

Ms. Juliet T. H. Walker, AICP
Planning Director
Planning Department
1 Junkins Avenue
Portsmouth, NH 03801

May 3, 2019

Ref. T0884

Re: Cate Street Extension Roadway Design & West End Yards Site Stormwater Peer Review

Dear Ms. Walker:

On behalf of the City of Portsmouth, TEC, Inc. (TEC) has completed an engineering peer review of the Cate Street Extension roadway design and West End Yards site stormwater management system. The following details the results of this review:

Reference Documents:

The following documents obtained from the Planning Department's project website were included as part of our review:

- *West End Yards Site Plans*, prepared by Fuss & O'Neill – dated March 2019
- *Traffic Impact and Site Access Study Peer Review*, performed on behalf of the City of Portsmouth by TEC – dated October 2, 2018
- *Wetlands Conditional Use Permit Application*, prepared by Gore Environmental Services, Inc. – March 21, 2019 submission
- *Stormwater Management Report - West End Yards*, prepared by Fuss & O'Neill – dated November 19, 2018
- *State Wetlands Submission*, prepared by Gore Environmental Services, Inc. – February 13, 2019 submission
- Meeting minutes for various public meetings (Neighborhood Listening Session, Planning Board, Conservation Commission, Technical Advisory Committee)

Field Reconnaissance:

TEC visited the project site on April 23, 2019 to observe existing conditions and elements of the site vicinity that may be impacted by or are adjacent to the proposed development. Items observed in the field included:

- Existing roadways and intersections at Cate Street, Bartlett Street, Islington Street, Cottage Street, US Route 1 Bypass, and Borthwick Avenue

- Existing drainage infrastructure, including pipes currently draining into Hodgson Brook
- Existing landscaping along Hodgson Brook and the brook's bank adjacent to the Site

After review of the reference documents cited above and field reconnaissance performed, TEC offers the following comments and recommendations to be addressed by the Applicant, at the discretion and direction of the City:

Horizontal Alignment and Roadway Plan Review:

1. Please confirm the intended design speed of the Cate Street / Cate Street Extension. It appears that most, but not all, design parameters are consistent with a design speed of 30 mph.
2. The proposed alignment of Cate Street Extension at the Route 1 Bypass / Borthwick Avenue intersection causes the westbound through movement to approach the existing raised median island within Borthwick Avenue at an angle. Consider revising the alignment of Cate Street Extension at this intersection to provide a better alignment for through traffic (refer to attached markup of Sheet CS-101).
3. Consider revising the proposed 20-foot radius at the northeast corner of the Cate Street Extension / Route 1 Bypass intersection to a 50-foot radius. It is noted that the existing traffic signal mast arm foundation is at the edge of pavement and is a design constraint. However, if the northern curb line of Cate Street Extension were re-aligned and shifted to the south as suggested (refer to attached markup of Sheet CS-101), a 50-foot radius curve may fit while maintaining the existing traffic signal mast arm and guardrail.
4. The Cate Street Extension westbound approach to US Route 1 Bypass appears to be excessively wide. Consider revising the approach layout (refer to attached markup of Sheet CS-101).
5. Consider revising the 15' wide receiving lane on Cate Street Extension eastbound to be comprised of an 11' wide lane and a 4' wide shoulder.
6. Provide turning movement simulations for the intended design vehicle entering / exiting Cate Street Extension from US Route 1 Bypass. Utilize WB-67 design vehicle, if applicable (Sheet CT-103).
7. The existing guardrail at the northeast corner of US Route 1 Bypass / Cate Street Extension will need to be modified to provide a gap for the shared use path, with appropriate crash worthy end terminals for vehicular traffic.

8. Consider extending the raised median island on Cate Street Extension from Station 1+60 to Station 3+50 (refer to attached markup of Sheet CS-101). While this would restrict the U-Haul driveway access to right-in / right-out only, allowing left turns at this intersection may be a safety concern given, its proximity to the signalized US Route 1 Bypass intersection. It is understood that U-Haul may have requested full access to this intersection; however, further coordination should be conducted to ensure the long-term operational safety at this driveway access.
9. Remove the horizontal angle point in the proposed alignment at Station 4+50.47 (Sheet CS-101). Utilize a horizontal curve at this location with radius and length appropriate for the intended design speed of the roadway.
10. Revise the horizontal curve located at Station 9+73.3. Currently, the curve is too sharp/short and should meet NHDOT minimum curve length based on the assumed design speed of 30 mph (Sheet CS-102).
11. Revise the Cate Street baseline alignment at the Cate Street / Bartlett Street intersection to better fit the existing roadway layout. See also Comment #59 below with recommendations to improve this intersection.

