

NEWBURYPORT/ROCKPORT LINE



GLOUCESTER Drawbridge Replacement Project

Introduction

The Gloucester Drawbridge carries the MBTA's Newburyport/Rockport Commuter Rail service over the Annisquam River in Gloucester. The existing bridge was built in 1911, reconstructed in 1932, and updated in 1984. Given the age and condition of the bridge, the MBTA slated it for replacement.

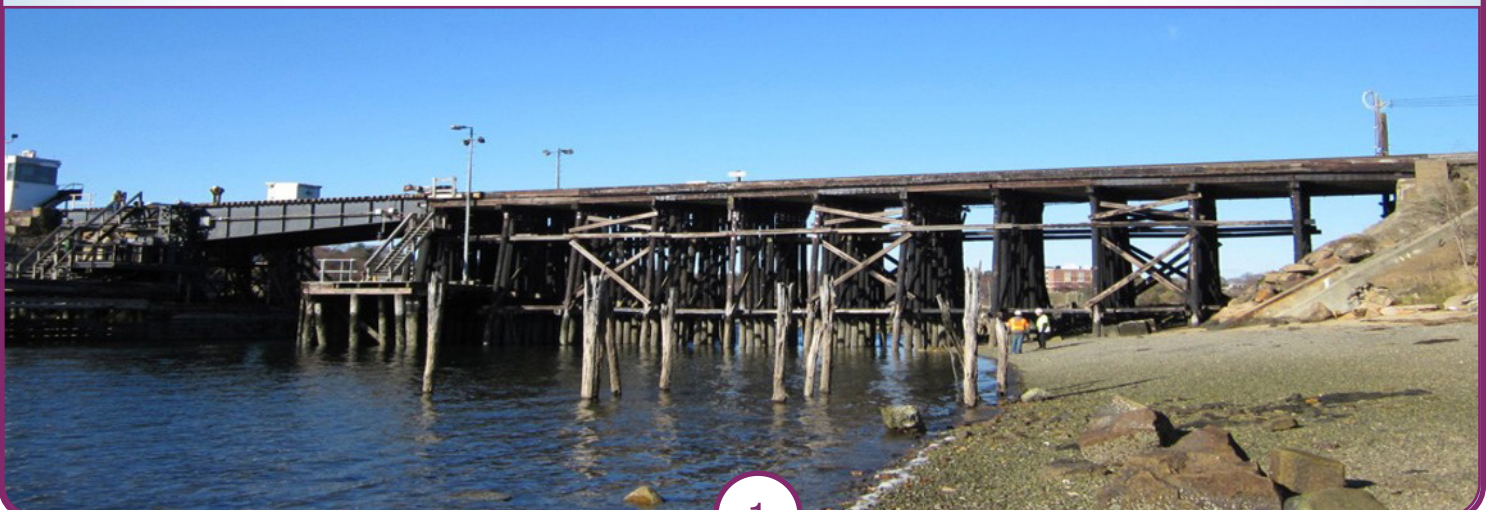
The original replacement plan called for keeping the bridge in service during construction, but the the 110-year-old bridge presented unexpected construction challenges. The MBTA suspended service across the bridge in April 2020 due to site conditions found as construction was underway. Free shuttle bus service connects riders from Rockport and Gloucester to service at the West Gloucester and Manchester Stations.

Top photo: rendering of completed bridge; below, the original drawbridge

What is a Bascule Bridge?

The Gloucester Drawbridge is described as a steel single leaf trunnion bascule drawbridge. A bascule bridge is a moveable bridge that opens to provide clearance for boat traffic. It uses a counterweight that continuously balances a span, or leaf, throughout its upward swing to provide the opening. The name comes from the French term for teeter totter, which employs the same principle. The original Gloucester bridge was a single leaf bridge with two tracks. It is one of the most common drawbridge types in the world since it opens quickly and requires little energy to operate.

The MBTA is replacing the two-track single leaf bascule with two new single track movable bridges. The updated construction plan is for the contractor to complete replacement of the southern barrel so it can open to train traffic in summer 2021. The northern barrel will be completed in 2022.



Construction Challenges

The MBTA developed a replacement plan for the Gloucester Drawbridge and advertised the project. It awarded a notice to proceed in November 2017 for a total project cost of \$100 million. Substantial completion was expected by summer 2022. Originally, the contract required maintaining Commuter Rail service during the staged bridge construction.

