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Planning Director
City of Portsmouth Planning Department
City Hall, 3rd Floor
1 Junkins Avenue
Portsmouth, NH 03801

September 7, 2018

Ref. T0812

Re: Cate Street Extension Traffic Study – Mixed Use Proposal
Transportation Peer Review

Dear Ms. Walker:

On behalf of the City of Portsmouth, TEC, Inc. (TEC) has reviewed documents as part of the transportation engineering peer review of a proposed mixed used development located on the east side of US1 Bypass at the site of the Frank Jones Center in Portsmouth. The project consists of constructing 325 apartment units, 17 townhome units, 22,000 SF of retail/restaurants and 22,000 SF of office. The project currently includes a proposal to extend Cate Street along the north side of the property between US Route 1 Bypass and Bartlett Street.

The following documents were received as part of our review:

- *Draft Traffic Impact and Site Access Study – Proposed Mixed-Use Site*, prepared for Torrington Properties by Stephen G. Pernaw & Co., Inc. – July 18, 2018.
- *Cate Street Development Conceptual Site Plan* – prepared by PCA, undated;
- *Road Layout Exhibit* - prepared by Fuss & O'Neil, revision dated June 28, 2018;

TEC completed a review of these documents for the City of Portsmouth, and the following provides a summary of the comments that were compiled during our review:

Transportation Impact Evaluation

1. Study Area – The Traffic Impact and Site Access Study (TISAS) evaluates a reasonable study area for the purposes of evaluating the potential traffic impacts to the surrounding street system with the construction of the proposed development and the realignment/extension of Cate Street. TEC concurs that the scope of the study is in general accordance with NHDOT guidelines; and was previously approved by NHDOT and the City.
2. Traffic Counts - Traffic counts used within the TISAS were conducted in May 2018 during a period in which area schools were in session. The May counts were seasonally adjusted upward by 7% during the weekday evening peak hour and 8% during the Saturday midday peak hour to reflect peak month conditions, consistent

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with NHDOT standards. This is generally reflective of summertime volumes in the seacoast area. TEC concurs with the use of these traffic volumes and adjustment factors based on NHDOT guidelines.

The weekday evening peak commuter hour and Saturday midday peak commercial hour were studied with the TISAS to determine the project's overall effect on the roadway system. While TEC concurs that these selected time periods are generally appropriate for a mixed-use development, Stephen G. Pernaw and Company, Inc. (SGP) should provide justification for not including the weekday morning peak hour within the study as the morning peak hour of the residential dwelling units and office space within the development will typically overlap with the morning peak hours of the adjacent street system.

3. Background Growth - The TISAS uses an annual traffic volume growth adjustment factor of 1.0 percent per year based on standard rates approved by NHDOT. SGP concurrently overlaid projected traffic volumes associated with five pending development projects within the study area. TEC concurs with the use of these adjacent development projects and adjustment factors based on NHDOT guidelines. The future conditions in 2020 (opening year) and 2030 (10-year horizon) were studied in conformance with NHDOT requirements.
4. Crash Data – No motor vehicle crash data was provided within the TISAS. SGP should obtain and review crash data at the study area intersections to determine whether any specific crash trends exist. This is primarily of concern at the two ends of the proposed Cate Street realignment. The crash data typically indicates the number, type, and severity of crashes at the study area intersections for the most recent three years on record. SGP should further provide documentation of other traffic safety related issues/deficiencies at the intersections and subject roadways, such as sight distances, if applicable.
5. Site Trip Generation – The TISAS uses data published in the industry standard Institute of Transportation Engineers (ITE) publication, *Trip Generation, 10th Edition* to estimate the traffic generated by the proposed development. The TISAS uses data found under Land Use Code (LUC) 220 – Multi-Family Housing (Low-Rise) for the townhouse units, LUC 221 – Multi-Family Housing (High Rise) for the apartment units, LUC 710 – General Office Building for the office areas, and LUC 932 – High Turnover (Sit-Down) Restaurant, LUC 930 – Fast Casual Restaurant, and LUC 820 – Shopping Center for the retail areas of the site. TEC concurs with these land uses and general traffic generation methodology.

The TISAS indicates that a portion of the traffic generated by the commercial areas of the site will be "pass-by" trips, or vehicles generated by the site that are existing on the immediately adjacent roadway system, specifically the US Route 1 Bypass. This is appropriate for the retail and restaurant areas of the site. It appears that some pass-by credit was taken for the office areas of the site within the study. Office land uses are primary trip generators and are not known to attract pass-by trips. While the removal of the pass-by credit will not materially impact the results of the overall analyses due to the relatively small size of the office area proposed,

the trip generation calculations should be revised to remove any pass-by trips associated with the office land use.

