Aviation / Airfield Electrical

Engineering Qualifications

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Rethinking Infrastructure®

ARORA®

Arora Engineers, Inc.
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Dear Prospective Client,

For more than 30 years, Arora Engineers, Inc. has worked at nearly 50 airports across the country from California, to Maine, to Florida and has grown into an Aviation centric firm. Arora's aviation expertise includes a range of services for the complete project life cycle.

Airfield electrical design is at the core of Arora's technical expertise. Our team has designed airfield lighting systems for over a billion dollars of construction at airports across the United States. Arora's airfield electrical engineers utilize the latest lighting technologies for increased reliability to enhance the safety of aircraft operations on the airfield.

Our capabilities in this area range from airfield lighting, signage, and NAVAIDS, to field lighting vaults and Runway Incursion Mitigation (RIM). We design airfield lighting with the future in mind and live our tagline of Rethinking Infrastructure® as we approach each unique project.

Our Program and Construction Management group (PM/CM) experience ranges from serving as airport extension of staff and owners rep to running capital projects and programs, to field inspections, to working with general contractors as master systems integrators, performing constructability reviews, and managing and overseeing the design and construction process.

No project is too big or too small, and we look forward to working with you and exceeding your expectations for quality and service.

Sincerely,

Manik Arora
President and CEO

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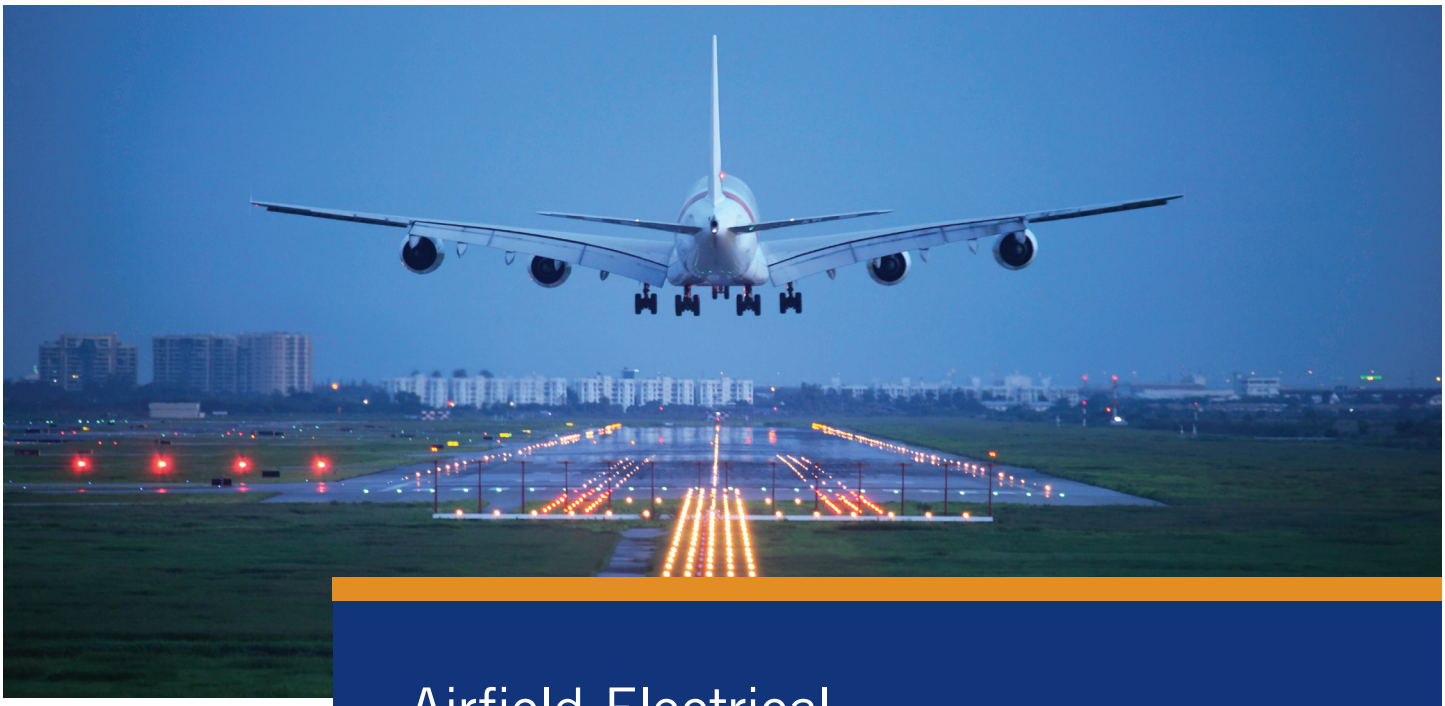
COMPANY OVERVIEW



Airfield Electrical

Arora's airfield electrical practice utilizes their experience and knowledge of current airfield products, standards, and installation practices to provide modern, coordinated, cost-conscious, and schedule sensitive design solutions for large, medium, and small airport operations. Throughout the life of the company, Arora has successfully designed airfield lighting systems for over a billion dollars of construction at airports across the United States. Our airfield designers are experienced in civilian and military airfield systems as well as engaged in industry leading organizations such as American Association of Airport Executives (AAAE), Airport Consultants Council (ACC), and Illuminating Engineering Society of North America Aviation Lighting Committee (IESALC).

