

5.13 VIBRATION

5.13.1 Introduction

This Section describes the potential for construction of the water mains to result in vibration impacts. The methodology used to prepare this Section is described in Section 3.12, “Vibration,” in Chapter 3, “Impact Methodologies.” Only a screening level assessment is provided because the equipment that would be used does not produce high levels of vibration and is used extensively throughout New York City. Therefore, “Existing Conditions” and “Future Conditions Without the Project” are not presented.

5.13.2 Future Conditions With the Project

Construction

The equipment used for the water main construction with the highest vibration levels would be soil compactors, jackhammers and trucks. Construction would result in varying degrees of ground-borne vibration, depending on the stage of construction, the equipment and construction methods employed, and the distance from the construction to vibration-sensitive receptors.

Typical vibration levels for proposed equipment at the water main construction locations are shown in Table 5.13-1. Note that values provided for large bulldozer are representative of those for the proposed soil compactor. The values provided in the table are representative values based on the literature. Actual vibration levels are dependent on construction procedures, soil and geological conditions, and receptor foundation and construction type.

Because construction activities would likely occur in the streetbed abutting the sidewalk, the distance from water main construction activities to the closest sensitive receptor under most construction scenarios will be the sidewalk width (see below). There is a potential that 5 feet of the sidewalk along First Avenue could be utilized under one of the potential construction scenarios—Scenario A (see Sections 5.9, “Traffic and Parking,” and 5.10, “Transit and Pedestrians”). In addition, up to 2 feet of sidewalk may be used during construction along E. 55th and 56th Streets. The sidewalk widths (from the curb to the building) along either the First Avenue route, the Sutton Place route, or the E. 59th Street/E. 61st Street route are as follows:

- First Avenue—15 feet (10 feet if 5 feet of sidewalk is used for construction)
- E. 55th Street, 56th Street, 59th Street, 61st Street—13 feet (11 feet if 2 feet of sidewalk is used for construction)
- Sutton Place—19-21 feet

**Table 5.13-1
Typical Levels of Vibration for Construction Equipment
Similar to that Proposed for Water Main Construction**

Construction Activity	PPV at 25 feet (ips)	PPV at 15 feet (ips)	PPV at 10 feet (ips)
Large Bulldozer	0.089	0.19	0.35
Loaded Trucks	0.076	0.16	0.30
Jack Hammer	0.035	0.08	0.14
Sources:	Federal Transit Administration (FTA), <i>Transit Noise and Vibration Impact Assessment</i> , April 1995.		
Notes:	PPV at 25 feet are based on FTA 1995. To calculate PPV at other distances, the following equation (FTA 1995) was used: PPV at Distance D = PPV (at 25 ft) * [(25/D)^1.5]		

As indicated in Table 5.13-1, peak particle velocity (PPV) levels induced by construction equipment at residential and other buildings along the water main route would be well below the 2.0 inches per second (ips) threshold to avoid structural damage and below the 0.5 ips threshold to protect more fragile structures or against cosmetic/architectural damage. During water main construction, equipment is generally situated in a linear fashion in a narrow trench and therefore multiple pieces of equipment would not be expected to be at the same distance from any given receptor at the same time. Some of the construction for the water main would overlap with construction of the shaft. Since the water main work does not involve blasting, and the distances between the equipment would be relatively far apart, the combined effects of more than one piece of machinery operating would not change the results of this assessment. The contractor will be required to have a vibration monitoring program in place.

As discussed in Section 5.5, “Historic Resources,” the E. 59th Street/E. 61st Street route would pass through a historic district between Second and Third Avenues, the Treadwell Farm Historic District, which straddles both sides of E. 61st Street. NYCDDC would consult with the New York City Landmarks Preservation Commission (NYCLPC) regarding the proposed construction in the Historic District to avoid any adverse impacts on this historic resource. There is the potential that, at times, vibration effects would reach levels that would be annoying to residents in nearby buildings. However, since many residential buildings along the water main routes contain ground floor commercial uses, vibration levels are likely to be lower on the second floor and above, depending on building construction. Lastly, much of the vibration-causing construction equipment such as soil compactors and jackhammers, among others, would be used on an intermittent basis during the construction period.

At locations where pavement breaking (with the use of jackhammers) is required, deep saw cuts would be made first. These saw cuts would minimize the transmission of vibrations from pavement-breaking operations to the foundations of nearby structures.

Overall, the effects of the water main construction are not unlike the effects from other major construction in Manhattan that involves the use of heavy construction in close proximity to sensitive receptors. Use of compactors, jackhammers and heavy trucks are typical activities that occur throughout the City. On any given block, construction would generally last 12 weeks for the street segment and another 10 weeks for each intersection. (Construction on one or two blocks for each of the alternative water main routes could last a few weeks longer; see Section 5.1, Project Description,” for more details on these durations). Lastly, much of the vibration-causing construction equipment such as soil compactors and jackhammers, among others, would be used on an intermittent basis during this construction period. These activities would be short-term and temporary in nature. The contractor will be required to have a vibration monitoring program. As discussed in Section 4.13, vibration levels during shaft construction may, at times, occur at levels that would be likely to cause annoyance to residents and other sensitive receptors in the immediate vicinity of the site. These potential impacts are considered short-term and temporary in nature, and the contractor will be required to have a vibration control plan and monitoring program in place during all construction activities. Therefore, no potential significant adverse vibration impacts would be anticipated to occur from construction of Shaft 33B and its water main connections from the preferred Shaft Site.

Operation

None of the activities associated with the activation or operation of the water main would cause potential vibration impacts, as there would be no significant vibration-causing machinery associated with these activities. Therefore, no potential significant adverse impacts are anticipated to occur.

