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September 14, 2026

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Scott:

Subject: Residential Development at 1450 Beason St, Baltimore
HCEA Job Number AJT250454A

Introduction

I evaluated the potential effects of the proposed development on the existing townhomes across from the site in the Locust Point neighborhood of Baltimore, Maryland. The approximately 8-acre site is proposed for residential townhome development. The new townhomes will be slab-on-grade structures without basements.

A preliminary geotechnical investigation performed in September 2025 encountered deep deposits of sedimentary clayey sand and sandy clay. Rock was not encountered within the maximum explored depth of 50 feet.

The adjacent townhomes were constructed circa 1880s and consist primarily of wood-framed and brick-masonry construction. Using the current building setbacks the new foundations will be a minimum of 40 feet from the existing foundations. The existing structures appear to contain basements. Because of their age and construction, the evaluation considered two potential mechanisms by which the proposed development could affect these townhomes:

- Ground vibration generated by construction equipment
- Static stress imposed by the completed structures

Construction Vibration

The proposed townhomes will be supported on conventional spread footings bearing on approved natural soils or properly placed and certified compacted fill. Driven piles, drilled foundations, blasting, and other high-energy foundation-construction methods are not anticipated.

The principal potential source of construction vibration will therefore be the compaction of existing soils and structural fill. For purposes of this evaluation, vibrations were estimated conservatively using a typical 20-ton vibratory smooth-drum roller. As shown on Figure 1, the estimated peak particle velocity at the adjacent townhomes is approximately 0.10 inch per second.

The U.S. Bureau of Mines criteria, supplemented by commonly applied construction-vibration limits, provide the following reference values:

- Older residential structures with plaster finishes: 0.20 inch per second
- Modern residential structures with drywall finishes: 0.30 inch per second
- Engineered concrete or masonry structures: 0.50 inch per second

The predicted PPV of approximately 0.10 inch per second is only 50 percent of the conservative 0.20-inch-per-second criterion applicable to older residential construction. Accordingly, vibrations generated by the anticipated earthwork and compaction equipment are not expected to cause cracking, structural distress, or other vibration-related damage to the existing townhomes.

Static Foundation Loading

Potential stress transfer from the proposed foundations to the existing townhomes was evaluated using the Boussinesq elastic-stress relationships presented in the U.S. Department of the Navy Design Manual DM-7.

The analysis conservatively modeled, for the new construction, a uniformly loaded, 2-foot-wide continuous strip footing bearing 2.5 feet below grade and applying a net bearing pressure of 2,000 pounds per square foot. The existing footings were modeled at a depth of 6 feet below grade and approximately 40 feet horizontally from the proposed footing.

As shown on Figure 2a, the calculated increase in vertical stress at the base of the existing footing is approximately 0.042 psf. This represents approximately 0.0021 percent of the applied footing pressure. The transferred stress is several orders of magnitude below the proposed bearing pressure and is too small to produce measurable settlement or materially affect the performance of the existing foundation.

Lateral Foundation-Wall Pressure

The potential increase in lateral pressure against the existing basement foundation walls was also evaluated using the Boussinesq stress relationships. As shown on Figure 2b, the calculated maximum incremental lateral pressure is approximately 0.0421 psf using the conservative parameters adopted for the analysis.

This pressure is negligible relative to customary soil pressures and structural design loads acting on basement walls. It will not materially increase lateral loading on the existing foundations or affect their structural performance.

