

CASE STUDY

Providing Complex Overhaul Design For a Naval Dry Dock Facility

Since its opening in the early 1990s, the Trident Refit Facility Dry Dock at Naval Submarine Base Kings Bay had remained unchanged. A retrofit design was needed to provide crucial updates to the facility to meet mission requirements.



Challenge

The Trident Refit Facility Dry Dock at Naval Submarine Base (NSB) Kings Bay facility had not undergone any significant repair or update since beginning operations in the early 1990s. Composed of a reinforced concrete dry dock with a steel frame cover and roof, three bridge cranes and various support buildings, much of the existing equipment at the base had surpassed its normal design life.

After more than 25 years of service, base maintenance personnel were finding that parts for repair were often no longer available. A complete overhaul would be required to modernize the equipment and functionality of the facility in order to meet current and future mission requirements. This required redesigning and replacing complex systems such as electrical and power generation systems; compressed air production; mechanical utility distribution; communications; sanitary sewer and pump stations; potable and process water systems; and storm drainage systems.

Project Stats

Client

Naval Facilities Engineering Command, Southeast (NAVFAC SE)

Location

Naval Submarine Base, Kings Bay, Georgia

12

SUPPORT BUILDINGS UPDATED

900K+

SQUARE FEET 3D LASER-SCANNED

Solution

The dry dock process began shortly after Burns & McDonnell was awarded a contract to provide the majority of design disciplines, serving as the prime architecture and engineering contractor on a design-bid-build project.

A detailed study was conducted to develop the scope of the design project. The study included a description of each dry dock deficiency, including recommended corrective action and associated cost. The study scope also included 3D laser-scanning over 900,000 square feet of facility, including the superstructure roof, dry dock basin, utility tunnels, wet wells and other areas of the dry dock.

Complete construction documents and cost estimates were developed for civil, structural, mechanical, plumbing, electrical, telecommunications and fire protection engineering solutions by using Revit design software. Repairs for the dry dock project included its cover, infrastructure systems, utilities, steel and concrete caissons, and 12 support buildings.

To support dry dock personnel during construction, performance specifications were also developed for temporary facilities, including office and locker spaces, tool storage, clean room, towers and fixed fighting positions.

Additionally, the work included utility evaluation and select design accommodations to support the future Columbia class of submarines. This forward thinking aims to minimize future dry dock downtime while preparing for Columbia class at NSB Kings Bay.

Results

The final design documents incorporate various critical repairs and updates for the facility, including blast repairs and recoating structural steel; metal panel replacement; overhaul of electrical and mechanical systems, including substations, switchgear and pumping systems; provisions for new auxiliary seawater system with chemical treatment; steel and concrete caisson repairs; bridge crane repairs; environmental permitting; cybersecurity design; and repairs to support buildings.

As the project moved into the construction phase, on-site engineers served as construction administration support for the project. Additional on-site engineers were assigned for the duration of construction, as part of an ongoing effort to support NSB Kings Bay and NAVFAC SE as it updates its facility and continues delivering on its mission.

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