



*Civil  
Site Planning  
Environmental  
Engineering*

133 Court Street  
Portsmouth, NH  
03801-4413

August 6, 2018

Juliet T. H. Walker, AICP, Planning Director  
City of Portsmouth Municipal Complex  
Planning Department  
1 Junkins Avenue  
Portsmouth, New Hampshire 03801

Re: Drainage Review for Lonza Biologics Proposed Industrial Development,  
70 & 80 Corporate Drive, Tax Map 305, Lots 1 & 2  
Altus Project 4940

Transmitted via email to: [jthwalker@cityofportsmouth.com](mailto:jthwalker@cityofportsmouth.com)

Dear Juliet:

As requested by the City of Portsmouth Technical Advisory Committee, Altus Engineering, Inc. (Altus) has performed a review of the drainage calculations, plans and documents prepared for the above referenced development as prepared by Tighe & Bond Engineers.

The review is based on the following documents provided to Altus:

- Site plans for the Proposed Industrial Development, 70 & 80 Corporate Drive, Portsmouth, NH, Project No. L-0700-13 prepared by Tighe & Bond with revisions dated through June 18, 2018;
- Iron Parcel Redevelopment, 70 & 80 Corporate Drive, Portsmouth, New Hampshire, Alteration of Terrain Application, Prepared For: Lonza Biologics, 101 International Drive, Portsmouth, New Hampshire, dated June 18, 2018;
- The Restoration of Hodgson Brook at the Iron Rail Parcel at Pease Tradeport in Portsmouth, NH, prepared by Streamworks, PLLC, dated May 28, 2018.

Our review was limited to the following:

- Review of the drainage study and plans as they relate to temporary and permanent erosion control measures;
- Review of the drainage computations for irregularities;
- Review of the on-site restoration plans for Hodgson Brook; and
- Compare the results of the drainage study to City (PDA) requirements and customary engineering practices.

On August 3, 2018, Altus visited the site to familiarize ourselves with the existing site conditions.

Base on our review, we offer the following comments:

### **General Comments**

1. In general, Altus supports the premise to eliminate the closed drainage system across this property to create an open and vegetated channel. With this modification to the watershed, Altus is concerned that there could be unintended consequences that could impact down gradient properties. The Hodgson Brook watershed is highly developed. The flow through the Lonza site is through a series of pipes which allows the runs to pass through the area rapidly. Opening the channel up slows the flow through the system which will delay and impact the overall watershed time of concentration and the peak rate of runoff during storm events. This could create conflicts with the peak rate of flow elsewhere. Streamworks should document as to how this change will impact the rest of the system.
2. The development project is very large and complex and according to the drainage computations over 13.2 acres of new impervious will be created. It is presumed that it will not be constructed in a single phase. As such, it would be prudent for the designer to provide detailed phasing and sequencing plans for both the building and site improvements aspects as well as the stormwater management.
3. The Streamworks report discusses the stream work sequencing. These requirements should also be incorporated into the site plans.
4. It is understood that the stream bed will be constructed in advance of the culvert removal. Special construction considerations need to be discussed on the plans as to how the lower concrete vault (oversized drain manhole) will be removed and the flow maintained.
5. The plans are deficient detailed construction sequencing details and notes that are referenced in the Streamworks report.



## **Site Plans**

6. There is a discrepancy between the survey plans (Doucet sheet 4 of 4) and the grading and drainage plans (Tighe & Bond sheet C-110) for size and shape of the outlet pipes crossing Goose Bay Drive. Please verify which is correct and correct the plans.
7. The grading plans should include spot grades to confirm the subcatchment boundaries.
8. The plans should include locations for temporary sediment basins and other temporary erosion control measures typically seen on major site development projects.
9. The plans should provide documents as to how dewatering will occur on site and any special precautions necessary that are site specific.
10. The project will impact a significant amount of on-site wetlands. There may be an opportunity to reuse the excavated wetland soils for reuse in the gravel wetlands or in the stream channel. Altus has found that one challenge in creating wetlands is establishing the vegetation. The landscape architect and wetlands scientist may want to comment on this opportunity.
11. It appears that the culverts discharging into the gravel wetland forebays will be under tail water conditions. The designer should review this design approach to see if there are any alternative solutions.

## **Detail Sheets**

12. In order to ensure that the gravel wetland water level remains at the desired level a clay or other impervious membrane liner should be provided.
13. The gravel wetland and rain garden planting plans should be stamped by a licensed landscape architect. In addition to the New England Erosion Control/Restoration mix, there are only 2 varieties of plantings in the gravel wetlands. A more diverse variety of plantings is recommended.
14. The Hodgson Brook Wetland Planting Plan should be stamped by a licensed landscape architect. In addition to the Riverbank stabilization mix, only three species of plantings are proposed along the entire corridor.

