

Civil  
Site Planning  
Environmental  
Engineering

133 Court Street  
Portsmouth, NH  
03801-4413

January 14, 2018

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

Re: Follow up 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 continued to review the drainage calculations, plans and documents prepared for the above referenced development as prepared by Tighe & Bond (TB). Two previous reviews were completed with comment letters submitted on August 6 and September 3, 2018. On November 27, Altus received a revised set project documents that included the following:

- *Revised Project Plans*, dated November 6, 2018.
- *Revised Drainage Analysis*, Tighe & Bond, dated November 6, 2018
- *Watershed Modeling for Hodgson Brook*, by Streamworks PLLC, dated November 6, 2018

Following receipt of the above material, TB and Streamworks requested a meeting with Altus to discuss the methodology of the drainage analysis for the separate stormwater design models. The meeting was held on December 20, 2018 at Altus' office. In particular, Altus was looking for clarification on how the HydroCAD model prepared by TB and used for the NHDES Alteration of Terrain Permit was coordinated with the SWMM model prepared by Streamworks for the Hodgson Brook analysis.

On January 7, 2019 TB provided the following documents:

- *Response Letter*, by Tighe & Bond, dated January 4, 2019;
- *Watershed Model Input and Calibration*, by Streamworks PLLC, dated January 4, 2019;
- *Watershed Modeling for Hodgson Brook*, by Streamworks PLLC, dated November 27, 2018
- *The Restoration of Hodgson Brook at the Iron Rail Parcel at Pease Tradeport in Portsmouth, NH*, prepared by Streamworks, PLLC, dated November, 2018;
- *Long Term Operation & Maintenance Plan*, by Tighe & Bond, dated January 3, 2019
- *Alteration of Terrain Permit Application*, Final approved AoT Permit #Aot-1498, Tighe & Bond, dated August 30, 2018. (Sent via email January 9, 2019)

Based on the review of the revised information, Altus submits the following comments, which includes comments previously provided that we do not feel have been adequately addressed:

**General Comments:**

- All technical documents (including memos) shall clearly identify the preparer of the document and be signed by a professional engineer if the information is used for the design analysis.
- Provide modeling results for all calculation used in the stormwater analysis. I.e; If information from the SWMM model is used in the HydroCAD modeling, the modeling results from the SWMM model should be provided to confirm the results.
- The discrepancies between the Tighe & Bond drainage analyses and the Streamworks drainage analyses should be fully explained. It is understood that different modeling programs (HydroCAD & SWMM) and different rainfall data was used for the analysis, but the models produce significantly different results.
- The City of Portsmouth stormwater design standard is to use the same rainfall data as required by NHDES, which is the NRCC Extreme Precipitation Data with a 15% increase for Seacoast Communities. PDA does not have a design requirement, but simply states that "best available technology shall be used". The NHDES requirement, as recommended by the NH Coastal Risks and Hazards Commission, is considered the best available data for stormwater analysis and should be used for the analysis. All proposed improvements should be based on this rainfall data.



**Review Comments:**

**Tighe & Bond Drainage Analyses:**

*NHDES Alteration of Terrain Permit, dated August 30, 2018*

*Revised Drainage Analysis, dated November 6, 2018.*

- 1) The applicant has provided the *Revised Drainage Analysis*, dated November 6, 2018. The results presented in this report include revisions to the HydroCAD modeling results that were approved by NHDES Alteration of Terrain Bureau (AoT Permit #AoT-1498) in the August 30, 2018 submittal. The results in the two reports are significantly different. The approved AOT results indicate a Post Development 50 year peak flow at Point of Analysis #1 as 134.75 cfs, while the revised analysis indicates a peak flow rate of 82.0 cfs at the same location. It is unclear why there is such a high a reduction in the modeling results for the two reports. Any changes in the methodology used for the analysis may also need to be approved by NHDES AOT. We request that the design team explain the discrepancies.
- 2) Altus does not concur with the methodology used for the analysis of the flows from the upstream watershed that traverse through the site. The applicant has indicated that the modeling results from the Hodgson Brook analysis (by Streamworks) were used to account for the flows in the brook by introducing a tailwater condition at two locations (upper and lower watershed). This method does not account for the flows "through" the site, within the Hodgson Brook reach, or in determining the peak elevation at the inlet to the Goose Bay Drive culverts. Although a NHDES Alteration of Terrain Permit has been issued for the project, the analysis of the off-site flows are not adequately accounted for in the stormwater model (HydroCAD) and there are significant discrepancies between the results from the SWMM model and the HydroCAD model. An example of the discrepancies are that the HydroCAD model used for the AoT permit analysis indicates a peak flow rate of 60.01 cfs for the 10 year storm event at Point of Analysis #1 (downstream location), while the *Watershed Modeling for Hodgson Brook* (by Streamworks) indicates a peak flow rate of 130.86 cfs for the proposed condition at the same downstream location. We request that the design team amend their computations to address the above concerns.
- 3) The tailwater condition for the upper watershed is introduced at Link 1.0, with a 10 year tailwater elevation of 55.07. The flows from the upper watershed enter the site at PDMH 203. This MH should be modeled for the introduction of upstream flows and tailwater conditions. The current results indicate that only 9.84 cfs is flowing in the 54" pipe exiting DPMH 203 for the 10 year storm event.



