

MARRIOTT HOTEL AT PENN SQUARE & LANCASTER COUNTY CONVENTION CENTER

PROJECT INFORMATION

ARCHITECTURAL & SITE FEATURES

TOTAL AREA: 412,079 SF, 19 STORIES TALL
CONVENTION CENTER: 220,000 SF
MARRIOTT HOTEL: 300 ROOMS
TOTAL COST: \$170 MILLION

DESIGN & CONSTRUCTION FEATURES

HISTORICAL

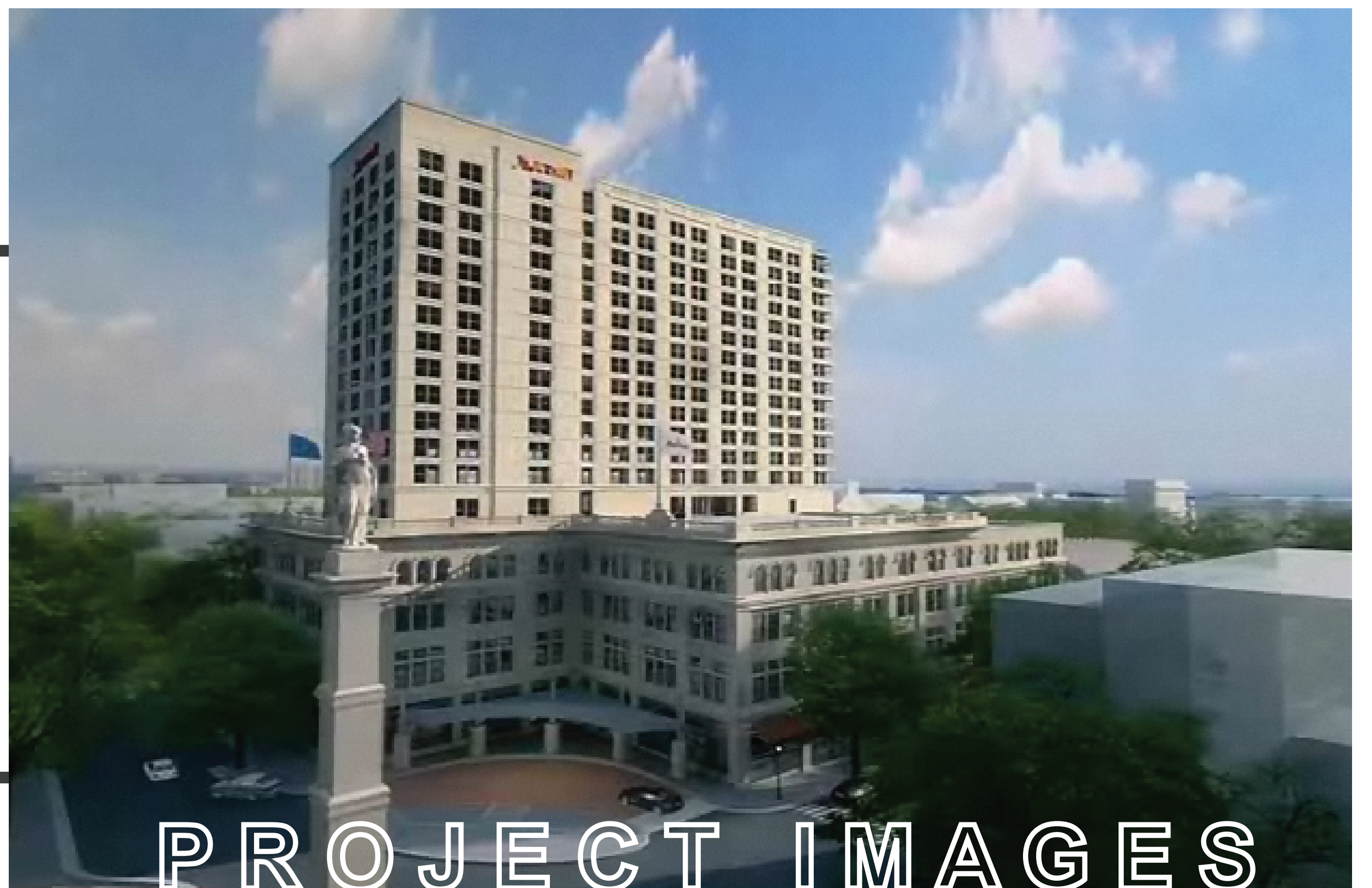
FACADE STABILIZATION AND RESTORATION OF THE 109 YEAR OLD WATT & SHAND BUILDING

CONSTRUCTION

PHASE 1: SITE PREP: MAY 2006 - OCT 2006
PHASE 2: CONSTRUCTION: OCT 2006 - DEC 2008

STRUCTURAL

200 CAISSONS USED FOR THE FOUNDATION VARYING IN SIZE UP TO 90" DIAMETER
CAST IN PLACE POST-TENSIONED CONCRETE STRUCTURE
153' BOW STRING METAL TRUSSES SPAN THE LARGE CONVENTION CENTER FLOOR



