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Ms. Kathleen Colwell
Planning Division Director
City of Methuen – Community Development Board
41 Pleasant Street
Methuen, Massachusetts 01844

February 7, 2022

Re: Engineering Peer Review
23 Hampstead Street – Methuen, Massachusetts

Dear Ms. Colwell:

On behalf of the City of Methuen, TEC, Inc. (TEC) reviewed documents as part of the civil engineering peer review for the proposed definitive subdivision located on 23 Hampstead Street in Methuen, Massachusetts. JR Builders Inc. (the "Applicant") submitted the following documents which TEC reviewed for conformance with the City of Methuen Subdivision Rules and Regulations, Massachusetts Stormwater Handbook, and generally accepted industry standards:

- *Application for Approval of a Definitive Plan for 23 Hampstead Street in Methuen, MA;* prepared by JR Builders Inc.; Dated October 4, 2021
- *Definitive Subdivision Plan for 23 Hampstead Street in Methuen, MA;* prepared by Millennium Engineering, Inc; Dated October 5, 2021; Revised January 24, 2022
- *Stormwater Management Report for the Definitive Subdivision Plan at 23 Hampstead Street, Methuen, MA;* prepared by Millennium Engineering, Inc; Dated October 4, 2021; Revised January 24, 2022
- *Traffic Memorandum for the Definitive Subdivision Plan at 23 Hampstead Street, Methuen, MA*; prepared by Bayside Engineering; Dated September 3, 2021

For consistency, the original comment numbers have been retained from the most recent TEC Peer Review letter dated December 1, 2021. The Applicant's responses to the comments are shown as **bold**; TEC's responses are shown as *italic.* To limit unnecessary duplication, comments that were previously addressed by the Applicant have been removed from the letter.

**Site Plan & Application – Definitive Subdivision Regulations**

Comment 3: TEC acknowledges the waivers requests in the Application and on Sheet 1 of the Definitive Subdivision Plans. TEC concurs with the terms of agreement for the two waivers (Sections 4.2.2.8 & 5.7.1) stated in the letter by Stephen J. Gagnon dated October 19, 2021. TEC also concurs with the statements regarding denial of the remaining two waivers based around the proposed water main.

**MEI Response:** **Waivers A and B: We agree to the additional inch of pavement based on the approval of the waivers for pavement width and bituminous curb.**

**Waiver C: There is currently no means of looping the proposed water main as no easements are in place. Furthermore, the cost associated with potentially looping the water main is significantly more than the**

**cost to install the water main to serve the project and is cost prohibitive to the project.**

**Waiver D: This waiver has been removed and 8" water main is proposed.**

**Additional waivers have been added to the list.**

*TEC Response:* *Regarding Waiver D: Comments Addressed. Regarding Waivers A-C & all additional waivers, TEC continues to defer to Stephen Gagnon and the City of Methuen on whether these waivers are acceptable.*

**MEI Response 3.2:** **No response required**

*TEC Response 3.2:* *Considering the response by Stephen Gagnon in his letter dated December 22, 2021, TEC continues to keep this comment open until the applicant resolves these waivers with Stephen Gagnon and the City of Methuen.*

Comment 4: The proposed outlet invert is drawn higher than the inlet pipes within DMH 1. The inverts for this structure should be adjusted to be in accordance with Section 4.3.3.7 of the MSSR.

**MEI Response:** **The profile has been revised to correctly show the inverts of the drainage system.**

*TEC Response:* *TEC acknowledges the revision on the profile, however inverts for the DMH 1, CB 1, & CB 2 are no longer provided on the Definitive Plan Set. The applicant should revise the plans to detail all inverts for these structures.*

**MEI Response 4.2:** **The Profile has been revised to show all inverts for DMH 1, CB1, and CB 2.**

*TEC Response 4.2:* *Comment Addressed.*

Comment 5: Per Sections 4.3.3.6 & 4.4.2.3 of the MSSR, drainage and sewer pipe designs respectfully have specific design velocity requirements. The applicant should provide pipe flow calculations for both systems to prove this design meets these requirements.