The tailwater condition for the lower watershed is provided in Link PA1, with an elevation of 38.65. The results from the SWMM model that show the tailwater elevations used in the analysis should be provided. We request that the design team explain their methodology and amend the computations accordingly.

- 4) Rip Rap calculations – As requested, rip rap calculations have been provided in the AoT application. All rip rap locations should be labeled on the plans to show proposed dimension (ie: HW200, POS100, & POS300). The rip rap protection at the inlet to the triple culverts crossing Goose Bay Drive shall also be sized and dimensioned based on velocity and water surface elevations. The applicant should review all storm events to determine the peak flow velocities to size the rock as it is anticipated that the peak velocity will not occur during the larger storms when the system is backed up under tailwater conditions. Rock shall extend at least one foot above the peak elevation of the 10 year storm elevation at the invert to the culverts for build-out conditions.
- 5) The applicant is proposing to construct a berm along the north side of Goose Bay Drive at an elevation of 42 ft. This berm is intended to provide flood protection to Goose Bay Drive from overtopping flows. The City of Portsmouth does not support the use of retaining berms or levees that exceed the road elevations for flood control. The SWMM modeling results indicate that the 1 year storm event will encroach into the roadway base, which has the potential to deteriorate the roadway base and decrease the life span of the roadway. Although Pease Development Authority (PDA) owns the right of way, the City of Portsmouth is responsible for the roadway maintenance. Altus recommends the applicant raise the profile of Goose Bay Drive to a minimum elevation of 42.0, in lieu of constructing a retaining berm.

**Streamworks Drainage Analyses:**

*Watershed Modeling for Hodgson Brook*

*The Restoration of Hodgson Brook at the Iron Rail Parcel at Pease Tradeport*

*Watershed Model Input and Calibration*

- 6) The *Watershed Modeling for Hodgson Brook* analysis was performed using different rainfall data than was used for the AoT/ HydroCAD analysis. Both calculations used the NRCC rainfall data, but the Hodgson Brook analysis did not account for the 15% increase required by AOT for seacoast communities. Altus recommends that the design team revise the NRCC flows in the SWMM model to also account for the 15% increase, particularly when transferring data between models.
- 7) *The Restoration of Hodgson Brook at the Iron Rail Parcel at Pease Tradeport* report should be checked to verify that proposed design flows are consistent with

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the modeling results. It appears that "LP3 Predictions for Long Term Results" were used for the analysis.

- 8) The *Watershed Modeling for Hodgson Brook* analysis indicates that the "results from the proposed conditions model are used for all design purposes pertaining to site infrastructure". It was also noted that proposed site conditions for the SWMM model were developed by inserting hydrographs from outlet points of the HydroCAD model. The design team needs to provide results for the basis of design and clearly explain their methodology.
- 9) The *Watershed Modeling for Hodgson Brook* analysis indicates that the flooding at Goose Bay Drive occurs at a lower elevation in the Post-Development condition, 42.2 feet for Post-Development compared to 42.7 feet for Pre-Development. Altus recommends that the design team provide a comparison of the Pre and Post development conditions indicating the storm "event" that causes flooding of Goose Bay Drive.

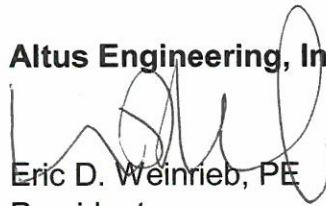
**Recommendations –**

- 10) Lonza is currently seeking approval for the development of Phases 1A and 1B. In order to determine that the interim conditions (construction of Phases 1A & 1B) do not negatively impact the downstream properties and infrastructure, the applicant shall provide the drainage analysis and results for this condition. As noted above, the flows from the upstream watershed should be accounted for in the analysis. As noted in the letter from TB to the City Portsmouth Planning Board Chairman, dated November 6, 2018, future phases of the project will require noticed Public Hearings and resubmittals to the Technical Advisory Committee and Planning Board.

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.**



Eric D. Weinrieb, PE  
President



Cory D. Belden, PE  
Project Manager