



MWRA's Metropolitan Water Tunnel Program

Potential Noise, Vibration, and Air Quality Impacts

Fact Sheet

Through the Metropolitan Water Tunnel Program, the Massachusetts Water Resources Authority (MWRA) will construct two new water supply tunnels that will allow our aging existing water tunnel system to be rehabilitated without interrupting service. Implementing the Program will require construction of deep shafts, rock tunnels, and near surface valve vaults, and pipeline connection facilities.

Most of the construction will take place below the ground surface, as the tunnel boring machine (TBM) excavates through rock up to 400 feet underground. However, several shafts will connect the tunnel to the surface:

- **Launching and receiving shafts**, which will allow the TBM to enter and exit the tunnel; and,
- **Connection shafts**, which will provide important connections from the new tunnels to our existing water transmission system and to the local communities that we serve.

Program construction is estimated to take approximately 8 to 12 years and is planned to occur in the 2027 to 2040 timeframe. MWRA expects that the proposed new deep-rock tunnel system will be placed into service by or around 2040 and that the system will have a useful life of more than 100 years. As part of the Environmental Impact Review (EIR) process, MWRA evaluated potential impacts from noise, vibration, and air quality effects that may occur during or after construction. This *Fact Sheet* describes the potential noise, vibration, and air quality impacts during construction of the Program. No noise, vibration, or air quality impacts are expected after construction during operation of the Program's facilities.

What noise impacts might occur?

Any noticeable increase in noise would take place during construction. Most of the construction will take place underground, although some above-ground construction activities at the launching, receiving, and connection shaft sites will involve equipment such as excavators, cranes, bulldozers, front-end loaders, and air compressors. The above-ground construction will take place at sites in Waltham, Weston, Wellesley, Needham, Brookline, and Boston. These municipalities have ordinances related to the hours of construction and allowable noise limits, which will be followed by the Program to the maximum extent possible.

Construction would occur over three work shifts at **launching shaft sites** during certain phases of construction, such as shaft excavation, TBM launching, TBM excavation, and tunnel concrete lining. The third-shift (midnight to early morning) activities would be limited to only staging and organization. The construction at the **connection shaft sites** will be much less active, with many of the activities limited to smaller equipment and limited durations. Truck traffic will increase along specific routes to and from each site; however, the additional traffic due to construction activities from equipment and vehicles entering and leaving sites would not substantially increase existing traffic noise conditions. (See the *Traffic Impacts Fact Sheet* for more information about construction-related traffic.)



Example of shaft construction activity

Existing noise conditions were measured at sensitive receptors (generally residences, churches, and schools), and near each of the shaft sites to understand the current noise conditions. Based on noise modeling of construction activities, anticipated construction noise levels would not exceed state and federal nighttime noise limits, except in a few limited instances where receptors are located near a construction site. After construction, there would be no operational noise generated by the valve chambers and shaft structures. Maintenance of these sites include mowing the grassed areas and plowing snow from the driveways, which would not result in any significant noise impact.

What vibration impacts might occur?

In the EIR process, vibration is evaluated in terms of potential damage from construction activities to existing structures such as buildings and other infrastructure, potential human annoyance inside buildings in office or residential settings, and potential effects on vibration-sensitive equipment or operations in nearby buildings. The vibration thresholds for structural damage are substantially higher than the thresholds for human perception in office or residential spaces. The thresholds for vibration-sensitive equipment or operations (for example, microscopes or surgical rooms in hospitals) are lower than the thresholds for human perception.

For the Program, the focus is on ground-borne vibration that may be associated with construction period impacts. Vibration can occur with construction activities such as pile driving, drilling, TBM excavation, and drill and blast excavation. Vibration levels from TBM operations underground are generally low compared to typical construction activities from trucks, excavators, and other equipment typically used at the shaft sites. Drilling or blasting needed for the shaft construction would generate the most vibration, but would be mitigated. MWRA will conduct a Blast Analysis and prepare a Blast Design Plan prior to any blasting activities taking place. These documents establish the precautions that would be taken to prevent potential damage due to vibrations. Also, blasting will not occur at all sites.



Example of tunnel boring machine cutting head

Vibration-sensitive receptors near the launching, receiving, and connection shaft sites include residences, a laboratory building, churches, and schools. Major activities such as pile driving and drill and blast at **launching and receiving shaft sites** would be the most likely sources for potential vibration impacts. Those activities would typically only occur during the day to minimize the potential for impact and would be conducted at low enough levels or far enough away from buildings and structures to minimize the risk of structural damage. Blasting is not anticipated to occur at the **connection shaft sites** and therefore no impacts from blasting are anticipated. MWRA will monitor for vibration around sensitive buildings during construction.

What air quality impacts might occur?

Air quality is the term typically used to refer to the level of pollutants in the air. Good air quality is beneficial for humans, animals, and vegetation. Poor air quality occurs when emissions increase concentrations of air pollutants above thresholds determined to cause impact on human health or the environment. The EIR assessed air pollutants and determined that no pollutant thresholds would be exceeded during construction or once the tunnel system is in operation. Greenhouse gases (GHG) include several air pollutants, such as carbon dioxide, methane, hydrofluorocarbons, and perfluorocarbons. There are no thresholds for identifying GHG impacts on human health.

The majority of air and GHG emissions that would be related to the Program are associated with construction-period activities. MWRA estimated the anticipated number of trucks and all fossil-fuel burning construction equipment to be used during the construction period, and evaluated the potential emissions. Emissions are not expected to be significant and will generally occur from a variety of geographically diverse sites, limiting any potential health impacts.

Between each launching and receiving site, a TBM would be used to excavate the deep-rock tunnel. It is anticipated that most of the tunnel boring equipment would be electrified to reduce emissions in the tunnel. Above-ground, most construction equipment and vehicles accessing and leaving the launching and receiving sites during excavation activities would be dump trucks for excavated material disposal from the tunnel. During the tunnel lining installation, the majority of construction vehicles would be concrete trucks.

After construction, it is expected that the Program will have minimal air and GHG emissions. During operations, activities at the sites would include minor operational and maintenance tasks, such as mowing and plowing, which may have minimal emissions. The underground chambers would have minimal air or GHG emissions as well. There would be no permanent fossil-fueled sources of emissions at any of the finished sites.

Impact Management Commitments

MWRA is committed to working with the community to manage any impacts related to the Program. The Program is intended to benefit the community by ensuring a resilient and reliable water system into the future with minimal noise, vibration, and air quality impacts during construction. Specific details for mitigation of impacts will be developed in the final design process. No long-term noise, air quality, or vibration impacts are expected after construction is complete.



For more information about the Metropolitan Water Tunnel Program please visit www.mwra.com/mwtp.html or contact our Communications Team at tunnels.info@mwra.com.

