

# Metro Purple Line Extension

*Construction Fact Sheet*



**Metro**<sup>®</sup>

## **BUILDING THE STATIONS** *Construction at each station is estimated to take five to seven years.*

The station is a large box, about 800-1000 feet long and 70 feet wide. When completed, the box will accommodate:

- > The station platform at the lowest level of the box where people will board and exit trains;
- > About mid-way between the platform and the street level is the concourse level where ticketing machines are located;
- > At least one street-level station entrance;
- > At least one elevator, two escalators, and stairs between these levels;
- > Non-public spaces to accommodate station equipment and functions such as communications, power, ventilation, maintenance, etc.

Stations are generally 50-60 feet deep to allow easy passenger circulation from the station platform to the surface. When built under a street, they are constructed below temporary concrete decking that allows the street to continue to carry traffic. If located off-street, they can be built using an open excavation, similar to the construction of a building.

### 1

#### **SITE PREPARATION**

Preparing a site for station construction typically begins by protecting or relocating any underground utilities such as power lines, water lines, sewers, gas pipes, cable/telephone lines and storm drains.

#### **CLOSURES**

This will likely require temporary closures of portions of the street under which utilities are located and detouring traffic around the work site. Detours are often limited to weekends or non-peak periods.



## **CONSTRUCTING THE TUNNELS**

Tunnels are typically about 20 feet in diameter. There are two parallel tunnels separated by about 20 feet, one tunnel for train travel in each direction. Tunnels are generally about 50-70 feet deep, though they can be deeper between stations. Some portions of the tunnel alignments for the Purple Line Extension will be significantly deeper than this, up to about 130 feet.

#### **TUNNEL BORING MACHINES (TBMS)**

The twin tunnels between stations are constructed with TBMs that must be lowered into the ground by cranes through a large shaft referred to as the TBM launch site. These sites are typically located in a staging area near one or more of the station boxes. The TBMs proceed in parallel, tunneling at an average rate of 40 to 50 feet per day.



Initial street excavation for stations may require temporary lane or street closures. Constructing a station is a multi-step process.

## 2

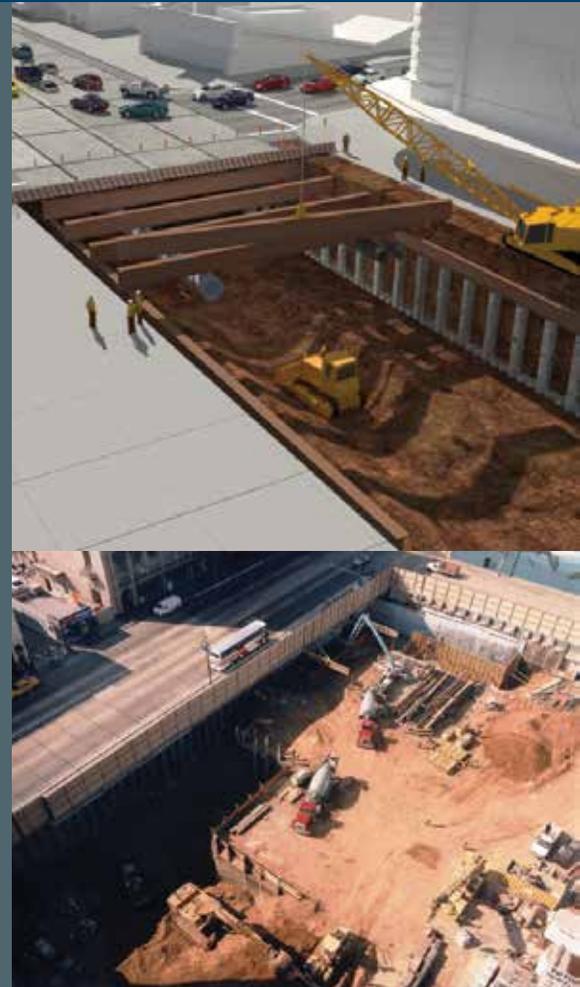
### INSTALL CONCRETE DECKING

The next step in the process is to install concrete decking that will serve as the temporary street surface, allowing traffic to continue to flow while construction continues underneath. Vertical support piles are installed along the edges of the street and steel beams are installed across the construction area atop these piles. Concrete decking is then installed in sections on top of the beams, flush with the street. The temporary decking is also designed to maintain access to sidewalks and driveways, wherever possible.