Vertical Alignment Review:

12. At Station 14+00, consider revising the curve to have a minimum K value of 37 to reflect the 30 mph design speed accommodated by all other proposed vertical curves.

Pedestrian and Bicycle Accessibility Review:

13. Provide construction details for tip-downs / curb ramps with maximum slopes and minimum dimensions for ADA compliance.
14. Consider adding a tip-down with ADA detectable warning panel to the southeast corner of the Cate Street Extension / US Route 1 Bypass intersection for future pedestrian accessibility.
15. A call-out for the tip-down of the side path with detectable warning panels at the northeast terminus of the side path appears to be missing.

Traffic Control Review:

16. Consider revising the proposed U-Haul egress to be a right-in / right-out only driveway. The proposed design presents a potential safety concern for left turns onto Cate Street Extension. Consider extending the proposed median island east to prohibit left turns onto Cate Street Extension (see Comment #8).
17. The proposed painted median island on the westbound approach to US Route 1 Bypass, ending at Station 4+24, does not provide enough width for a turning vehicle to wait. Consider extending the raised median island to prohibit left turns into / out of the U-Haul driveway (see Comment #8).
18. Consider whether a marked crosswalk is warranted across Cate Street Extension at the terminus of the side path. Note that a crosswalk would be required if a tip-down is added per Comment #14.
19. Consider providing intersection approach warning signage or markings on the proposed 10' wide bituminous side path prior to roadway crossings.
20. Consider providing pedestrian / bicycle crossing warning signs and/or warning devices at (and possibly in advance of) all proposed mid-block crosswalks (Sheet CS-101, Station 4+35 and Sheet CS-103, Station 13+90).
21. Provide crosswalk markings across the parking lot driveway before its intersection with Cate Street at approximate Station 13+15.
22. Add stop lines on all driveway approaches to Cate Street / Cate Street Extension and consider a short length of double yellow line.
23. Add a R1-1 STOP sign at the commercial building parking lot access intersection with Route 1 Bypass (Sheet CS-105), and consider STOP signs at internal driveways intersecting Cate Street / Cate Street Extension.
24. Impacts to the existing traffic signal at US Route 1 Bypass should be addressed in the plan set. This includes replacement of the loop detectors, adjustment or relocation of pullboxes, and any necessary timing or phasing modifications.

Pavement Section Review:

25. The proposed pavement design shown on the Roadway Typical Sections of 5"-HBP, 12"-Crushed Gravel, 12"-Gravel appears to be adequate for the class of roadway and anticipated volume and composition of traffic.

General Comments:

26. To improve plan readability, include street names on all plan sheets for all major roadways. (e.g. Cate Street, Cate Street Extension, Bartlett Street, Borthwick Avenue, US Route 1 Bypass.)
27. The slope arrows on the Typical Sections, Sheet CS-001 are pointing in the wrong directions for the multi-use trail; revise as appropriate. The trail should drain toward the roadway rather than onto abutting properties.
28. Include dimensions of all lane and shoulder widths, where appropriate. Some seem to be missing at the Cate Street Extension intersection with US Route 1 Bypass. Dimensions along Cate Street / Cate Street Extension and parking lot driveway access points onto Cate Street / Cate Street Extension also appear to be missing.
29. On many plan sheets, the Graphic Scale within the border / title block is missing the number values indicating the plan scale (i.e. 20- or 30-scale).
30. Add additional relevant existing conditions survey information to site plans, specifically the existing guardrail and utility/signal infrastructure at the Cate Street Extension / US Route 1 Bypass intersection and Hogdson Brook bank limits.
31. Include match-line sheet continuation notes on all plan sheets (i.e. "See Sheet XXXX").
32. Include and label all proposed curbing tip downs on Site Plans.
33. Remove sewer text from roadway profile sheets (Sheet CS-102 & CS-103).
34. Label grades on profiles at intermediate 50-foot stations.
35. Consider expanding plan coverage to show Borthwick Avenue and the intersection with US Route 1 Bypass on the plans (e.g. Sheet CS-101).
36. On Sheet CU-100, add label to indicate "See Inset Above for Continuation".