Conclusion

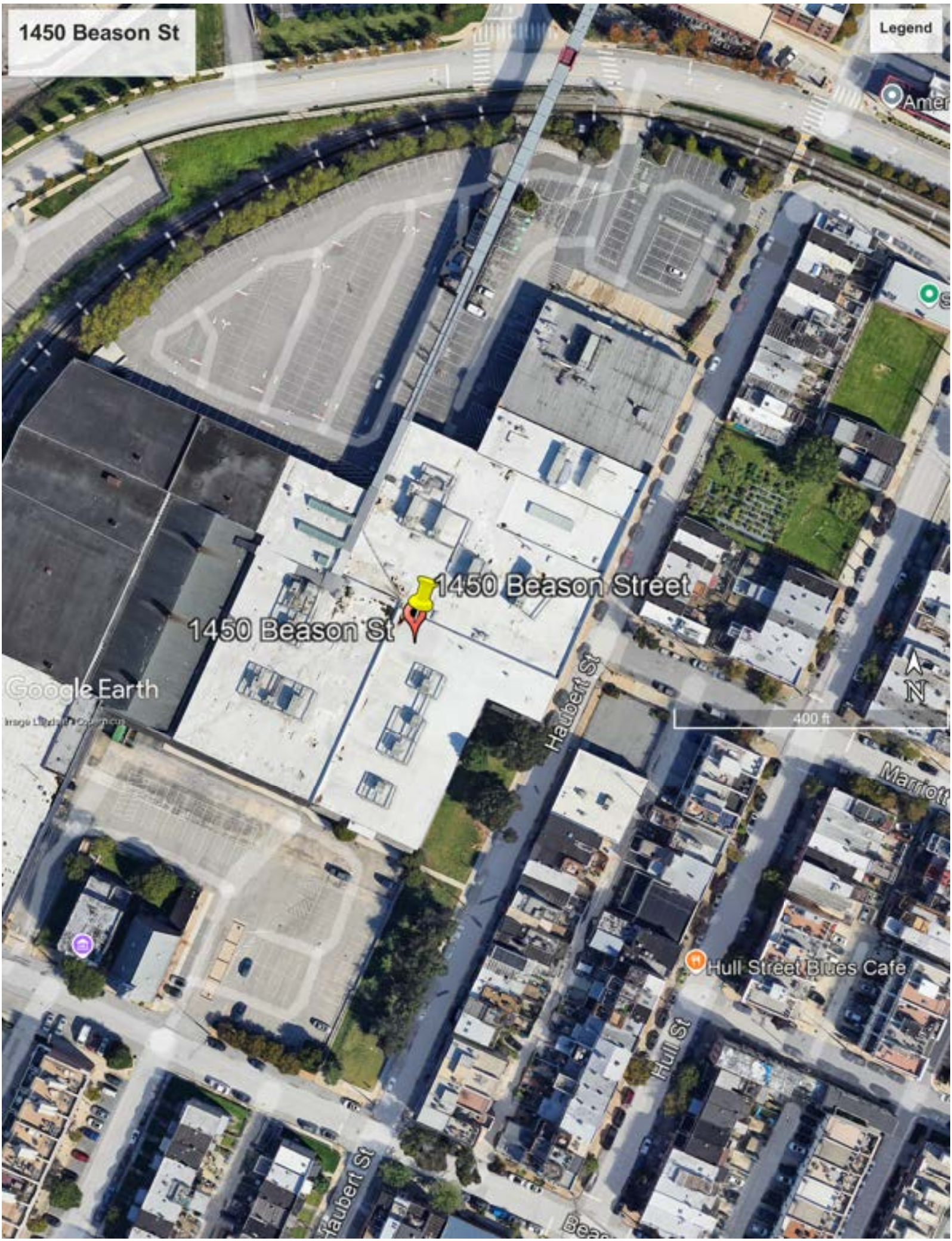
Based on the subsurface conditions encountered by the preliminary geotechnical investigation, the proposed shallow foundation system, anticipated construction methods, separation between the proposed and existing foundations, calculated stress distribution, and estimated construction-vibration levels, it is my professional engineering opinion that the proposed development will not adversely affect the adjacent townhomes.

The predicted construction vibration is below the conservative criterion applicable to older residential structures. The calculated vertical and lateral stress increases at the existing foundations are negligible and are insufficient to cause measurable settlement, foundation movement, cracking, or structural distress.

Provided that construction is performed substantially as described, using accepted earthwork practices and without driven piles, blasting, or unanticipated deep excavation adjacent to the existing structures, no adverse structural or foundation-related effects to the adjacent townhomes are anticipated as a result of the proposed development.

Very truly yours,
Hillis-Carnes Engineering Associates, Inc.

