FBA INC
STRUCTURAL ENGINEERS

1675 Sabre Street
Hayward, CA 94507
510-265-1828

July 17, 2019

Mr. Doug Ross
SC River Front, LLC
P.O. Box 377
Santa Cruz, CA 95061

Re: **418 and 428 Front Street / Riverfront Apartments**
Santa Cruz, CA

Sub: Response to EIR consultant, Item 1, 2 & 3

Dear Mr. Ross,

Per your request, please find herein our response to the EIR consultant regarding the demolition of the two above referenced buildings:

Item 1, Preserve Buildings and Incorporate into Project Design:

This option allows the construction of a five story multiuse building over two level subterranean parking while preserving the existing two buildings while the construction is performed. Our professional opinion is that this option is neither feasible nor possible for the following reasons:

The multiuse project is supported by a two level cast in place structural concrete podium structure that extends one full level below grade at the front of the building and approximately 20 feet below grade at the back of the site. For all practical purposes, the footprints of the proposed improvement cover the entire site and will require earth shoring with either tie backs or internal bracing to accommodate the excavation of the site and the construction of the podium structure.

Based on the geotechnical investigation by TRC, the site is underlained by poor soil to a depth of 26 feet. This layer is supported by bedrock of the Purisima Formation. Design ground water level was judged to be five feet below existing grade level. The project site is in a highly active seismic zone with maximum mean peak ground acceleration of 0.5g. Due to the nature of the upper layer of soil at the site, the high ground water, and the potential ground acceleration in an event of a credible seismic event, the soil will have a very high potential to liquefy with total settlements due to liquefaction ranging from 5 to 9.75 inches. Additionally, due to the vicinity of the San Lorenzo river (100 feet to the east), the potential for lateral spreading would be moderate to high in localized areas due to the primary geotechnical concern noted herein (high ground water, settlement due to liquefaction). Based on these conditions and to support the proposed improvement, the soil at the site below the bottom of excavation will need to be improved through the introduction of rammed aggregate piers or stone columns to a depth of 30 feet below the bottom of the excavation. These 18" to 24" diameter elements will need to be spaced 5 to 7 feet on center in each direction. A mat foundation will rest over the improved soil and will provide the support for the structure and will act

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as the base for "the boat" to resist the effects of the hydrostatic pressure caused by the high ground water with the basement walls acting as the sides since permanent dewatering of the site is not an option.

In summary, the new improvement will require the placement of earth shoring, the excavation of about 30,000 cubic yard of soil, and the introduction of hundreds of soil improvement elements 18" to 24" in diameter, 30 feet below the bottom of the excavation spaced 5 to 7 feet on center to support a 36" concrete mat as the foundation for the structure at the same time while providing a temporary de-watering system to allow for working conditions at the site.

The existing two structures are on grade with perimeter concrete or CMU walls, a light roof, and a non structural slab on grade making the flooring. Supporting such structures temporarily while shoring, excavating, improving the soil, and building the podium structures is impossible and no similar endeavor has been attempted in the San Francisco Bay Area as far as we know. The only way, to preserve the existing structures in this case is to disassemble them (more about that in item 3) and then to re-erect them once the podium is built.

Item 2, Partial Preservation of Existing Structures:

This option entails the disassembly of certain elements of the structures, most likely the facades and then to put said elements back in place and incorporate them into the new building.

The facades of the existing buildings are made of various elements that have been altered over time with concrete and/or CMU being part of these elements. This item requires the bracing of the facades, the removal of the roof structures (since they are fully or partially supported by the walls), the disassembly of the walls into 8 to 10 feet wide elements, the off haul of the elements for offsite storage, and the re-assembly of all the elements to their original form and incorporate them into the new building once the podium structure is built. This will also require the strengthening of these elements to meet current codes (which entails the placement of a gunnite/shotcrete wall on the inside face of the façade that would serve as a support structure to stitch the various 8 to 10 feet elements. In our professional opinion, this process can be accomplished. We recommend that this option be priced to determine its impact on the project overall viability and feasibility.

Item 3, Relocate Structures:

This option entails, the vertical shoring and bracing of the structures roofs and walls, the removal of existing roofing material, the salvaging of roofs beams, purlins, trusses, and interior columns/supports, the disassembly of all perimeter walls into 8 to 10 feet sections and to off haul to the new site. Floor slabs, non structural partition walls, and existing foundation will be demolished and recycled. A new foundation and floor slab will be built at the new site, and all salvaged elements will be reassembled to bring the buildings to their original forms as close as possible while upgrading the buildings to standards that are acceptable to the local building official.

While this option is theoretically possible, we don't believe that it is economically and logistically feasible due to the nature of the existing structures (size, material used, and type of construction). Our preliminary estimates to disassemble, move, re-assemble, and bring to near current standard will be an eight figure cost number (not including the price of land).

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Limitations

The evaluations and conclusions provided in this correspondence are based on documents supplied, the best information currently available, and our experience on podium projects with similar conditions. If additional data become available or are generated, indicating conditions different than those observed and described by this report, our firm should be notified so that any necessary modifications may be made to our conclusion.

Sincerely,

FBA, Inc.
Structural Engineers

Walid Naja, SE
Principal