Key Services

Airfield Lighting Vaults

+ Constant Current Regulators and 5kV Series Circuits
+ SwitchGear Regulator Systems (SGRS)
+ Generators and Emergency Power Distribution
+ S-1 5kV Cutouts and Enclosures
+ L-823 5kV Breakout Patch Panel Enclosures

Airfield Lighting

+ Edge Lighting / Centerline Lighting
+ Touch Down Zone Lighting
+ Guard Lights
+ Displaced Thresholds
+ In-Pavement Light Bases in Flexible (Asphalt) or Rigid (Concrete) Pavements
+ Temporary Lighting
+ Approach Lighting Systems – Medium Intensity (MALSR)
+ Approach Lighting Systems – High Intensity (ALSF-1, ALSF-2)
+ Runway End Identifier Light (REIL) Systems
+ Visual Glide Slope Indicator (VGSI) Systems
+ Precision Approach Path Indicator (PAPI) Systems
+ Airport Rotating Beacons
+ Wind Cones
+ Obstruction Lighting
+ Surface Movement Guidance Control Systems (SMGCS)

ATLANTA

BALTIMORE

BOSTON

CHARLOTTE

CHICAGO

DALLAS

NASHVILLE

NEW YORK

PHILADELPHIA

SAN JOSE

Airfield Guidance Signage (LED and Conventional)

Underground Distribution of Airfield Electrical Circuits

+ Junction Can Plazas
+ Airfield Rated Manholes
+ Airfield Rated Handholes
+ Duct Banks
+ Trenching
+ Directional Boring
+ Direct Buried
+ Lightning Protection and Grounding

Airfield Controls

+ L-854 Pilot Radio Control Equipment
+ L-821 Relay Based Airfield Lighting Control System (ALCS)
+ L-890 PC Based Airfield Lighting Control and Monitoring Systems (ALCMS)

Ground Based Navigational Aids (NAVAIDs)

+ Instrument Landing Systems (ILS) - Glideslope
+ Instrument Landing Systems (ILS) - Localizer

Apron Lighting and Equipment

+ Apron Lighting (LED and Conventional)
+ Ground Service Equipment (GSE)
+ Ground Power Units (GPUs)
+ Visual Docking Guidance Systems
+ Passenger Boarding Bridges (PBB)

Additional Design Services

+ Support for Federal Aviation Administration (FAA) Facilities
+ Automated Weather Observation System (AWOS)
+ Maintenance and Storage Buildings
+ Aircraft Hangars
+ Helipads and Heliports
+ Vehicular Gate Access Controls Systems
+ Pavement Surface Sensor Systems
+ Construction Safety and Phasing
+ Runway Incursion Mitigation (RIM)
+ Photometric Calculations
+ Photometric Testing Specification
+ Airfield Asset Management
+ Airfield Assessments
+ Airfield Electrical Master Planning
+ FAA Airport Improvement Program (AIP)
+ Voltage Drop Calculations
+ Short Circuit Calculations
+ Arc Flash Studies
+ Selective Coordination Study
+ Engineer Estimate of Probable Cost (EEOPC)
+ Non-Destructive Engineering Investigations
+ Construction Observations
+ Construction Submittal Review
+ Sustainable Solutions

Representative Clients

+ MSCAA - Memphis Shelby County Airport Authority (MEM)
+ CRAA – Columbus Regional Airport Authority (LCK)
+ PTAA - Piedmont Triad Airport Authority (GSO)
+ GARAA - Greater Asheville Regional Airport Authority (AVL)
+ LNAA - Lehigh Northampton Airport Authority (ABE)
+ PANYNJ - Port Authority of NY and NJ (LGA) (JFK) (EWR) (FRG)
+ WCAA - Wayne County Airport Authority (DTW) (PKB)
+ City of Philadelphia, Division of Aviation (PHL)
+ MPA - Massachusetts Port Authority (BOS)
+ MAA - Maryland Aviation Administration (BWI)
+ SARAA - Susquehanna Area Regional Airport Authority (CXY)
+ CAA - Connecticut Aviation Authority (BDL)
+ SJTA - South Jersey Transportation Authority (ACY)
+ ACAA - Allegheny County Airport Authority (PIT)
+ DRPA Delaware River Port Authority (ILG)
+ St Petersburg-Clearwater, FL Airport (PIE)