**MEI Response:** **Pipe flow calculations have been included in the Stormwater Report.**

*TEC Response:* *Regarding the drainage system & Section 4.3.3.6 of the MSSR, comment addressed. Per Section 4.4.2.3 of the MSSR, the applicant should provide sewer pipe design velocities for review.*

**MEI Response 5.2:** **Sewer pipe sizing calculations have been included with this submittal.**

*TEC Response 5.2:* *Comment addressed.*

Comment 7: The sewer service detail calls for a 6" service diameter, but the Plan & Profile call for a 4" service diameter.

**MEI Response:** **The plans have been revised to depict 6" sewer services.**

*TEC Response:* *Regarding the Plan & Profile sheet and sewer service detail, Comment Addressed. However, the Roadway Cross-Section detail shows a 6" PVC Sewer under the roadway while the Plan & Profile detail an 8" PVC Sewer. The applicant should revise this detail accordingly.*

**MEI Response 7.2:** **The Roadway cross-section detail has been revised to show an 8" PVC sewer.**

*TEC Response 7.2:* *Comment Addressed.*

Comment 8: Both CB 1 & 2 do not include the proposed use of gutter curb inlets. Per Section 5.3.8 of the MSSR, these catch basins should be revised to include gutter curb inlets.

**MEI Response:** **A waiver from this requirement has been requested.**

*TEC Response:* *See TEC response on Comment 3.*

**MEI Response 8.2:** **No response required.**

*TEC Response 8.2:* *TEC will continue to defer to Stephen Gagnon and the CD Board regarding the acceptance of any & all waivers.*

Comment 9: Per Section 5.4.2.2 of the MSSR, all drainage pipes must be constructed of reinforced concrete. On Sheet 6 of the Definitive Subdivision Plan, the connection between CB 1, CB 2, and DMH 1 are detailed as 12" PVC. This should be revised to follow this Section.

**MEI Response:** **The drainage pipes have been revised to specify RCP.**

*TEC Response:* *TEC notes the change to RCP for the pipes between these structures. However, there is no information stating the pipe type, size, lengths, or inverts on the Definitive Site Plans. The applicant should revise the plans accordingly.*

**MEI Response 9.2:** **All drainage pipes are labels with size, material, length, and slope.**

*TEC Response 9.2:* *Comment addressed.*

**Site Plan – General**

Comment 11: The typical section calls for sloped granite curbing on both sides of the roadway. The Applicant should confirm that curbing is proposed around the full extents of the roadway, and TEC recommends adding a leader to call out the proposed curbing on the Plan.

**MEI Response:** **A waiver has been requested to allow for bituminous curbs to be installed. Curbing is proposed along the full extents of the roadway. A label has been added to the Plan and Profile sheet calling out the curbing.**

*TEC Response:* *TEC recommends the use of sloped granite as originally shown on the typical section. Bituminous curbing will become a long term maintenance issue for the City.*

**MEI Response 11.2:** **The bituminous curb has been discussed with the Engineering Department and in lieu of sloped granite curbing, we are in agreement to proposed bituminous curb and increase the depth of pavement for the roadway.**

*TEC Response 11.2:* *Comment Addressed.*

Comment 14: There appears to be some existing vegetation at the rear corner of abutting lot 75-3. The plans should identify if this vegetation will be removed or a portion will remain. Location of individual trees may be required in this area in order to preserve the natural buffer.

**MEI Response:** **The existing vegetation will mostly be removed as the drainage line is proposed through the area of trees.**

*TEC Response:* *TEC recommends that the plan be revised to clearly identify that these trees will be removed.*

**MEI Response 14.2:** **A note has been added to the plans stating "Exist. Trees within drain easement to be removed as needed"**

*TEC Response 14.2:* *Comment Addressed.*

Comment 16: TEC suggests the addition of proposed gas and electric connections to the proposed and existing dwelling(s) on Sheet 6 of the Definitive Subdivision Plans.

