrigation controllers on the property will be WaterSense certified weather-based controllers.

C) Water Balance Calculations (Matrix #1)

The water balance calculation as presented is inadequate in numerous respects. Most importantly, it needs a computation for both the previously developed condition, the existing interim condition, and the proposed condition. The Applicant can't simply take the previously developed condition from the old FEIR and reuse it. The old calculation is for a different number of acres, a different rainfall dataset, and appears to use different methods for calculating runoff and recharge. In addition, we would point out the following other problems:

1) Additional notes or narrative explaining how the calculations were made would be helpful for all

2) The calculation uses a data set from Norwood Airport for precip, and from Blue Hill for estimating ET. The both parameters should come from the same station, and the temp data shouldn't come from someplace that is 600' higher in elevation.

3) It would be preferable to have more than 10 years of rainfall data to ensure that average conditions are represented. There is another weather station nearby in Walpole with 40 years of precip (and temp) data readily available online (or I can send it to you).

4) The calculation assumes that rain falls from the sky and goes directly into the infiltrator. In fact, rain falls from the sky, hits the pavement, is subjected to interception, evaporation, and depression storage and then what's left over runs off to the infiltrator where some percentage of it is captured depending on infiltrator sizing. This is true even in the winter and thus wintertime recharge to the infiltrators is being overestimated.

5) It seems to assume there is almost no interception, evaporation or depression storage from roof areas and instead 97.5% of rain falling on roofs goes directly into the infiltrators, thus greatly overstating recharge from roof areas. In practice, the volume of evaporation and runoff generated by roofs will be fairly similar to that generated by pavement. Notice that 21 acres of roof produces more recharge than 40.6 acres of parking lot in their calculation.

6) Per comment above, it provides no backup for the assertion that ALL infiltrators have the capacity to capture 2" of runoff. As far as I can see there is no sizing information for the new infiltrators.

7) Need to remove the water conservation credit or add new efficiency commitments as mentioned above.

8) It is unclear how evaporation (as opposed to ET) is being calculated

9) Although it is based in part on the Thornthwaite Method, it overlooks several key elements of the approach (particularly the issue of soil moisture vs recharge), and it never ties together all the elements of the water balance to demonstrate that conservation of mass has been achieved.

D) Readjusting the Water Balance (Matrix #1)

Once the various problems with the water balance calculations are addressed—particularly the absence of any evaporation/interception allowance for roof recharge, the lack of efficiency commitments, and the computation of net recharge under existing 2013 conditions—the water balance for the site may well be less favorable than the 2007 pre-existing conditions and will likely also be less favorable than the 2013 existing condition.

If so, the Applicant should evaluate "better than WaterSense" water efficiency measures outlined above, opportunities for incorporating additional infiltration across the site, the possibility of routing a shallower depth of runoff from a wider tributary area to the new infiltrators, the possibility of including additional storage for rainwater collection to offset irrigation demand, and measures to achieve additional water or wastewater efficiencies offsite such as the partnership proposed by the 2007 project to assist the Dedham-Westwood Water District with reducing unaccounted-for-water.

E) Lid Techniques (Matrix #2)

From the Watershed Association's standpoint, all impervious areas which are subject to appropriate pre-treatment and routed to infiltrators that hold at least the water quality volume are "consistent" with the bacteria TMDL as required by the stormwater handbook. Similarly areas routed to the wetland basins are also adequately addressed. Thus, in these areas we do not feel there is any need for further analysis of LID alternatives.

However, there are still sizeable areas of the site that are not managed using BMPs that are consistent with the Bacteria TMDL. In these areas, further analysis of LID alternatives and other practices that would address bacteria are needed. There would seem to be numerous opportunities to incorporate LID techniques in these areas, with bioretention practices (including tree boxes) seeming well suited to the residential, office and lower density commercial land uses in these areas, and roadway medians, parking lot islands, pedestrian areas, and landscaped areas being particularly promising locations. Alternatively, these goals could be achieved through more conventional means by directing larger portions of the parking areas (in addition to roof areas) to the newer infiltrators, or introducing additional wetland BMPs.

We also recognize that the design process is not as far advanced in these areas of the project as in the core retail area. If it is not feasible to prepare a detailed analysis of how the applicant will comply with the bacteria TMDL in these areas, the Applicant could describe in general the strategies it would utilize to meet this requirement as the design for this area evolves in the future and state its commitment to complying with these requirements when the time comes, so long as the final design of the stormwater system in this area is subject to further municipal and public review in the future.

F) O&M Plan (Matrix #3)

We would like to thank the applicant for clarifying its commitment to monthly sweeping across the site using regenerative air equipment in the new version of the O&M Plan which was recently circulated. We have no further comments regarding O&M at this time.

G) Offsite Infrastructure (Matrix #4)

We have no further comments in the area at this time.

H) Stormwater Calculations (Matrix #5)

1) We agree with other commenters that we would like to see calculations updated with more recent rainfall data than that contained in TP40.

2) Please see our extensive comments above regarding recharge calculations and the need for additional documentation at the new infiltrators. We also agree that a further analysis of mounding and infiltration rates is needed.

3) Rather than an analysis of bacteria removal rates at each POA, our primary concern is that the Applicant identify and/or commit to the implementation of additional BMPs that address bacteria in areas not served by infiltrators and/or wetland basins as discussed above.