**Alteration of Terrain (AOT) Package / Drainage Calculations.**

15. The drainage study (AOT package) has not been stamped by the responsible Professional Engineer.
16. The Streamworks Report has not been stamped by the responsible Professional Engineer.

**Section 6, BMP Worksheets**

17. The name and stamp of the qualified professional who designed the planting plan for the gravel wetlands needs to be provided for all three gravel wetlands.
18. The flow lengths shown for the gravel wetlands do not seem to match the scaled flow lengths shown on the plans. Please review and correct as necessary.

**Section 7.2, Pre-Development Conditions**

19. The color-coded soil map shows the 500 series soil to be HSG D, however the soil type legend and the soils report indicate that it is HSG C. This should be corrected and the calculations revised to reflect the correct soil type.
20. For the calculation of sheet flow time of concentration, the 2-year rainfall depth should be 3.68 inches to match the depth assumed for the analysis.
21. The analysis is deficient computations for the off-site drainage that flows onto and through the site. It appears that there may be a significant flow coming onto the site from the existing facility. These computations should be included in the analysis in both the pre-and post-development scenarios.
22. The existing triple arch culverts are partially submerged with sediment and are under tail water conditions. It does not appear that the designer took the current field conditions into consideration with their computations.

**Section 7.3, Post-Development Conditions**

23. As with the pre-development model, the soil types should be corrected to reflect the 500 series soils as HSG C.
24. The Soil Listing for the post-development model should be revised to reflect that much of the site will be developed and the existing soil types will not necessarily remain as they are. Please review and revise as necessary.



25. For the calculation of sheet flow time of concentration, the 2-year rainfall depth should be 3.68 inches to match the depth assumed for the analysis.
26. In general, the time of concentration longest flow path does not match the pipe sizes and slopes depicted on the plans.
27. The site has been modeled as five large subcatchments feeding into either constructed gravel wetlands, a rain garden or the re-constructed Hodgson Brook. Modeling the site in this manner may result in some inaccuracies as the calculated times of concentration are much longer than what would be seen if each structure were modeled as a subcatchment and pond. Additionally, this method does not provide a way to determine if catch basin grate capacity or pipe sizing is adequate. It is recommended that the site be modeled in a more conventional way so as to provide a more detailed analysis of the stormwater management system.
28. Subcatchment Post 1.3 is shown as entering Reach 1.3 (Hodgson Brook) directly, however it will need to pass through the pipe network modeled as Reach 1.2 before it reaches the brook. Please revise.
29. Reach 1.2 is modeled as a 54-inch diameter pipe, however the engineer has not provided calculations to show that this is adequate to convey the existing upstream flows into the system.
30. Reaches 1.2 and 1.3 replace the existing underground culvert that carries Hodgson Brook. The model should reflect the existing brook flow and the anticipated flows from the modeled storms through these reaches.
31. The analysis should include calculations to show that the existing pipes crossing Goose Bay Drive have sufficient capacity to carry the anticipated flows from the site as well as the flows from the Hodgson Brook watershed. The culverts are flowing under tail water conditions.

#### **Section 8, Rip Rap Apron Calculations**

32. Please provide rip rap calculations for the outlet at HW 300 (Hodgson Brook). The design should include the flows from the upstream watershed.

#### **Section 11, Long Term Operation & Maintenance Plan**

33. The O & M plan should incorporate the recommended maintenance schedule for gravel wetlands contained in the publication "Design and Maintenance of Subsurface Gravel Wetlands" by the UNH Stormwater Center, dated February 4, 2015 or as amended. This document should be recorded at the registry of deeds to

August 6, 2018

ensure that the owner and/or subsequent owners are aware of the maintenance requirements.

34. The O&M Plan should include the recommendations for the maintenance of the reconstructed Hodgson Brook.

**Appendix B, Soil Report and Boring Logs**


35. Provide boring logs for the test pits in the vicinity of the proposed gravel wetlands so as to verify the assumed seasonal high water shown in the BMP worksheets (TP-1, 2, 17 and 18).

We look forward to discussing the above with the project representatives and resolving all issues prior to final approval of the plan.

Please contact Altus to discuss any of the above comments or, if preferred, to set up a meeting to resolve any of the above issues.

Respectfully submitted,

**Altus Engineering, Inc.**

  
Dennis Moulton, PE  
Project Engineer

  
Eric D. Weinrieb, PE  
President