37. On Sheet CD-511, proposed cast iron cover for Bioretention Inlet Structure Detail should be labeled "DRAIN". It currently shows "SEWER".
38. On Sheet CD-511, label inlet structure on Bioretention System Typical Section Detail.
39. Label all proposed drainage structures on Grading, Drainage & Erosion Control Plans, including subsurface infiltration basins (SSIBs).
40. The Applicant should provide an update on status of coordination with NHDOT District 6 regarding the Driveway Permit that will be required for work within the NHDOT Right-of-Way at US Route 1 Bypass.

Stormwater Management Review:

41. It is understood that the Applicant is in the process of procuring a City Conditional Use Permit as required by the City of Portsmouth due to disturbance within the wetland buffer zone. Construction shall not commence before such permit is granted.
42. The Executive Summary notes in Section 2.1 that Hydraulic Conductivity and ESHWT (Estimated Seasonal High Water Table) will be confirmed by the project geotechnical engineers. Subsequent to this confirmation, the Applicant shall review and provide verification of the adequacy of the proposed stormwater infrastructure design to ensure compliance with City of Portsmouth and NHDES standards.
43. The Executive Summary notes in Section 2.1 that test pits will be performed to confirm site geotechnical conditions. If any soil borings have been advanced to date, reports and locations should be provided in the Stormwater Management Report and/or Site Plans.
44. Label all proposed stormwater infrastructure shown on the Grading, Drainage, & Erosion Control Plans, including subsurface infiltration basins (SSIBs) for clarity.
45. Subcatchments T9 and T10 appear to drain toward the storm drain system Pond AP2. However, the HydroCAD routing diagram appears to show subcatchments T9 and T10 draining toward Hodgson Brook, Pond AP1. The Applicant should review and revise the drainage design if necessary to confirm compliance with City of Portsmouth and NHDES standards.
46. The Applicant shall confirm via a qualified hydrogeologist that the proposed drainage system additions do not provide any "adverse effect on other public or private groundwater sources", as required by the City of Portsmouth Site Plan Regulations, Section 7.2.4.

47. The Applicant should review Tables 1.1 and 2.1 of the Executive Summary. The Net Change in the 50-year AP1 and 10-year AP2 peak flows appear to be incorrect based on the Existing and Proposed Flows cited.
48. 4" perforated underdrain pipe is proposed in the Bioretention System details. NHDES Stormwater Manual Volume II requires ≥ 6 " pipe.
49. Deep sump catch basins are proposed throughout the design. The Applicant shall confirm that each deep sump catch basin has a contributing impervious drainage area of ≤ 0.25 acres, as parametrized by NHDES Stormwater Manual Volume II.
50. There appears to be a slight (± 3 SF) discrepancy in total area between the pre/post HydroCAD conditions. Please consider revising.
51. Groundwater Recharge Volume Calculations, BMP worksheets and calculations, Infiltration Feasibility Report, UIC Registration, and I&M Manual are noted as "pending" items. "Pending" items have not been reviewed by TEC and should be completed prior to final approval.
52. It appears that multiple roof drain lines are proposed as 6" HDPE. Section VII, Part 2.B.3. of the City of Portsmouth Subdivision Regulations specifies a minimum of 12-inch diameter pipe for drains and culverts.
53. Consider revising the location of proposed catch basins 5 & 6. Catch basins should be located at the low point (Station 2+78).
54. Consider revising catch basin locations throughout Cate Street / Cate Street Extension to provide a minimum spacing of 300'.
55. Show and label proposed curb openings to bioretention basins on the applicable plan sheets. The detail shows a curb opening to the BMP but the plans do not shown such information.
56. Adjust existing catch basin #1346 at the southeast corner of the US Route 1 Bypass / Cate Street Extension intersection to proposed final grade. Currently this catch basin is raised above the existing pavement and is not currently proposed to be adjusted.