As construction began, MBTA and the contractor discovered unexpected issues, which are not unusual for a 110-year-old bridge. The northwest retaining wall was failing, threatening settlement of the slope and track. The bridge was operating safely, but in an abundance of caution, the MBTA suspended train service immediately. Additionally, excavation of the east abutment showed problems with the foundation, which affected the initial plan to employ single track operation during construction.

Given these and other concerns, the team developed a new approach to the construction project. Safety was the priority, both for the MBTA's Commuter Rail customers and for the construction workers on the project. Originally, the work would have continued

with train service still operating. Looking at the options, the MBTA and its contractor determined that the work needed to make the bridge safe enough to continue the construction would result in a two-year delay and as much as \$15 million in overruns due to technical risks and the condition of the aging bridge. Further, COVID-19 would add to the potential for significant delays.

Solutions

The project team turned to a solution that is frequently employed for rail projects, known as a service diversion. Stopping train service around the construction and providing full bus service gives the contractor unencumbered access to the site and mitigates the schedule risks and passenger inconvenience. A service diversion was successfully implemented for six weeks over summer 2019 as initial project demolition and testing were underway. Diversion typically adds about 15 minutes to the overall trip times.

In addition, during COVID-19, Commuter Rail ridership has dropped substantially. Fewer than 10

Operations

Idling

Because the Gloucester Drawbridge is out of service, trains cannot reach the Rockport Layover Facility, where they would usually idle between trips or for overnight storage. To avoid disruptions to residential neighborhoods along the right-of-way, the MBTA is holding idling trains in more remote areas of the line between service times to the extent possible.

Train engines idle between service for safety reasons. The train's brakes work on air pressure, which is provided by an onboard air compressor. If the engine is not running, the compressor is not producing air for the brakes. If the engine is shut down and air leaks from the compressor, the brakes might not work properly.

Turning

The Rockport trains are turning outside of West Gloucester Station to maintain train service to the shuttle buses that carry passengers to and from Gloucester and Rockport Stations. To accomplish

this, outbound trains must change direction to become inbound trains in the vicinity of the West Gloucester station. Turning requires about 15 minutes to execute.

To change direction, a train arrives on the outbound track and traverses the switch to the inbound track. Following the track change, the crew moves to the opposite end of the train for the trip into Boston. Once this process is completed, the train departs at the scheduled time. Federal Railroad Administration (FRA) regulations require Commuter Rail operators to use horns and bells when changing direction and when entering and leaving the station (the sound depends on the type of locomotive in use).

Once the first new bridge span and track are in place on the drawbridge (anticipated for summer 2021), trains will resume running all the way to Rockport and there will no longer be a need to turn outside West Gloucester Station. The MBTA and Keolis, which operates the Commuter Rail, are monitoring efforts to minimize disruption to residential neighborhoods.

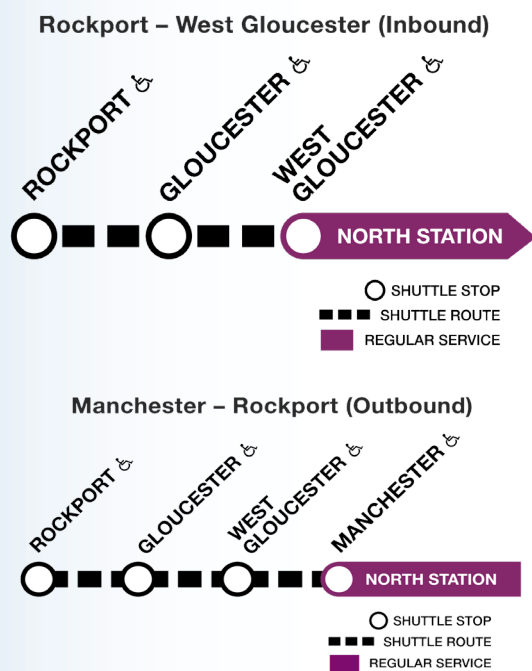
people per station are traveling during the morning and evening peak travel times. Given these factors, the MBTA began providing free bus shuttles to connect passengers from Gloucester and Rockport to inbound and outbound service. The plan provides sufficient bus service to maintain social distancing, with larger buses added when ridership increases.