AIRFIELD ELECTRICAL EXPERIENCE

CITY OF PHILADELPHIA, DIVISION OF AVIATION

American Airlines PHL Truck Based Deicing Apron Project

Philadelphia International Airport, Philadelphia, PA

PROJECT DETAILS

CLIENT

American Airlines for the City of Philadelphia, Division of Aviation / Capital Improvement Program
Bijan Pashanamaei
AECOM
1700 Market Street, Suite 1600
Philadelphia, PA 19103
215-735-0832

CONSTRUCTION

$35,000,000

PROJECT START

2016

PROJECT COMPLETION

2017

HIGHLIGHTS

+ MEP, FP / Life Safety, Airfield Electrical Engineering and Special Systems
+ New Crew Building
+ New Vehicle Maintenance Building

American Airlines funded a project on behalf of the City of Philadelphia Division of Aviation to convert the boom based deicing facility at Philadelphia International Airport (PHL) to a truck based operation. Arora provided mechanical, electrical, fire/life safety, special systems, and airfield electrical engineering as part of the team lead by AECOM, who was responsible for the project.

Constructed in 2001, the boom based deicing system showed signs of wear and repairs had been mounting. In addition, the new ADG IV aircraft could not fit in between the booms, putting PHL in an untenable situation. The two phased transformation provided four deicing bays capable of servicing the largest aircraft or two smaller aircraft at the same time. Additional provisions were made to deice at a contiguous cargo apron.

A fleet of fifty deicing trucks are now accommodated. Underground systems deliver Glycol #1 and #4 and water to filling stations located between the bays. Diesel fuel is dispensed off the apron within the operational limits. A new Crew Building and Vehicle Maintenance Building has been erected to provide work and support facilities for the staff and full truck mechanical servicing capability.

The Deicing Apron is illuminated by wireless controlled high mast LED lighting. The twelve centerlines of In-Apron lighting are individually controlled to enhance directional guidance to the pilots, followed by individually illuminated lead-off lighting when deicing has been completed. Other operational features include utilization of the Harris System for aircraft identification prior to their arrival at >>

CITY OF PHILADELPHIA, DIVISION OF AVIATION

American Airlines PHL Truck Based Deicing Apron Project

Philadelphia International Airport Philadelphia, PA

<< the Deicing Apron, blanket coverage by a robust CCTV system, and a WiFi system for telemetry transference between trucks and Command.

Phase 1 involved the removal of approximately half of the booms and the creation of two new truck based bays and the diesel fueling station. Phase 2 included the construction of the buildings and the last two deicing bays, an additional diesel tank, modification to the fluid distribution system, new in-apron lighting regulators and controls. The project reused two transformers from the Boom based system and mothballed twelve others for future PHL use.

ABERDEEN PROVING GROUND

Installation of Airfield Signage and Associated Equipment

Phillips Army Airfield, Aberdeen, MD

PROJECT DETAILS

CLIENT

Bering Straits Companies
Shawn Weaver
Project Manager
823 Old Philadelphia Rd.
Aberdeen, MD 21001
sweaver@beringstraits.com
443-327-6406

CONSTRUCTION

$1,000,000

PROJECT START

2016

PROJECT COMPLETION

2017

HIGHLIGHTS

+ LED Airfield Signage
+ Conditions Assessment
+ Cost Benefit Analysis
+ Power Distribution

Arora provided electrical design services for airfield signage improvements at Phillips Army Airfield in Aberdeen, Maryland. Arora also performed an analysis of existing conditions, using value engineering & expert judgement to design the installation of new airfield signage and associated underground distribution powered from the airfield lighting vault. In addition, Arora also furnished Bering Straits Companies contract drawings, specifications and an estimate of probable construction costs in conformance to UFC and FAA design standards for a fully functional airfield guidance sign system.

SCOPE OF WORK INCLUDED:

+ LED Airfield Signage
+ Airfield Lighting Vault Equipment Modifications New lighting, emergency egress lighting and exit signage was provided.
+ Power Distribution
+ Airfield Lighting Control System Panel and toggle switch upgrades within the control tower and operations office.

PIEDMONT TRIAD AIRPORT AUTHORITY

Rehabilitation of Runway 5R-23L

Piedmont Triad International Airport, Greensboro, NC

PROJECT DETAILS

CLIENT

Piedmont Triad Airport Authority
Piedmont Triad International Airport
Mr. Alex Rosser, P.E.
Deputy Executive Director
1000A Ted Johnson Parkway,
Greensboro, NC 27409
rossera@gsoair.org
336-665-5600

CONSTRUCTION

$40,000,000 (Design/Bid/Build)

PROJECT START

2017

PROJECT COMPLETION

2019

HIGHLIGHTS

+ Rehabilitation and upgrade of airfield lighting systems
+ High intensity LED runway lighting system (TDZ's and Centerline)
+ Airfield Lighting & Control Monitoring System
+ Surface Movement and Guidance Control Systems
+ Pavement Surface Sensor System
+ LED Runway Guard Lights
+ Modified Underground Distribution
+ Airfield Signage Modifications
+ Economy Approach Aids
+ Load analysis and configuration for series circuit distribution

Arora recently completed contract documents for the Rehabilitation of Runway 5R-23L at Piedmont Triad International Airport (GSO). The project primarily includes the mill and overlay of the existing pavement surfaces as proposed by Michael Baker International (Prime), which impacted several existing runway airfield systems. The modified airfield systems included the existing airfield lighting, signage, and underground distribution. It is a challenging project considering the abbreviated design schedule and multiple electrical systems requiring modifications from changes in pavement grade elevations.

