Horsley Witten Group
Sustainable Environmental Solutions
55 Dorrance Street • Suite 200 • Providence, RI 02903
401-272-1717 • horsleywitten.com

February 8, 2022

Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, suite 3
Wakefield, RI 02879-1900

Re: Response to Initial Review
Woonasquatucket River Greenway, Providence
Project ~~#2018-~~08-018
2021

Dear Ms. Silvia,

On behalf of the City of Providence, the Horsley Witten Group (HW) is pleased to submit the following responses to your initial review comments provided via email on December 3, 2021 for the Woonasquatucket River Greenway Application (#2018-08-018). Listed below are the comments followed by our response.

We have enclosed two copies of the following materials to address the comments and provide additional clarity:

- Response to Comments Letter
- Updated Narrative (Revision dated December 2021), including:
  - LID Design Certificate & Narrative
  - RIDEM Remedial Approval Letter
  - CRMC Building Official Form
  - Coastal Hazard Application Worksheet
  - Proprietary Product Information
- FWWVC Narrative, including:
  - Site Photos
  - Cut and Fill Floodplain Analysis
- Updated Plan Set Sheets 48 & 49 (Revision dated January, 2022) including:

Comments:

1. *Please describe purpose of "muscle wall", please note may have negative recommendation to the council regarding this wall. The walls are being installed within at floodway (AE-Zone) and may result in obstructing flow in the river. RIEMA will need to be contacted about the placement of this obstruction. Please see Ordinances/State Building Codes and FEMA regulation below:*
   a. *Prov's City Ordinance Sec. 5-123. (b) 3).: "In Zones A1-30 and AE, along watercourses that have regulatory floodways designated on the Providence County FIRM, encroachments are prohibited in the regulatory floodway which would result in any increase in flood levels within the community during the occurrence of the base flood discharge."*
   b. *FEMA's Code of Federal Regulations (44 CFR 60.3 (d) (3)-(4):"*
   (3) Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway

unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge;
(4) Notwithstanding any other provisions of § 60.3, a community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that the community first applies for a conditional FIRM and floodway revision, fulfills the requirements for such revisions as established under the provisions of § 65.12, and receives the approval of the Federal Insurance Administrator."

c. *State Building Code Appendix G103.5.1 "A floodway encroachment that increases the level of the base flood is authorized if the applicant has applied for a conditional Flood Insurance Rate Map (FIRM) revision and has received the approval of the Federal Emergency Management Agency (FEMA)"*
d. *State Building Code R322.4 Variances and Appeals 2.7*
"Variances shall not be issued by a community within any designated regulatory floodway, if any increase in flood levels during the base discharge would result. (For communities which must meet the requirements of Section 60.3 (d) of the National Flood Insurance Program regulations.)"

Response:
The muscle wall will be a temporary diversion during construction only, expected to be less than 30 days depending on manufacturer recommendations and contractor logistics. The wall will be installed during low tide with individual pieces locked together, filled with water and covered with a waterproof liner. Excess water will be pumped out from behind the wall during construction and the wall and liner will be removed when soil is stabilized, and plants are established. The muscle wall is therefore not expected to be an encroachment requiring analysis – we are seeking clarification from CRMC to verify. Additional details for the wall are provided on sheet 48, and information about the product testing rating is provided in as an appendix in the Coastal Resources Management Program Narrative.

2. *How will "muscle wall" be secured so as not to be displaced in a flood event, provide engineer analysis that show the structure will remain intact. There is serious concern about the placement of these structures programmatically and engineering wise.'*

Response:
The muscle wall will be a temporary diversion during construction only, expected to be less than 30 days depending on manufacturer recommendations and contractor logistics. If a flood event is forecast, the muscle wall will be removed. Additional information about testing and resistance to water pressure for the muscle wall has been provided as an appendix in the Coastal Resources Management Program Narrative.

3. *Provide engineer analysis for the wall along the river to insure integrity.*

   Response:
   The detail and layout for the wall along Kayak Launch 1 has been updated so it will not exceed a 4-foot height and therefore not a structural wall. This information can be found on sheets 48 & 49a. Additionally, an engineering analysis for the wall will be provided, if still required by CRMC prior to beginning any construction work.

4. *Kayak ramp is using stone pavers, this is a concern in a flood event. As the pavers may be dislodged and end up in the river. A solid structure (i.e. full precast slab) would provide a surface that would less likely be displaced or increase the size of stone pavers.*

   Response:
   The size of the stone pavers has been increased and can be found on sheet 49 – Kayak Launch Layout & Erosion Control. Additionally, the velocity for the river, as calculated in the FEMA Woonasquatucket River Flood Insurance Study (FIS) (#44007CV001D 07/17/2020), for transect K (In between the two launches) is noted as 3.4 feet/second (fps) for the 100-year storm. For this velocity the minimum diameter rip rap size needed is approximately 2.25 inches based on Ishbash Equation. The size of the stones (36" x 36" x 6") exceeds this diameter.