PROJECT IMAGES

THESIS RESEARCH & RESULTS

0 PROBLEM STATEMENT

NATURAL SPRING ENCOUNTERED: AN UNDERGROUND SPRING WAS ENCOUNTERED DURING EXCAVATION IN THE MUSEUM LEVEL. THIS DIRECTLY AFFECTED THE ABILITY TO PLACE THE MUSEUM LEVEL SOG AND THUS PROCEED WITH THE CONSTRUCTION OF THE CONCRETE SUPER-STRUCTURE

FACADE ISSUES: THE EXISTING 109 YEAR OLD WATT & SHAND FACADE WAS DISCOVERED TO BE NEITHER STRAIGHT NOR PLUMB DURING CONSTRUCTION, CAUSING THREE MONTHS OF REDESIGN / REVISION WORK TO RECTIFY THE PROBLEM

1 LASER SCANNING RESEARCH

IMPLEMENT LASER SCANNING TECHNOLOGY: THROUGH IMPLEMENTING LASER SCANNING TECHNOLOGY IMMEDIATELY AFTER DEMOLITION OF THE BUILDING INTERIOR, THE THREE MONTHS OF REDESIGN WORK COULD HAVE BEEN AVOIDED. WHILE LASER SCANNING COST AN ADDITIONAL \$27,000 OVER THE TRADITIONAL SURVEYING UTILIZED, IT WOULD HAVE SAVED THE \$40,000 OF CHANGE ORDERS RESULTING FROM THE REDESIGN.

2 GROUNDWATER SYSTEM REDESIGN

PERMANENT DEWATERING SYSTEM: THE EXISTING DUPLEX 120 GPM SYSTEM WITH 4" AND 6" UNDERSLAB DRAINAGE HAS BEEN INCREASED TO A TRIPLEX 1020 GPM SYSTEM WITH 6" AND 10" UNDERSLAB DRAINAGE TO ACCOUNT FOR THE ADDITIONAL WATERFLOW REQUIREMENTS. THE REDESIGN RESULTS IN AN ADDITIONAL PLUMBING COST OF \$74,050.

3 MINIPILE RESEARCH

MINIPILE FOUNDATION SYSTEM: GIVEN THE KARST TOPOGRAPHY OF CENTRAL PENNSYLVANIA, MEETING THE INTACT ROCK REQUIREMENTS FOR CAISSONS PROVED DIFFICULT. TWO 8", 300 K, MINIPILES WERE DESIGNED TO REPLACE THE 36" DIAMETER CAISSONS FOR THE PROJECT. THIS RESULTED IN AN ADDITIONAL COST OF \$382,020 (+35%), THOUGH SAVING THE 16 WEEKS FOR FOUNDATION CONSTRUCTION.

4 STRUCTURAL REDESIGN

CONVENTION CENTER REDESIGN: THE STRUCTURAL SYSTEM FOR THE CONVENTION CENTER WAS REDESIGNED FROM A CAST IN PLACE CONCRETE STRUCTURE TO A STEEL STRUCTURE TO SAVE TIME FROM THE SCHEDULE DELAYS IN THE MUSEUM LEVEL. THE RESULTING REDESIGN UTILIZED 18CJ SERIES JOISTS AND COST AN ADDITIONAL \$102,360 (+9%) OVER THE EXISTING CAST IN PLACE CONCRETE SYSTEM.

RETAINING WALL REDESIGN: THE EXISTING CAST IN PLACE CONCRETE RETAINING WALLS WERE REDESIGNED USING AN IVANY BLOCK WALL SYSTEM. THE BLOCK WALL SYSTEM ALLOWED FOR FULL HEIGHT BACKFILLING WHILE REDUCING FORMWORK, SCHEDULE, AND COST. THE IVANY SYSTEM SAVES \$289,125 (-20%) OVER THE CONCRETE.

5 CONSTRUCTION RESEQUENCING

RESEQUENCING ANALYSIS: THROUGH IMPLEMENTING THE PROPOSED CHANGES ABOVE, FIVE WEEKS WERE SAVED FROM THE OVERALL CONSTRUCTION SCHEDULE WHILE ADDING AN ADDITIONAL COST OF \$251,806 (+0.15%) TO THE TOTAL PROJECT COST. THE HOTEL ALONE COULD GENERATE \$1.4 MILLION IN REVENUE DURING THE FIVE WEEKS.