

## Top Flange Trench Drain Assemblies Memphis International Airport Apron



Completed trench drain sections between the taxiway and apron of B Concourse.

### Job Site

Memphis International Airport

### Government Entity

Memphis-Shelby County Airport Authority

### Location

Memphis, Tennessee, USA

### Products

Top Flange Trench Drain Assemblies

### Overview

With a major modernization project planned for its passenger terminal facilities, the Memphis International Airport first needed to complete an extensive reconstruction of the airside aprons for arriving and departing aircraft. This reconstruction included a new stormwater management system with trench drainage components manufactured by EJ.

### Project Summary

The airport's apron work involved replacing an estimated 320,000 square yards of aging concrete pavement and installing significant amounts of upgraded infrastructure.

EJ supplied approximately 10,000 feet of linear trench drain assemblies for this multi-phase, multi-year construction project. Hinged hatch assemblies, manhole access assemblies, valve boxes and catch basin assemblies from EJ were also used.

After airport consulting engineers finished apron design plans, the initial construction of the trench drainage began in 2012 and finished in mid-2015. In meeting the design engineers' key requirements, the unique EJ



Image credit to Aerial Innovations of TN & KY, MSCAA, and Memphis International Airport

"EJ provided quality products for this project and was very helpful and responsive to any requests that we have had."

### Walter Pearson

Project Manager  
APAC Tennessee, Inc.

manufacturing capabilities and production logistics provided the most competitive pricing to the customer.

### Challenge

The airport's stormwater drainage is a gravity-flow system. Stormwater flows north one-quarter mile into Nonconnah Creek, which connects with McKellar Lake and the Mississippi River.

Because of this, the new trench drainage system was designed for two purposes: typical stormwater management and the containment/management of any fuel spills.

Additionally, the system will encounter heavier load demands in the future with the increased traffic of larger aircraft like the Airbus A380. Accommodation of these large planes is configured in the new terminal's design, which will allow unobstructed access to the gates for large aircraft.

## Solution

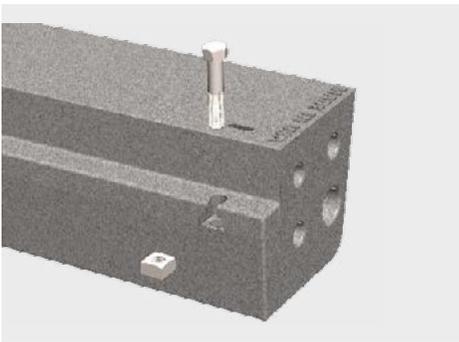
### Rated “airport extra heavy duty”

“We specified that aircraft-rated frame and grates be installed,” said Patrick Neal, Principal/Transportation Project Manager at Pickering, Inc., a Memphis-based consulting design-engineering firm. “The contractor selected a product according to the specifications, and we reviewed the submittals for compliance.”

EJ tests its airport castings at significantly higher loads than required by the American Association of State Highway Transportation Officials (AASHTO) — at 200,000 pounds versus 40,000 pounds.\* Because of this, the EJ trench grate assemblies are load rated as Airport Extra Heavy Duty.

The EJ linear trench drain assemblies also feature a top-flange design, which enhances the load-bearing capabilities of the trench system and provides a better interface with the concrete structure. The flange protects the structure’s edges, helping prevent structural failure beneath the trench frame.

Other attributes of the assemblies include vertical gussets with openings positioned to allow running of rebar through the top flange frame and tying the unit into the reinforcing steel.



All 6900 series frames utilize pockets for insertion of a replaceable threaded nut. EON LOCK® retains the nut when the grate is unbolted and allows the nut to be removed in the future should it require inspection or replacement.

### EJ

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### Continuous elevation changes

After removing massive amounts of old concrete, contractors began building reinforced-concrete trench structures (two feet wide and four feet deep). Onsite construction project management of the stormwater drainage system was overseen by APAC Tennessee, Inc., with installation performed by GCM, Inc., a local subcontractor.

On top of the trench, **EJ 6908 top flange trench grate bolted assemblies** were positioned in line to be poured integrally with the structure. The trench system was poured-in-place — approximately 10 linear feet at a time.

EJ assemblies were selected for this project because they allow for continuous, slight elevation changes during construction of the trench system, unlike alternative pre-formed trench components. Since the EJ drainage grate assemblies are placed in two-foot increments, their position can be continually realigned during installation — allowing the trench system to follow the apron area contours.

Vent slots are in the top of each EJ trench frame. The slots allow air to escape while concrete is being poured and provide a visual check for inspectors to verify whether concrete has flowed completely under the trench frame.

### EJ helped with troubleshooting

“An example of EJ customer service and support resulted from our realization that one of the specified end-piece frame components turned out to be unneeded in our case,” said Mike Morganthaler, Project Manager for APAC Tennessee. “As our contractor began installation of the trench grates and observed some potential concrete forming issues, EJ worked with us to delete the end frames from shipment quantities and provided guidance or troubleshooting to help us adjust our method of installing each drainage assembly.”

### EJ suggested more solutions

Airport consulting engineers configured a series of concrete firestops between each trench run. The sluice gates can be remotely activated and closed to prevent fuel from flowing into storm drains in the event of a spill.



## Memphis International Airport Overview

- First established in 1929
- 5,100-acre property
- Four runways, associated taxiways, aprons, hold pads and other safety-related protection zones
- Today, among the top 50 most active airports in the USA
- Approximately 3.4 million passengers annually
- Busiest air cargo airport in the USA (globally, a close second to Hong Kong)
- “Super Hub” for FedEx Express
- Considered America’s first true “Aerotropolis” (an airport-integrated region extending outward in strings and clusters of airport-linked businesses)
- Managed by Memphis-Shelby County Airport Authority
- Image credit to Aerial Innovations of TN & KY, MSCAA, and Memphis International Airport

To provide access to these sluice gates, EJ recommended its airport-rated hatch assemblies. Morganthaler said EJ was a valuable resource by suggesting the **8196 model hatch assemblies** as an access solution. The APAC team described the 30"x30" hinged hatches as ideal, due in part to their having the same design load rating as the trench grates and a similar flush mount profile (with both having top flange frames).

\*This load rating uses a testing method in AASHTO Specification M306 that requires castings intended for H-20 traffic to hold a 40,000-pound proof load for one minute, applied on a 9"x9" footprint in the center of the casting. For airport-rated product, EJ modifies the test by applying a much higher load of 200,000 pounds. In the opinion of EJ, this additional loading provides end users with the appropriate safety factor. Products that pass this load test receive an Airport Extra Heavy Duty rating from EJ.