### CLOSURES

This initial street excavation and installation of the concrete decking requires temporary street closures. This typically occurs over a series of sequential weekends beginning after rush hour on Friday night, with the street reopening before rush hour on Monday morning. In some cases, communities may prefer to close the streets continuously to shorten the overall duration of this process. If the work can be accomplished by closing only a portion of the lanes, traffic will be accommodated in the remaining lanes. In some instances, the entire street may need to be closed for some period of time. If so, traffic will be temporarily diverted to parallel streets.

*AT RIGHT: Construction staging at Hollywood/Highland during construction of that station. Note traffic continuing to flow on Hollywood Bl.*



### PRESSURIZED-FACED TBMS

The cutting face and other aspects of TBMs are typically custom-made for each tunneling job, depending on the soil conditions that will be encountered. However, most urban tunneling around the world today utilizes what are known as pressurized-faced TBMs. These machines maintain the pressure in the surrounding ground, and precast concrete linings are installed as the machines progress. Most recently, Metro used pressurized-face TBMs on the 1.8 mile tunnel for the Metro Gold Line Eastside Extension and experienced no measurable surface subsidence or substantiated property damage claims. Another recent project utilizing pressurized-face TBMs is the City of Los Angeles' large diameter East Central Interceptor Sewer, which runs under portions of Exposition Bl.

### SPECIAL CONDITIONS

Different measures can be built into the tunnels along the way to accommodate special conditions. In areas with gassy or watery ground this could include secondary tunnel liners or gaskets, or enhanced ventilation systems. In areas where the tunnel may cross an earthquake fault, a wider tunnel may be excavated or flexible tunnel liners could be installed.



process and somewhat more complex if the station is being constructed under a street.

# 3

## EARTH REMOVAL

Once the concrete decking is in place, the traffic continues to flow above while station construction continues below.

The next steps involve removing the earth within the area that will eventually become the station box. At the same time, shoring is installed along the edges of the excavation to support the ground around the station box.



# 4

## INTERIOR STATION CONSTRUCTION

Once excavation is completed to the bottom of the station box, construction of the inside of the station begins.

The public areas of the subway stations also contain architectural design treatments and art work, information displays, lighting, signage, security monitoring devices and many other design elements.

# 5

## DECKING REMOVAL AND RESTORATION

One of the final steps in the process is the removal of the decking and restoration of the street. This can again be done at night and on weekends, or over a shorter period of time by closing the street continuously and rebuilding the street on top of the station box. When construction is finished, there is little evidence on the surface other than the station entrances.

## EXCAVATED MATERIAL

As the tunneling progresses, the excavated material is brought back to the TBM launch site through the tunnel using bins mounted on rail cars or a conveyor system. Alternately, some systems use a slurry transport method to remove soil to the surface. With a slurry system, excavated soil is mixed with a fluid so it can be pumped thru pipelines in the tunnel. Soil will then be separated from the fluid at the surface worksite. Once the tunneling between the stations is completed and the tunnel surface is finished, the tracks and electrical facilities can be installed.



## Background

Metro is getting ready to break ground on the first section of the long-awaited extension of the Purple Line subway to the Westside of Los Angeles. The full nine-mile project will bring fast, reliable mass transit to some of LA's busiest destinations including Miracle Mile, Beverly Hills, Century City and Westwood. Once the subway extension is complete, commuters will travel entirely below ground in just 25 minutes between downtown Los Angeles and Westwood. 49,000 people are projected to board the train at one of the seven new stations. Even more new transit riders will board the growing Metro Rail system in other places to travel into the Westside. The Extension will also provide Westsiders with easy access to many destinations across the region.

Extensive and thorough planning, analysis and environmental review for the project occurred from 2007 to 2012. In April and May 2012, the Metro Board of Directors approved the project and certified its Final Environmental Impact Statement/Report. The Federal Transit Administration then issued a Record of Decision for the project signifying the end of the federal environmental review process. These combined actions signify the conclusion of all environmental reviews and approvals required for the project to proceed.

Construction of the Purple Line Extension is projected to generate 52,500 jobs within the region and cost \$6.3 billion based on the three-phase funding schedule shown. Approximately three-fourths of those funds are coming from Measure R - the local half-cent sales tax approved by voters in 2008. Metro is seeking federal "New Starts" matching funds for the remainder.