SCOPE OF WORK INCLUDED:

The existing runway, centerline, and touchdown zone lighting systems were upgraded to LED, with existing conduit/light base cans being removed, disposed of, and replaced. Runway edge lights will be removed and replaced with Quartz lights. Lighting for the connector taxiway (edge, elevated/in pavement guard lighting) is also designed to be LED. Base can and conduit infrastructure are proposed for the airports approved Surface Movement and Guidance Control System (SMGCS) plan.

Additional design elements include a pavement surface sensor system, relocation of windcone and PAPI units on new foundations, and MALSR/ALSF-2 approach lighting modifications in accordance with pavement grade elevations. The project includes all new series circuit distribution to Airfield Lighting Vault No. 1 in a new junction can plaza system, which parallels the runway. Airfield Signage improvements include relocated signage to accommodate modified taxiway geometries and signage upgrades to LED.

Lessons Learned:

A runway rehabilitation project involving complete replacement of electrical systems. The project challenge included stakeholder and project team coordination to maximize the construction area within Airport Authorities adjusted program budget. The electrical team remained flexible with the modified work areas and phased approach to implement electrical improvements that would minimize rework during the future full build out. Lessons learned included coordination with Civil disciplines early in design to coordinate drainage of light bases and phased approach to implement partial runway centerline lighting replacement with future new LED upgrades.

LEHIGH – NORTHAMPTON AIRPORT AUTHORITY

Multi-Modal Transportation Center

Lehigh Valley International Airport, Allentown, PA

PROJECT DETAILS

CLIENT

Lehigh Northampton Airport Authority
Ryan Meyer
Director of Planning & Programming
3311 Airport Road
Allentown, PA 18109
rmeyer@lnaa.com
610-231-5230

CONSTRUCTION

$5,000,000

PROJECT START

2015

PROJECT COMPLETION

2017

HIGHLIGHTS

+ Assisted with Airport obtaining $2.5MM PennDOT grant.
+ Stakeholder Coordination
+ MEP Design
+ Roadway Improvements
+ Rental Car Maintenance Building Demolition
+ Terminal Expansion
+ Rental Car Consolidation
+ Construction Safety and Phasing

As an extension of the Lehigh-Northampton Airport Authority (LNAA) staff, Arora recently led design and procurement efforts for a new Multi-Modal Transportation Center at Lehigh Valley International Airport. Arora's design included mechanical, electrical and plumbing, area lighting, wayfinding, security, special systems and project management efforts of the design team and stakeholders.

Prior to the project the rental car pick up and drop off locations were hidden by a decaying building accessible by a lengthy walkway that exposed passengers to weather. Improvements were necessary to increase the level of service to the airports customers.

SCOPE OF WORK INCLUDED:

The $5 million project provides passengers with improvements like reduced walking distances to car rental operations, weather protected walkways, seven designated berths for local bus services, and elimination of passenger/vehicle conflict points.

It also provides consolidated rental car operations, wayfinding upgrades, and increased taxi service and roadway improvements to make the airport more accessible to area residents. The rental car companies and project stakeholders were engaged throughout the process.

Arora also provided construction management services which ensured that the project remained on schedule and within budget.

WAYNE COUNTY AIRPORT AUTHORITY

Reconstruction of Runway 4L/22R & Associated Taxiways

Detroit Metropolitan Wayne County Airport, Detroit, MI

PROJECT DETAILS

CLIENT

Wayne County Airport Authority
Detroit Metropolitan Wayne County Airport
Theresa Samosiuk
Project Manager
L.C. Smith Building – Mezzanine
Detroit, MI 48242
Theresa.samosiuk@wcaa.us
734-247-3692

CONSTRUCTION

$110,000,000 (Design/Bid/Build)

PROJECT START

2014

PROJECT COMPLETION

2016

HIGHLIGHTS

+ Rehabilitation and upgrade of airfield lighting systems and Airfield Lighting Vault No. 1
+ Complete high intensity LED runway lighting system
+ Airfield Lighting & Control Monitoring System
+ Pavement Surface Sensor System
+ LED Inpavement Runway Guard Lights
+ Modified Underground Distribution
+ Airfield Signage Modifications
+ Load analysis and configuration for series circuit distribution

Arora completed contract documents for all professional electrical engineering tasks associated with the pavement rehabilitation of Runway 4L/22R and Associated Taxiways. The associated taxiways included Taxiways N, N1, N2, Q, R, and V. The project primarily included full depth removal of the existing pavement section and replacement with new PCC sections as proposed by RS&H (Prime), which impacted several existing runway airfield systems. The modified airfield systems included the existing lighting, signage and underground distribution.