Peer review (by TEC) of the Cate Street Extension Traffic Impact and Access Study, dated October 2, 2018:

TEC's response letter to the City Planning Department and Stephen G. Pernaw & Company, Inc., dated October 2, 2018 was reviewed as part of this Cate Street Extension Roadway Design peer review and it appears that there are a number of outstanding comments for which responses from the Applicant are warranted. The outstanding comments are as follows:

57. Traffic Study Comment #9: *"The Applicant should consider the addition of a northbound right turn lane at Cate Street during the site plan review process as an alternative to providing the northbound right turn lane at Cottage Street.*
58. Traffic Study Comment #11: *The Applicant should study the possibility of extending the US Route 1 left turn lane going southbound into Cate Street Extension, and shortening the US Route 1 left turn lane at Cottage Street southbound. The Applicant should pursue the implementation of these improvements with NHDOT during the site plan review process. (These improvements would entail a NHDOT driveway permit approval process and should be coordinated through the City of Portsmouth.)*
59. Traffic Study Comment #15 TEC: *The Applicant should further analyze the suggested realignment of the Bartlett Street / Cate Street intersection. TEC suggested the Applicant evaluate the addition of a left turn lane along northbound Bartlett Street to provide a short queue storage and turning refuge area in the busy intersection. In addition, the realignment of Bartlett Street could provide additional safety benefits, as noted in the 10/2/18 Traffic Study Peer Review.*

Upon the receipt of additional, revised, and/or new documentation for the project, TEC reserves the right to provide additional comments as needed. Please do not hesitate to contact us directly at 978-794-1792 if you should have any questions concerning this peer review. Thank you for your consideration.

Sincerely,
TEC, Inc.
"The Engineering Corporation"

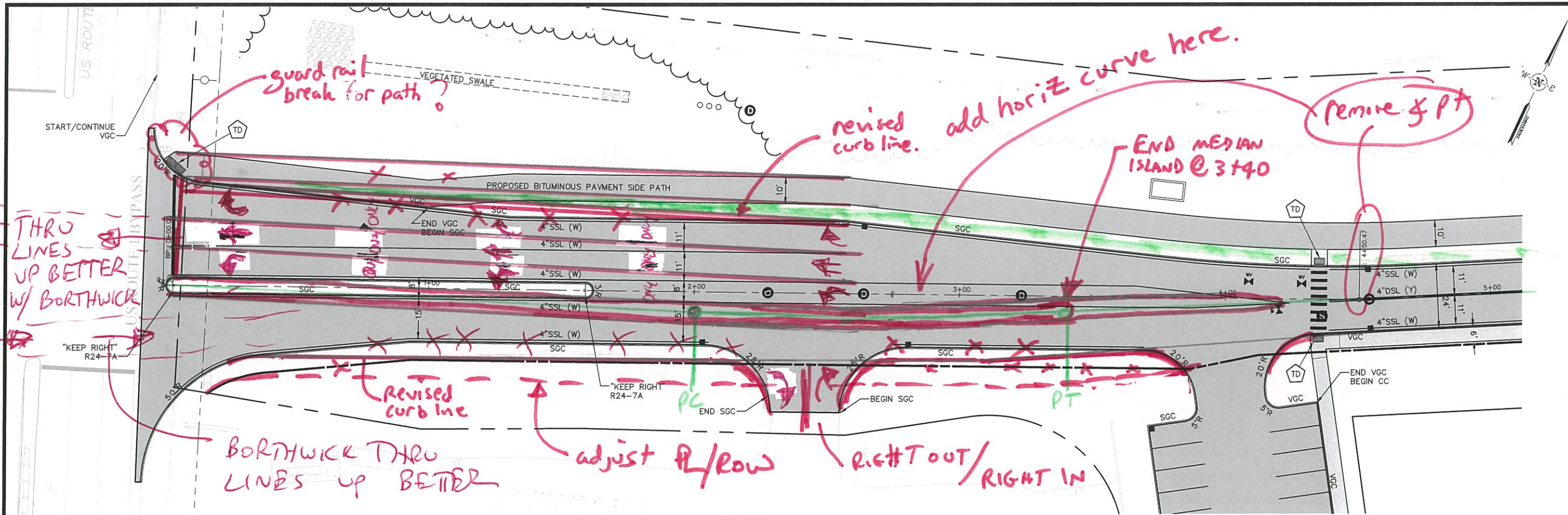


Jonathan A. Rockwell, P.E.
Director of Transportation Infrastructure Services
Ext. 1025