5. *Provide engineering analysis of the MSE walls, …as they are not simply retaining walls but will be subject to scour from flow in storm events. There appears only "cut sheet" for the design of the walls. Please provide engineering specific details (i.e. show toe protection and depth of toe) of the walls to be installed.*

   Response:
   Further specific details regarding Vegetated MSE installation have been provided on sheet 49b. The detail's maximum dimensions are provided for the 'worst case scenario' for existing site soils. Prior to beginning installation, soil samples will be collected, and the appropriate geosynthetic length will be verified, as noted on the plans.

   The velocity during the 100-year storm in this project location is 3.4 fps (per the FEMA Flood Study, see response to #4 above), which the product is fully capable of withstanding. Flex MSE bags have been installed in locations that have reached higher velocities without scour/deterioration. Also, according to the PADEP ESC Manual (363-2134-008, March 31, 2012) vegetation established by seeding alone, can withstand a velocity up to 4.0 fps. The area over the socks will be seeded with a native salt tolerant mix.

   Additionally, the mean boundary shear stress was calculated at Transect K from the FEMA Woonasquatucket River flood study (#44007CV001D 07/17/2020) and resulted in a shear stress of 1.33 LB/ft^2. The calculations for this can be found in Appendix C of the Coastal Resources Management Program Narrative. Within the same manual (PADEP ESC

Manual, table 6.2 – see https://www.centrecountypa.gov/DocumentCenter/View/246/e-and-s-pollution-manual?bidId=) the maximum permissible shear stress for a straw with net liner is 1.45 lb//^{ft2}.

During plant establishment Flexterra (a mulch-based wood fiber growth medium) will be used to secure seed in place on the Vegetated MSE bags. Vegetated MSE bags have been tested against Double-net straw blankets. Additional information regarding bag material testing, longevity, sheer stress testing and Flexterra information can be found in Appendix C of the Coastal Resources Management Program Narrative (Revision date January 2022).

6. *The CRMC Freshwater Wetland Rules (FWWVC) shall be addressed in writing.*

   Response:
   The CRMC Freshwater Wetland Rules (FWWVC) have been addressed and are attached as a separate narrative.

7. *Has RIPDES review, as applicable, commenced under RIDEM?*

   Response:
   RIDEM indicated that they will not be completing a RIPDES review. The project will be covered under the RIPDES Construction General Permit upon CRMC Assent.

8. *Is the previously discussed 5-year work timeframe for permit being sought?*

   Response:
   Yes, the 5-year work time for the permit is still being sought.

9. *Are there any wetland areas which can be restored (unlikely creatable given location) in the area, including FWW? Note for the 145sf of permanent wetland loss proposed, a 2:1 mitigation is required.*

   Response:
   The resource area that will be disturbed during construction of the launches would be considered part of the Flowing and Standing Water Wetland – or the bank of the Woonasquatucket River (flagged was the approximate extent of the MHW/OHW mark based on the physical characteristics in the field) as well as the Riverbank Wetland. There are no existing vegetated wetlands in these specific locations; therefore, in our opinion additional restoration appears to not be applicable. Additional information for the resource area can be found in the FWWVC Narrative.

10. *Please document any compliance with Metro Bay SAMP, as applicable.*

Response
Compliance with Metro Bay SAMP including the Urban Coastal Greenway and the Woonasquatucket River & Promenade Street District Recommendations for Management have been included in the Coastal Resources Management Program Narrative, Section 6, Revision Date January 2021.

11. *Please clarify the 140sf of riverbed "adjustment".*

Response:
The 140 SF was referring to the area on the bottom of river where river stone pavers are proposed. An updated breakdown on temporary and permanent disturbance along the riverbank for each kayak launch can be found in the FWWVC Narrative.

12. *Please submit variance requests as applicable for earthwork within the setback and other standards, as applicable (Section 1.1.7)*

Response:
The variance request as well as the written criteria is addressed in the Coastal Resources Management Program Narrative, Section 4, Revision Date January 2021.

13. *Please clarify ACOE review status, as applicable. Have you had any specific dialogue with the agency re this project? Note, it is likely to be jointly reviewed again at December's GP meeting with ACOE/DEM/CRMC.*

Response:
The ACOE requested information on the project which was provided in the form of a plan set on October 22, 2021. We have not received a review status update from ACOE at this time.

Thank you in advance for your attention to this matter. If you have any questions during review or require any additional information, please do not hesitate to contact me at 401-272-1717 or jford@horsleywitten.com.

Sincerely,
HORSLEY WITTEN GROUP, INC.

Jonathan A. Ford, P.E.
Senior Project Manager – Community Design

Ellen Biegert, RLA
Landscape Architect

cc: Jessica Pflaumer, Martina Haggerty – City of Providence *via email*
Francisco Lovera, Dara Clough – McMahon Associates *via email*