SCOPE OF WORK INCLUDED:

The existing runway centerline, edge light and touchdown zone lighting systems were upgraded to LED with existing conduit/ light base cans being removed, disposed of, and replaced. Lighting for connector taxiway (centerline, guard lighting) was also designed to be LED type in conjunction with the existing reinstalled LED taxiway edge lights on new infrastructure.

Additional design elements include a pavement surface sensor system, inpavement runway guard lighting and Runway 22R touchdown zone lighting. Project includes all new series circuit distribution to Airfield Lighting Vault No. 1 and new constant current regulators for the majority of the modified circuits. Airfield Signage >>

WAYNE COUNTY AIRPORT AUTHORITY

Reconstruction of Runway 4L/22R & Associated Taxiways

Detroit Metropolitan Wayne County Airport, Detroit, MI

<< improvements included relocated signage to accommodate four (4) new high speed exit taxiways and new signage (Taxiway N/N1/N2) and sign panels for the renaming of Runway 4L/22R connector taxiways to conform to Engineering Brief 89.

Lesson Learned:

The pavement section for this $100MM runway rehabilitation consisted of 18" of PCC pavement over existing subgrade requiring complete replacement of electrical infrastructure. Project Challenges included coordination with paving and joint patterns to accommodate the installation of the interconnecting conduits and light base cans. This project included directional drilling under existing service roads and temporary circuit connections to minimize disruption to airport operations. A fully function LED runway, coordination with the airport authority and the FAA was necessary for installed equipment that was non-AIP eligible. Project included the modifications/adjustments of electrical elements typically found within the runway safety area of a CAT II runway. Major lessons learned included the realized benefits of engaging all stakeholders early during the design process, including the Airlines and FAA. Major impacted utilities were identified and mitigated prior to construction which minimized change orders.

MASSACHUSETTS PORT AUTHORITY

Runway 4R-22L Rehabilitation and Approach Pier Replacement

Boston Logan International Airport, Boston, MA

PROJECT DETAILS

CLIENT

Massachusetts Port Authority
Sarah Dennechuk, PE
Project, Manager
One Harborside Drive
East Boston, MA 02128
sdennechuk@massport.com
617-568-5971

CONSTRUCTION

$22,000,000

PROJECT START

2016

PROJECT COMPLETION

2017

HIGHLIGHTS

+ Airfield lighting
+ ALSF-2 approach lighting
+ Underground electrical distribution
+ FAA coordination
+ Utility coordination

Arora is currently performing professional engineering services to design and layout the removal and reinstallation of the Runway 4R ALSF-2/SSALR approach lighting system in coordination with the upgrades to the Runway 4R Light Pier. Arora's work includes design efforts and FAA coordination to reinstall the ASLF-2 system at exact locations in conformance to FAA design standards for a fully functional airfield lighting system upgrade within the limits of disturbance.

SCOPE OF WORK INCLUDED:

+ Cross-discipline coordination with Pier replacement to minimize downtime of ALSF-2 system and associated CAT II/III infrastructure.
+ Design and layout of the removal of the existing ASLF-2 approach lighting system lighting fixtures and structures. Lighting fixtures & structures to be carefully stored for reinstallation.
+ Design and layout of the demolition/removal of existing ALSF-2 power and controls back to junction cans adjacent to the new pier.
+ Design and layout of ALSF-2 light plane profiles and lamp schedules. Light plane will be coordinated with the proposed pier elevation change.
+ Design and site layout of the reinstallation of ALSF-2 light equipment. >>

MASSACHUSETTS PORT AUTHORITY

Runway 4R-22L Rehabilitation and Approach Pier Replacement

Boston Logan International Airport, Boston, MA

<<

+ Design and layout of removal and reinstallation of Far Field Monitor, shelter and associated components from existing pier to new. The existing antenna elevation will be adjusted to 8" below the ALSF-2 light plane.
+ Design and layout of power distribution to Far Field Monitor and ALSF-2 light station.
+ Design and layout details for mounting, cabinet and wiring installation for ALSF-2 components.
+ Underground electrical and series circuit distribution with limits of disturbance.
+ FAA and Utility coordination.