The ITE publication, *Trip Generation Handbook, 3^d Edition*, indicates that retail land uses have an average of 34% pass-by trips during the weekday evening peak hour and 26% during the Saturday midday peak hour and high-turnover sit-down restaurants have an average pass-by rate of 43% during the weekday evening peak hour. The TISAS applies a 36.5% pass-by rate during the weekday evening peak hour and 39.8% during the Saturday midday peak hour, which is appropriate for the proposed retail/restaurants on the site.

No internal capture rate was applied between the land uses on the site. TEC concurs that this provides a conservative representation of the trips generated by the site.

6. Trip Distribution – The traffic generated by the proposed project was distributed onto the adjacent roadway system based upon available Journey-to-Work data published by the US Census Bureau for persons residing in the City of Portsmouth for the residential portions of the development and for persons working in the City of Portsmouth for the office portion of the development. This form of trip distribution calculation is consistent with industry standards and TEC concurs with the methodology.

The Site Generated Traffic Volume Figures within Appendix G include both the site generated traffic volumes and the diverted link volumes. TEC requests a figure detailing only the site generated traffic be provided to ensure consistency with the Journey-to-Work distribution and for clarity.

7. Traffic Diversion – With the relocation and extension of Cate Street to intersect US Route 1 Bypass at Borthwick Avenue and close the connection with Cottage Street, traffic will be diverted to use the new roadway connection. The TISAS identifies five different traffic diversion patterns. TEC concurs with the existing patterns that will divert to the new Cate Street extension. The Diverted Traffic Volumes figures within the report are not consistent with the anticipated diversions. SGP should revise and reissue the figures. TEC recommends that SGP provide detailed tables or figures illustrating the volumes of traffic being diverted in each pattern scenario for review to ensure consistency and clarity.
8. Capacity and Queue Analysis - TEC generally concurs with the results of the capacity and queue analysis provided as part of the TISAS; utilizing *Highway Capacity Manual 2010* (HCM 2010) methodology as modeled by Synchro 10.
9. At the intersection of US 1 Bypass / Cottage Street / Coakley Road, the capacity and queue analyses depict significant vehicle delay and queues on various approaches during the weekday evening peak hour in the 2030 No Build and Build condition. The addition of site generated traffic increases the delay and extends queue lengths on the northbound and westbound approaches. Suggested mitigation at this intersection includes the addition of a northbound right turn lane and shortening the northbound left turn lane queueing length to 50 feet. TEC notes

that the addition of a northbound right turn lane may not be feasible within the existing US 1 Bypass right-of-way.

The report does attempt to document the influence of the Portsmouth Rotary on the operations at intersections along Route 1 Bypass to the south by using reduced lane utilization factors on the northbound approach movement during the peak hour studied. Observations of the operation of this roadway during the evening peak hour indicate that the queues from the rotary often extend beyond the Cottage Street / Coakley Road when the rotary is saturated with traffic. While TEC does not recommend incorporating rotary analysis as part of this application review, it is important to document the interconnected operations of other transportation facilities in this area.

10. At the intersection of US 1 Bypass / Borthwick Avenue / Cate Street Extension, the capacity and queue analyses depict increased vehicle delay and queues along the eastbound Borthwick Avenue approach, westbound Cate Street Extension approach and northbound US 1 Bypass left turn movement during the weekday evening peak hour in the 2020 and 2030 Build conditions. The addition of site generated traffic increases the delay and extends the queues by one to two vehicles. Suggested mitigation at this intersection includes the modification of the westbound Cate Street Extension approach to provide a shared left/through/right turn lane and an exclusive right turn lane and extending the southbound left turn lane queueing length to approximately 200 feet. TEC notes that one of the proposed mitigation items for this intersection is increasing the signal cycle length to 120 seconds. During the weekday evening and Saturday midday peak hours, the existing cycle length is 120 seconds, rendering this mitigation item unnecessary. The improvements proposed will not fully mitigate the impact of the site generated traffic, but do reduce delays on the Borthwick Avenue approach and the Cate Street Extension approach during the weekday evening peak hour.
11. The southbound left turn lane of US 1 Bypass at Borthwick Avenue / Cate Street is projected to have a 95% queue length (the generally accepted maximum queue length) of 11 vehicles, or 275 feet in the weekday evening peak hour and 13 vehicles, or 325 feet, in the Saturday midday peak hour. The left turn queue length may extend past the provided storage length during some signal cycles within peak periods, even with the proposed longer storage length. This increase in delay may encourage vehicles to divert to back to the intersection of US 1 Bypass / Cottage Street / Coakley Road to make a left turn.
12. Should NHDOT execute on their vision to remove the traffic signal and close the median opening at US 1 Bypass / Cottage Street / Coakley Road, the intersection of US 1 Bypass / Borthwick Avenue / Cate Street Extension will require a complete redesign to accommodate the relocated traffic. With the introduction of new development traffic, existing over capacity conditions are aggravated at both US 1 Bypass / Cottage Street / Coakley Road and US 1 Bypass / Borthwick Avenue / Cate Street Extension. TEC recommends that SGP perform an alternative analysis