**MEI Response:** **Gas and underground electric have been added to the plan and profile sheet.**

*TEC Response:* *Regarding the proposed gas connections, comment addressed. The proposed underground electric only shows connections from the cul-de-sac center to the proposed buildings. The Plans should be revised to indicate if the underground electric will be extended to the street.*

**MEI Response 16.2:** **The underground electric has been extended to Hampstead Street. Note 3 has been added to the Plan and Profile Sheet.**

*TEC Response 16.2:* *Comment addressed.*

Comment 17: On Sheet 6 of the Definitive Subdivision Plans a few issues were noted regarding the proposed utility profile:

a. Pipe lengths of sewer pipes are labeled in inches, not feet.

b. The inverts into DMH 1 should be specified for each CB they connect to.

c. The invert out of CB 1 is labeled as an invert in.

**MEI Response:** **The sewer pipe labels have been revised. The Inverts into DMH 1 have been specified. The label for CB 1 has been revised to show the invert out.**

*TEC Response:* *Regarding the sewer pipe labels, comment addressed. Regarding the labels for DMH 1 & CB 1, inverts and pipe sizes/materials should be added to the Plans.*

**MEI Response 17.2:** **The labels for DMH 1 & CB 1 have been revised to include inverts and pipe size/material.**

*TEC Response 17.2:* *Comment Addressed.*

**Stormwater Report**

Comment 24: The estimated seasonal high-water table near the proposed infiltration basin within proposed Lot 2 is less than 2' below the bottom of the proposed basin based on the provided Test Pit 21-9. A revision in design of the basin is required to meet the 2' minimum separation between the estimated seasonal high-water table and the bottom of basin per Volume 2 Chapter 2 of the Massachusetts Stormwater Handbook. The ESHWT value on the Infiltration Basin Cross-Section on Sheet 9 of the Definitive Subdivision Plans should also be revised accordingly.

**MEI Response:** **The infiltration basin has been revised to provide a 2' separation to ESHGW.**

*TEC Response:* *Based on the revised design on Sheets 7 & 9, the proposed infiltration basin still does not provide the 2' minimum separation between the estimated seasonal high-water table and the bottom of basin. The ESHWT value reported for TP 21-8 is 176.6 based on the information on Sheet 10. However, the ESHWT shown on the infiltration basin cross-section is labeled at 175.5 which is not detailed on any test pits. The applicant should revise accordingly.*

**MEI Response 24.2:** **We believe there is at least a 2' separation to groundwater from the bottom of the basin. TP21-7 has ESHGW of 178.5 and the bottom of basin is 181.6. TP21-8 has an ESHGW at 176.6 and the bottom of basin is at 178.6. TP21-9 has an ESHGW at 178.4 and the bottom of basin is at 181.2. The lowest elevation of the basin is 177.5 and the existing grade is 179.5. With ESHGW in TP21-8 of 49", the lowest point of the basin will have just over 2' separation to groundwater.**

*TEC Response 24.2:* *Based on the information stated above, 49" below TP21-8 is equal to elevation 176.6, not 175.5 as shown on the plans. TEC disagrees with the assumption of ESHGW. The applicant should either provide additional test*

*pits at the proposed location to prove this assumption, or adjust their design to meet the documented existing site conditions.*

Comment 25: Below are new comments related to the dry well (SC-740 chambers):

a. Sheet 5 labels the chambers as a roof drywell. Sheet 10 shows a detail labeled subsurface infiltration area. These labels should be revised to be consistent for clarity.
b. The subsurface area elevations are not consistent with the dimensions of the detail. (Bottom of Chambers = 183.00 + 30" chamber height = 185.50, not 186.50)
c. The "Subsurface Infiltration Area Detail" shows what appears to be an outlet pipe and manifold system labeled with a dimension "0.5'". This is not shown on the Site Plan Sheet 5.