## Construction Overview

There are two basic elements of subway construction – building the stations and their entrances, and building the tunnels running between the stations. Stations and tunnels are constructed in very different ways. Stations are constructed from the surface by excavating the area to be occupied by the station "box." Construction staging areas are usually located adjacent to station construction sites. Tunnels are bored completely below ground using the latest tunneling technology.

The greatest construction impacts will likely be generated by station construction and from the associated construction staging sites. Little disturbance on the surface is likely from the tunnel construction between the station areas. The Final EIS/EIR evaluated impacts associated with construction and proposed mitigations for these impacts.

This fact sheet provides an overview of the construction process for stations and tunnels, discusses construction staging areas and indicates possible construction impacts.

## Construction Staging Areas

While most of the construction activity takes place below ground, there is also the need for a significant amount of space at the surface to store materials and stage construction activities. It is preferable to utilize two staging areas directly adjacent to each station to allow access to the station construction area to expedite the process.

## Schedule

	Planned Schedule	Forecasted Schedule*	
	SECTION 1	SECTION 2	SECTION 3
Length	3.9 miles	2.6 miles	2.9 miles
New Stations	Wilshire/La Brea Wilshire/Fairfax Wilshire La Cienega	Wilshire/Rodeo Century City	Westwood/UCLA Westwood/VA Hospital
Pre-Construction Activities	Current–2014	2017-2018	2025-2027
Construction	2014-2023	2019-2026	2027-2035
Operations	2023	2026	2035

\* METRO IS PURSUING ALTERNATE FUNDING SCENARIOS THAT WOULD ACCELERATE SUBWAY CONSTRUCTION. THIS SCHEDULE WILL BE UPDATED AS NEW INFORMATION BECOMES AVAILABLE.

## Construction Staging Areas (continued)

The combined staging area at each station is typically about one to three acres in size. The larger areas are needed where the tunnel boring machines (TBMs) are launched and/or the earth from the tunneling process will be removed. At the earth removal locations, there will be areas to temporarily store the earth and potentially sort it for appropriate disposal, areas for off-street truck loading and unloading, and equipment/construction material storage. The staging areas may also include construction trailers for offices, workshops and some employee parking. Often, the construction staging area is also the site where the station entrance will be located.

The staging areas may be on property purchased by Metro or leased from private property owners for the construction period. Owners who retain ownership can then develop their property once subway construction is complete. Please see *Property Acquisition Fact Sheet* for more information.

## Construction Schedule

Current funding streams allow the project to be built in three phases, with the initial section to Wilshire/La Cienega planned to open in 2023. Under this three-phase scenario, the total project is forecast to cost \$6.3 billion based on the schedule shown on the prior page. About three-fourths of those funds are generated locally from Measure R, the half-cent sales tax approved by Los Angeles County voters in 2008. Metro is seeking the remainder in federal matching funds through the New Starts Program. Metro is pursuing alternate funding scenarios that could accelerate subway construction.

## Construction Impacts and Mitigations

Clearly, subway construction cannot be accomplished without impacts. Some of the impacts from subway construction could be:

- > Noise, dust, vibration or the visual appearance at construction sites;
- > Noise and vibration from below ground construction activities;
- > Traffic impacts from temporary street closures;
- > Impacts to merchants near construction sites; or
- > Traffic or other impacts from trucks hauling equipment to or dirt from construction sites.



The Final EIS/EIR for the Project provided information about how the subway will be built including impacts from the construction process. These include any potential impacts resulting from constructing the stations, station entrances, the use of construction staging locations, and the underground tunnels.

The Final EIS/EIR included mitigations to eliminate or reduce any of these impacts, such as:

- > Restrictions on days and hours of construction;
- > Identifying detours for any street closures;
- > Specifying truck haul routes;
- > Utilizing noise dampening and/or decorative fencing around construction sites; or
- > Assistance to area businesses, etc.

## Additional Information

More information about subway construction is available on our website: [metro.net/purplelineext](http://metro.net/purplelineext).

## How to Stay Involved and Give Input

Metro invites you to stay involved throughout the project. You can keep up with developments on our web site, [metro.net/purplelineext](http://metro.net/purplelineext), where you can find information as the work progresses, leave comments, and let us know how to contact you so we can keep you informed of upcoming meetings and other milestones.

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