Changes in the diversion schedule may be implemented during construction, depending on levels of service and other factors. Currently, daily shuttles run between Rockport and either West Gloucester or Manchester. Diversion schedules and information are available on the MBTA's website: mbta.com/diversions/newburyport-rockport-line.

With the diversion in place, the MBTA looked at the potential to address other issues along this section of the Rockport Line. They include:

- » Infrastructure improvements between Gloucester Station and Rockport Station
- » Operations improvements identified by MBTA's Maintenance of Way that can also take place, such as tie replacements
- » Maintenance activities undertaken by Keolis, such as tree limb trimming
- » Ability to advance and facilitate installation of the elements of Positive Train Control, known as PTC, a federal requirement for Commuter Rail systems to improve safety (see page 4).

These projects will also be working along the right-of-way while the bridge work is underway.



Environmental Considerations

The MBTA has standard construction operating procedures to protect sensitive environmental resources. Additionally, environmental permits for the project with local, state, and federal agencies require the contractor to deploy containment booms around the construction site to protect sensitive resources from construction-related debris. The contractor is required to monitor and report any unexpected incidents to these agencies and outline how they were addressed.

Project Benefits

What will Commuter Rail passengers experience when the Gloucester Drawbridge is complete? The new structure will include:

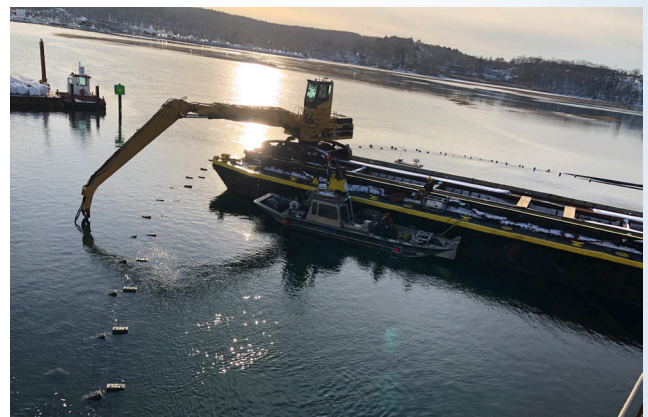
- » New side-by-side single track moveable bridges
- » An updated east approach trestle
- » A relocated Control Tower on the Gloucester Station side of the bridge

MBTA riders will see additional benefits:

- » Safer, more resilient, more reliable service on the Newburyport/Rockport line
- » Elimination of speed restriction on the bridge
- » A new bridge in a State of Good Repair
- » Reduced maintenance costs and service impacts
- » Improved right-of-way access for boats

Summary

The diversion approach has allowed the MBTA to implement construction alternatives to help mitigate project cost and schedule risks. The MBTA plans to return train service over the drawbridge in summer 2021. The MBTA appreciates its customers' patience as the work is completed and Commuter Rail service returns over the new bridge.



Cable conduit work being performed

Positive Train Control

The Rail Safety Improvement Act of 2008 requires every railroad across the country to have Positive Train Control, or PTC. PTC is a train monitoring system that alerts the engineer when it detects the possibility of either a train-to-train collision or a train that's moving too fast along the line or through a work zone. The MBTA's PTC system is also designed to prevent unexpected movement of trains through "open switches." The safety technology monitors a train's location, direction, and speed in real time. If the crew does not respond to an alert, PTC will take over and automatically stop the train.

The safety system works through signals and transponders along the rail corridor that transmit data to the train, onboard controls that can regulate a train's speed, and communications throughout the commuter rail network.

The revised construction plan for the Gloucester Drawbridge allows the PTC contractor to accelerate work on the terminal end of the Rockport Line.

To learn more about PTC please visit the website: mbta.com/projects/commuter-rail-positive-train-control-ptc.

Construction Photos



Removal of Bascule span framing



Bascule girder removal



Demolition of Pier 1 trunion tower

Contact Information

To view service alerts and sign up to receive email advisories and meeting notices, please visit the website: www.mbta.com/gloucesterdraw.

To reach the project team for questions and concerns related to the Gloucester Drawbridge Replacement, please email us at GloucesterDraw@MBTA.com.

Connect with MBTA for transportation news and updates!



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