**MEI Response:** **a. The Detail on sheet 10 has been revised to read "Roof Drywell Detail"**

**b. The subsurface elevations have been corrected.**

**c. There is no outlet pipe coming from the roof drywell. The 0.5' dimension is the labeling the width of stone between chambers.**

*TEC Response:* *a. Comment Addressed.*

*b. Comment Addressed.*

*c. Comment Addressed.*

Comment 26: Traditionally, the sight distance calculations are based upon the design speed of the roadway which was not identified by the Applicant. It would generally be assumed that the design speed would be slightly above ethe posted speed, say 35 mph. The Applicant has provided sight distance calculations for 40 mph as well which depicts the conservative calculation for sight distance at the subdivision road.

*TEC Response:* *No response required.*

Comment 27: The Sight Distance Assessment memorandum denotes that the required minimum sight distance due to grade is 188-feet at 30 mph and 285-feet at 40 mph for both directions in terms of stopping sight distance. This would suggest that the downgrade is the same in both directions from the sub-division road. Based on field observation it appears that the grades are not the same and that the calculated SSD should be higher than 200-feet for the downgrades on each approach.

*TEC Response:* *Comment not addressed.*

Comment 28: TEC agrees that the sight distance measurements will exceed AASHTO minimum recommendations. It is anticipated that the changes based on the comment above will not alter this conclusion. Although the minimum sight distance is met, the desired sight distance at 30 mph is not for intersection sight distance (ISD) looking north and at 40 mph for ISD looking south. TEC agrees that the Applicant should maintain cut-back vegetation on the site frontage to provide the maximum sight lines possible.

*TEC Response:* *No response required.*

**New Comments – February 7, 2022**

Comment 29: On page 15 of the attached Stormwater Report, the applicant references the use of water main that is 6" in diameter instead of an 8" diameter pipe referenced on the plans. The applicant should revise accordingly.

Comment 30: Multiple pipe lengths, slopes, and inverts detailed on the Pipe Sizing Calculation Spreadsheet (page 82 of the attached Stormwater Report) do not match the information stated on sheets 5 & 6 of the Definitive Subdivision Plan set. The applicant should revise accordingly.

Comment 31: The infiltration basin design incorporates an underdrain and valve in Plan View. The underdrain and valve should be added to the Construction Detail and Cross Section of the infiltration basin.

Comment 32: The infiltration basin cross section includes several errors and should be revised:

a) Emergency spillway labeled at 181.00, but drawn at elevation 180.50
b) 100-year Flood Elevation labeled at 180.82, but drawn at ~180.50
c) ESHWT labeled at 175.5, but test pits show 176.6 (lowest elevation)
d) Naturally occurring materials labeled as loamy sand, but test pits show sandy loam
e) TEC recommends an anti-seep collar within the berm to prevent risk of breakout/erosion.

Comment 33: The infiltration basin is designed with an emergency spillway at elevation 181.00. The berm around the basin should be designed to provide a minimum of 1-foot of free board above the highest water elevation. TEC recommends retaining the 10-foot berm width for access and maintenance purposes.

Comment 34: The sediment forebay construction detail shows information for four different sediment forebays. TEC believes this is a drafting error and should be revised to show accurate information for the one forebay proposed.

Comment 35: The construction detail for the outlet control structure calls for a top of structure elevation of 180.75, but the HydroCAD shows a top elevation of 180.00. Also, the "top view" of the detail shows only one orifice, but the side view calls for two.

Comment 36: TEC recommends installation of a level spreader at the discharge point of the infiltration basin to better match existing drainage patterns.

Comment 37: DMH A is shown within the right-of-way of Hampstead Street but it does not show any connection to the existing drainage system. The Applicant should provide invert information and should provide confirmation that the system in Hampstead is in working condition and functioning properly. If DMH A is proposed as a dog house manhole, a construction detail should be provided to be reviewed by the City Engineering Department.

Please do not hesitate to contact me directly if you have any questions concerning our comments at 978-794-1792. Thank you for your consideration.

Sincerely,
TEC, Inc.
*"**T**he **E**ngineering **C**orporation"*

Peter F. Ellison, PE
Director of Strategic Land Planning