Lessons Learned:

A unique project consisting of the complete replacement of the existing ALSF-2 light stations to facilitate the demolition of the Runway 4R existing wooden pier and construction of a new concrete pier. The light plane profile required adjustment in coordination with the modified grade elevation. A challenging aspect of the project involved the coordination with Structural to accommodate the electrical conduits within the 8-foot concrete plank. Up to thirteen conduits were installed in sections of the plank, requiring proper clearances for the national electric code, structural rebar, and mounting equipment. Careful detailing was necessary to ensure the communication, low voltage and airfield lighting were fully coordinated prior to concrete placement. FAA coordination was a big component of the project which included removal of inner marker antennas, relocation of far field monitor antennas and a new equipment shelter. All equipment that required reinstallation was careful stored, tagged and reinstalled at the locations designated in the documents. Lessons learned involved the equipment shelter which was to be shipped to the Contractor by the FAA complete for installation on the new pier. The shelter had several variations which required field modifications to make the system work. The contract required a construction representative to approve the shelter before shipping to the site but was not enforced. If we had a construction representative visit the FAA depot before shipment we may have been able to mitigate the field changes.

CITY OF PHILADELPHIA, DIVISION OF AVIATION

Rehabilitation of Runway 9L-27R and Taxiway K Extension

Philadelphia International Airport, Philadelphia, PA

PROJECT DETAILS

CLIENT

City of Philadelphia
Division of Aviation
Thomas Joseph, PE
Project Manager
International Plaza II, Suite 540
Philadelphia, PA 19113
thomas.joseph@phl.org
215-937-5572

CONSTRUCTION

$35,000,000

PROJECT START

2011

PROJECT COMPLETION

2015

HIGHLIGHTS

+ Airfield lighting and signage upgrades in new runway/taxiway pavement
+ Introduced LED lighting within runway environment
+ Load analysis and configurations for electrical distribution
+ Pavement surface sensor revisions
+ Designed dedicated sign circuits for mandatory hold signs
+ Implemented color scheme for airfield lighting circuits to assist with field circuit verification
+ Airfield lighting and control system modifications

Arora prepared contract documents for all professional electrical engineering tasks associated with the pavement rehabilitation of Runway 9L-27R. The typical 3"-5" mill and overlay of the 9,500 feet long by 150 wide runway impacted several existing runway airfield systems. The modified airfield systems included the existing approach lighting, signage, airfield lighting, and pavement surface sensor system for both the runway and the associated taxiway connectors.

SCOPE OF WORK INCLUDED:

The existing centerline system and conduit was replaced with new LED centerline lighting and associated underground distribution. Lighting for the connector taxiway (centerline, guard lighting) was also designed to be LED-type to the runway hold line of each taxiway connector. With exception of the runway high intensity edge lighting, all runway lighting and signage within the Runway 9L-27R safety area is designed to be LED-type. Additional design elements included runway status light infrastructure, field lighting vault revisions, and relocation of existing utilities.

The project included innovative concepts which may become industry trends. Aside from the LED lighting, the project also featured colored series lighting cable which >>

CITY OF PHILADELPHIA, DIVISION OF AVIATION

Rehabilitation of Runway 9L-27R and Taxiway K Extension

Philadelphia International Airport, Philadelphia, PA

<< is being used for light fixtures within the runway environment based on a color scheme incorporated within the contract documents. The installation will enable quick circuit identification by maintenance allowing for the performance of repair work within a shorter timeframe.

Design phase services were completed on time and within budget. Contract documents included drawings, specifications, cost benefit analysis, engineering calculations, and an estimate of probable construction costs. Arora also provided construction administration services to the Division of Aviation including shop drawing review, field investigations, and responses to requests for information.

CITY OF PHILADELPHIA, DIVISION OF AVIATION

Rehabilitation of Runway 9R-27L and Associated Taxiways

Philadelphia International Airport, Philadelphia, PA

PROJECT DETAILS

CLIENT

City of Philadelphia
Division of Aviation
Thomas Joseph, PE
Project Manager
International Plaza II, Suite 540
Philadelphia, PA 19113
thomas.joseph@phl.org
215-937-5572

CONSTRUCTION

$50,000,000

PROJECT START

2006

PROJECT COMPLETION

2012

HIGHLIGHTS

+ Load analysis and configurations for electrical distribution
+ Recommended airfield signage upgrades to facility signage improvement master plan
+ Designed dedicated sign circuits for mandatory hold signs
+ Integrated pavement surface sensor design locations and hardware to support repaving of runway and connector taxiways
+ Coordination with global pavement surface sensor design project
+ Provided field inspection services

Arora prepared preliminary and final designs for all electrical tasks associated with the Rehabilitation of Runway 9R-27L and associated taxiways. Runway 9R-27L is Philadelphia International Airport's primary runway measuring 10,500 FT long by 200 FT wide. The rehabilitation included impacts to the existing pavement centerline, edge, touchdown zone, guard lights, airfield signage and pavement surface sensor system resulting from the mill and replacement of asphalt pavement on Runway 9R-27L and associated taxiways. This project was eventually split into two bid packages separating Runway 9R-27L and connector taxiways into a separate package from the rehabilitation of Taxiway S, which is Runway 9R-27L's full length parallel taxiway. Taxiway S was bid and awarded in 2007 and rehabilitated to the Runway 9R-27L hold line. Runway 9R-27L was bid in 2009 and rehabilitated the remaining runway surface and associated taxiway connectors.