William M. Carnes, P.E.
Principal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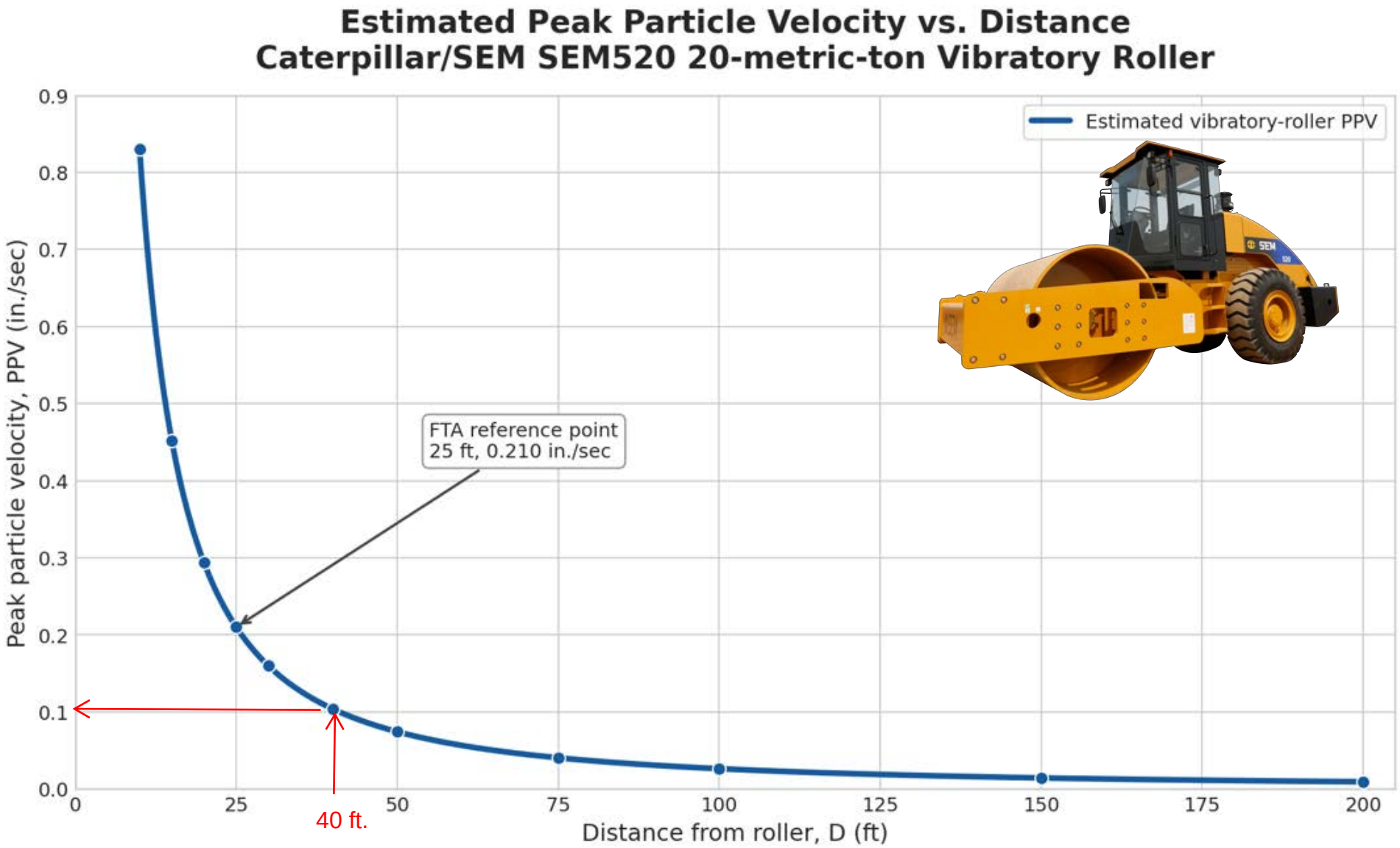
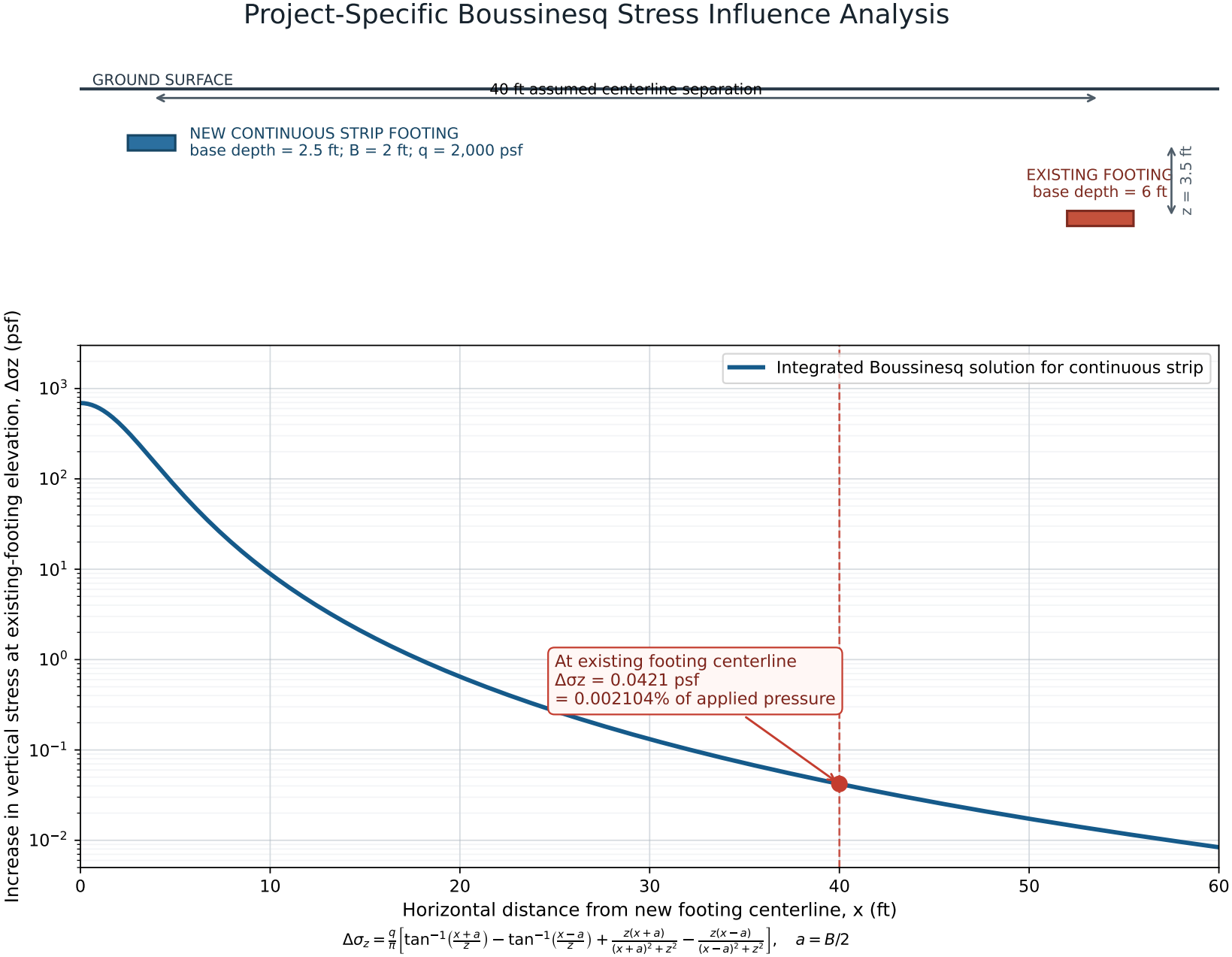