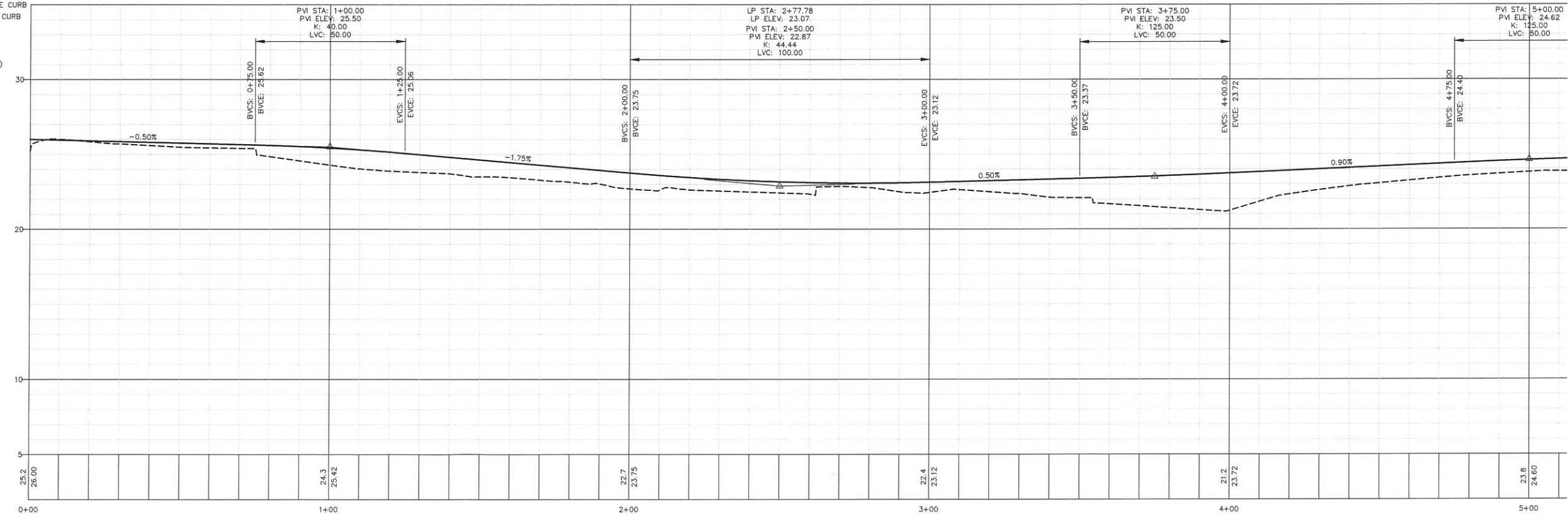
Anthony Ciolfi, P.E.
Senior Design Engineer
Ext. 1010

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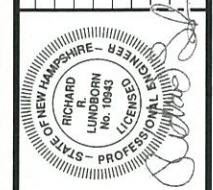
PLAN
 SCALE: 1 INCH = 20 FT.

- PROPOSED TIPDOWN RAMP W/DETECTABLE WARNING PANEL
- PROPOSED TIPDOWN RAMP W/RADIUS DETECTABLE WARNING PANEL
- PROPOSED VERTICAL GRANITE CURB
- PROPOSED SLOPED GRANITE CURB
- PROPOSED CONCRETE CURB
- SLOPED BITUMINOUS BERM
- SINGLE SOLID LINE (WHITE)
- DOUBLE SOLID LINE (YELLOW)



PROFILE
 HORIZ: 1 INCH = 20 FT.
 VERT: 1 INCH = 4 FT.

No.	DATE	TAC SUBMITTAL	DESCRIPTION	DESIGNER	REVIEWER
1.	3/18/2019			JVA/DAD	RRL



SCALE:	HORIZ: 1" = 20'
	VERT: 1" = 4'
DATUM:	HORIZ: NAD83
	VERT: NGVD29
GRAPHIC SCALE	

FUSS & O'NEILL
 UPPER SQUARE BUSINESS CENTER
 5 FLETCHER STREET, SUITE 1
 KENNEBUNK, MAINE 04043
 www.fussandoneill.com

CATE STREET DEVELOPMENT, LLC
 ROADWAY PLAN & PROFILE
 WEST END YARDS
 PORTSMOUTH NEW HAMPSHIRE

PROJ. No.: 20180317.A10
 DATE: 03/18/2019
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