SCOPE OF WORK INCLUDED:

Arora's airfield electrical tasks included modifications and improvements to the existing pavement surface sensor system and airfield signage system. Design phase services were completed on time and within budget. Design services included field investigation, record document review, meeting attendance, engineering design and calculations, preparation of drawings, technical specifications, cost estimation, and bid review.

Arora provided electrical inspection services for the duration of construction which was largely performed during nightly runway shutdowns. The project was closed out in summer 2012 in time for construction of runway 9L-27R for which Arora is the electrical designer of record.

CITY OF PHILADELPHIA, DIVISION OF AVIATION

Runway 17-35 Extension – Packages 1 through 3

Philadelphia International Airport, Philadelphia, PA

PROJECT DETAILS

CLIENT

City of Philadelphia
Division of Aviation
Jim Jones, PE
Project Manager
International Plaza II, Suite 540
Philadelphia, PA 19113
james_t.jones@phl.org
215-937-6229

CONSTRUCTION

$70,000,000

PROJECT START

2005

PROJECT COMPLETION

2011

HIGHLIGHTS

+ Evaluation of existing approach lighting systems and NAVAIDs
+ Designed lighting for new long term parking lot
+ Airfield lighting and signage upgrades in new runway/taxiway pavement
+ Design of lighting and underground distribution for relocated airport service roads, state road and economy parking lot
+ MALSF light profiles
+ New PAPI system layouts with associated power and communication
+ Fiber distribution from Field Lighting Vaults to control tower

Arora prepared contract documents for the Runway 17-35 Extension Project, which extended PHL's North-South runway by 1,040 feet to 6,500 feet.

SCOPE OF WORK INCLUDED:

The project was divided into three packages; Arora was responsible for electrical, airfield electrical, and mechanical engineering. Arora's airfield electrical tasks included runway safety area and navigational aid improvements and a new high speed exit taxiway. To facilitate the runway safety area improvements an existing airfield service road and economy parking lot was demolished and removed. Service roads were relocated and a new hold apron was added to serve the extended Runway.

ILS improvements for Runway 17 (Glideslope and Localizer) were closely coordinated with FAA Eastern Region. Improvements to Runway 17 included a modified MALSF system including underground distribution across Interstate 95. Airfield lighting & signage were a large part of the design effort since each runway end was extended. Distance remaining signs were removed and replaced and lens filters required revisions per the FAA advisory circular. Miscellaneous aids including windcones on both runway ends, runway 35 REIL and pavement surface sensor system upgrades. A comprehensive phasing plan was critical to ensure minimum disruption to airport operations especially since Runway 17-35 intersects one of the airports primary runways.

In May 2009, Arora attended the substantial completion ribbon cutting ceremony to commemorate a project that was completed on time and within budget and provides the airport more flexibility in managing airfield operations.

CITY OF PHILADELPHIA, DIVISION OF AVIATION

Rehabilitation of Airfield Signage and Economy Approach Aids

Northeast Philadelphia Airport, Philadelphia, PA

PROJECT DETAILS

CLIENT

City of Philadelphia
Craig Hinton
Philadelphia International Airport - Terminal E
Philadelphia, PA 19153
Craig.Hinton@phl.org
(215) 937-6730

CONSTRUCTION

$1,100,000

PROJECT START

2016

PROJECT COMPLETION

2017

HIGHLIGHTS

+ Airfield Lighting and Signage
+ Conditions Assessment
+ Cost Benefit Analysis
+ LED lighting
+ Economy Approach Aids
+ Navigational Aids
+ FAA Coordination for flight checks and equipment burn in.
+ FAA Form 7460
+ Construction Safety and Phasing Plan

Arora is currently providing electrical design services for airfield signage improvements and upgrades to navigational aids at Northeast Philadelphia Airport (PNE). The design elements include new LED airfield signage, circuit distribution modifications, supplemental windcone upgrades, LED type Precision Approach Path Indicators (PAPI) lamp housing assemblies, and LED type Runway End Identifier Lights (REILS) units.

SCOPE OF WORK INCLUDED:

Summary of upgraded equipment is as follows:

+ Airfield Signage
+ Runway 6 PAPI Assembly
+ Runway 6 REIL Assembly
+ Supplemental Windcones (Quantity of 4)
+ Runway 33 LAHSO Lights
+ Runway 24 LAHSO Lights

Arora performed an analysis of existing conditions, using value engineering & expert judgement to develop the design documents within the program budget of $1.1 million dollars. Design documents include contract drawings, specifications and an estimate of probable construction costs in strict conformance to FAA design standards for a fully functional airfield signage and economy approach aid upgrade. In addition, Arora is providing procurement and bid award services and construction administration services.