Screening equation: $PPV = 0.210(25/D)^{1.5}$ | Estimate only; field PPV depends on soil, lift, amplitude, speed, and coupling.

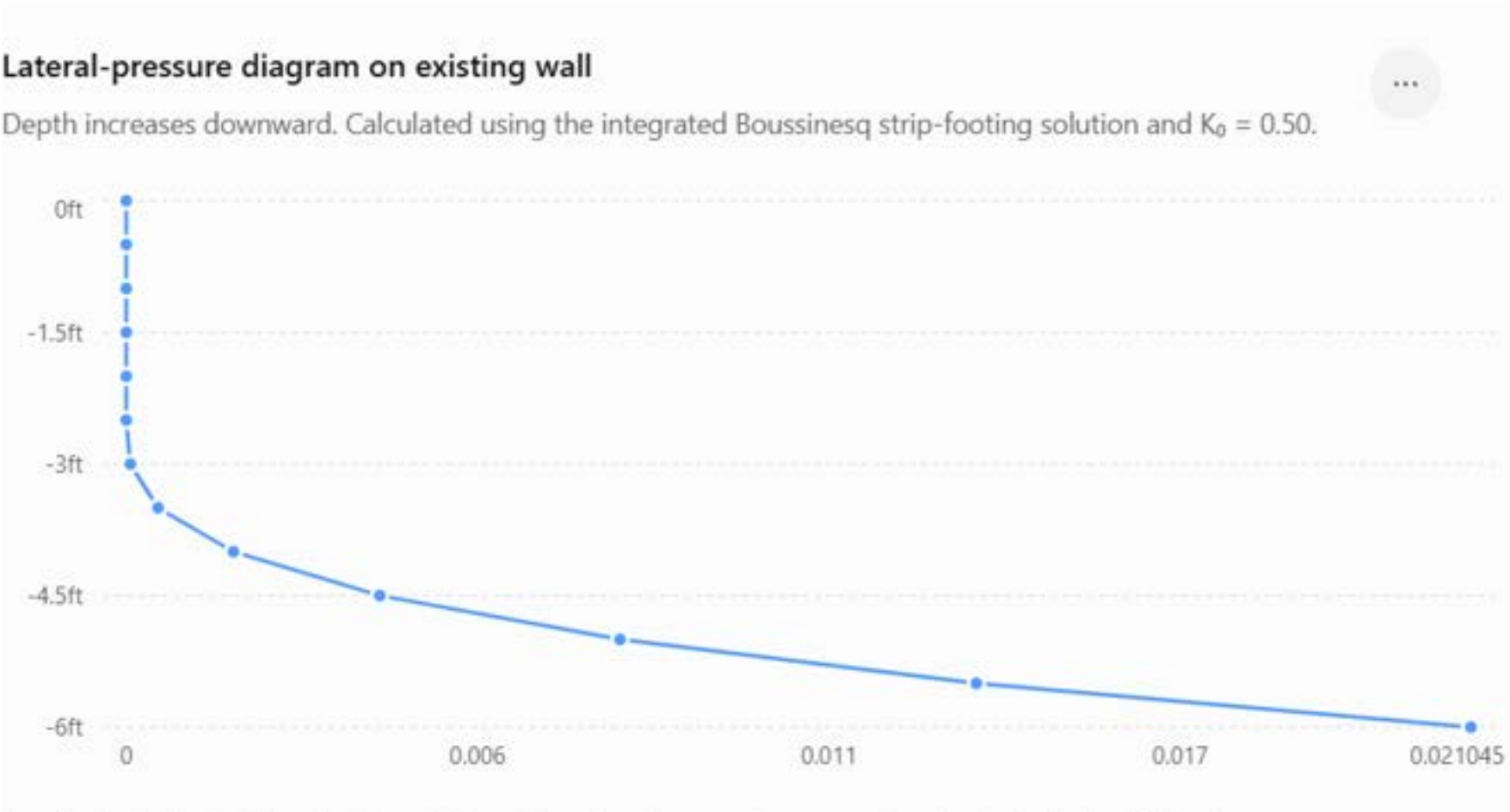
SEM520 nominal specifications: 20,000 kg; 30/28 Hz; 2/1 mm amplitude; 360/208 kN excitation force.

Table 1 Effects of Compaction



RESULT: For q = 2,000 psf, B = 2 ft, x = 40 ft, and z = 3.5 ft, Δσz = 0.0421 psf (0.002104% of q). The calculated stress increase at the existing footing is negligible.

Table 2a: Vertical Load on Existing Wall



New footing load plane is at elevation -2.5 ft; maximum lateral-pressure at the existing wall is 0.0210 psf which is negligable

Table 2b: Lateral load on Existing Wall