considering the removal of the traffic signal at US 1 Bypass / Cottage Street / Coakley Road and determine the desirable lane configuration at US 1 Bypass / Borthwick Avenue / Cate Street Extension to accommodate development traffic and diverted traffic.

13. At the intersection of Islington Street / Bartlett Street / Pharmacy Driveway, the capacity and queue analyses depict increased vehicle delay and queues along the eastbound Bartlett Street approach during the weekday evening peak hour in the 2020 and 2030 Build conditions. The addition of site generated traffic increases the delay on this approach, but does not increase the projected queue lengths. Improvements at this intersection are under final design by the City for construction next year. No additional lanes will be provided. Suggested mitigation at this intersection includes increasing the signal cycle length to 120 seconds. The proposed timing change reduces the delays on the Bartlett Street approach; however, the queue lengths increase. The 95% queue length on the Bartlett Street approach is projected to be 17 vehicles, or 425 feet, during the weekday evening peak hour. TEC notes that the intersection of Bartlett Street / Cate Street is located approximately 250 feet to the west of this intersection. As a result, it is likely that the intersection of Bartlett Street / Cate Street will be blocked by queueing traffic during peak periods, causing conflicts between queuing vehicles and turning vehicles. TEC does not recommend implementation of this mitigation.
14. SGP analyzed the intersection of Bartlett Street / Cate Street using several different geometric layouts for the unsignalized intersection. With the addition of site generated traffic, the Cate Street approach to the intersection increases in delay and degrades in levels of service (LOS) from LOS D to LOS F in the 2030 Build condition in both the weekday evening and Saturday midday peak hours. TEC notes that the condominium development under construction at 30 Cate Street will be widening the Cate Street approach to the intersection to provide an exclusive right turn lane as a condition of their approval. The analyses within the TISAS should be revised to reflect the eastbound right turn lane as constructed within the No Build and Build analyses. Further, constructing this lane should be removed as a recommended mitigation for the subject development.
15. The TISAS recommends maintaining the intersection geometry generally as existing, with the addition of an approach lane on Cate Street to provide a shared through/left turn lane and a right turn lane and provision of a northbound left turn lane along Bartlett Street. Of concern with maintaining this geometry is the sight distance for vehicles traveling north/westbound on Bartlett Street away from Islington Street. The distance between Cate Street and the railroad bridge over Bartlett Street is less than 100 feet, increasing the potential for rear-end accidents at the intersection should 1-2 vehicles queue to turn left into Cate Street. The addition of a left turn lane along northbound Bartlett Street to provide a short queue storage area can aid in relieving this safety concern. Realignment northbound Bartlett Street to become the through movement onto Cate Street (Alternative Configuration B within the TISAS) relocates the delay onto the Bartlett Street

southbound movement, but may allow for a safer intersection geometry and increased visibility for turning movements. This configuration would potentially have an added benefit of diverting more traffic from Bartlett Street north of Cate Street and removing additional through vehicles from the neighborhood. SGP should provide additional analyses and a recommendation based not only upon delay but considering safety issues and construction feasibility.

16. The remaining unsignalized intersections: US 1 Bypass / Site Driveway, Bartlett Street / Shared Driveway and Cate Street with the three site driveways will all operate with acceptable levels of service in the 2030 Build condition with the addition of site generated traffic.

Upon the receipt of additional, revised, and/or new documentation for the project, TEC reserves the right to provide additional comments as needed. If you have any questions regarding the peer review, please do not hesitate to contact us at (978) 794-1792. Thank you for your consideration.

Sincerely,
TEC, Inc.
"The **Engineering Corporation**"



Elizabeth Oltman, PE
Senior Traffic Engineer