Photo by Ken Lund from Reno, Nevada, USA

CITY OF PHILADELPHIA, DIVISION OF AVIATION

Taxiway D Extension

Northeast Philadelphia Airport, Philadelphia, PA

PROJECT DETAILS

CLIENT

Urban Engineers, Inc.
Jack Martins, PE
VP, Aviation Practice Leader
530 Walnut Street, 14th Floor
Philadelphia, PA 19106
jmmartins@urbanengineers.com
(215) 922-8080

PROJECT START

2012

PROJECT COMPLETION

2012

HIGHLIGHTS

+ Schematic layout of airfield lighting and signage
+ Recommendations for relocation of Glidescope facility
+ Coordination with FAA

Arora provided airfield electrical services for the design study of the Taxiway D Extension at Northeast Philadelphia Airport. The geometry extended proposed Taxiway D from Connector Taxiway J to the Runway 24 end (approximately 2400 linear feet). The extended Taxiway J is located parallel to Runway 6-24 and provides and alternate taxi route from aircraft exiting Runway 24.

Arora was responsible for creating a design study for infrastructure improvements including taxiway airfield lighting and signage. In addition, Arora evaluated the impacts to the existing ILS Glideslope system and provided recommendations based on new taxiway geometry.

SCOPE OF WORK INCLUDED:

+ Schematic layout of the removal of existing L-861T taxiway edge light fixtures, transformers, base cans and associated equipment and installation of additional L-861T taxiway edge light fixtures, transformers, and base cans within pavement limits of Taxiway J.
+ The capacity of the existing vault will be evaluated to determine whether it is sufficient to accommodate the additional power and control equipment required for the taxiway extension.
+ Schematic layout of the removal and replacement of conduit between the existing L-862/L – 862E runway edge light fixtures to enable the installation of full depth connector Taxiway D pavement sections at the Runway 24 end.
+ Schematic layout of underground distribution for the Taxiway D edge lighting system.
+ Schematic layout of new LED guidance sings, sign bases, and transformer within work limits.
+ Schematic layout of two (2) options as it pertained to the Runway 24 Glideslope Facility.
+ Relocation of Glideslope facility to accommodate Taxiway D construction at 400’ from runway centerline. The relocation included windcone and pavement surface sensor revisions.
+ Estimates of probable construction costs for each option.
+ Conformance to all relevant advisory circular and building codes.

PORT AUTHORITY OF NEW YORK AND NEW JERSEY

Navigational Aids Improvements to Runways 22L, 22R, and 4L

Newark Liberty International Airport, Newark, NJ

PROJECT DETAILS

CLIENT

Port Authority of New York
and New Jersey
Somnath Mukherjee
Airport Engineering Task Leader
2 Gateway Center, 16th Floor, SW
Newark, NJ 07102
smukherj@panynj.gov
973-792-4446

CONSTRUCTION

$13,000,000

PROJECT START

2008

PROJECT COMPLETION

2012

HIGHLIGHTS

+ Evaluation of existing approach lighting systems and NAVAIDs
+ Designed parking lot lighting modifications to accommodate RSA improvements
+ New ILS localizer system and shelter layouts with associated power and communication
+ New ILS glide slope system and shelter layouts with associated power and communication
+ New Inpavement ALSF-2 approach lighting system layouts with associated power and controls

Arora prepared contract drawings for navigational improvements to Runway 22L and 22R at Newark Liberty International Airport as part of a Call-In Contract with the PANYNJ.

Design phase tasks on the Runway 22L end involved the upgrade for the existing CAT I system to a new CAT II/III system. Components included inpavement ALSF-2 system, pre-fab shelter and associated ALSF-2 components, ILS system upgrades – Relocated Glideslope Shelter and Antenna, Far Field Monitor Antenna, Inner Marker Beacon, and associated underground electrical and communication distribution.

A parking lot and taxiway relocation was required to accommodate the placement of ILS system components outside the runway/taxiway safety areas. Design phase tasks for Runway 22R involved the upgrade of the existing CAT I system. The new system replaced an outdated localizer and glideslope system (and associated components).

Additional design responsibilities included field investigation, FAA coordination, inter-discipline design coordination, calculations, equipment specification, and cost estimating.

PORT AUTHORITY OF NEW YORK AND NEW JERSEY

Realignment of Westside Taxiways and RVSR

LaGuardia Airport, New York, NY

PROJECT DETAILS

CLIENT

Port Authority of New York and New Jersey
Greg Gadomski, Staff Engineer
2 Gateway Center, 16th Floor SW
Newark, NJ 07102
ggadomski@panynj.gov
973-792-4445

CONSTRUCTION

$2,000,000

PROJECT START

2011

PROJECT COMPLETION

2014

HIGHLIGHTS

+ Demolition of existing airfield lighting and signage to facilitate taxiway realignment
+ Design and layout of airfield lighting, signage and associated base cans
+ Series lighting system distribution to modified airfield lighting and signage
+ Life cycle cost and load capacity analysis for airfield lighting fixtures and associated cables
+ Modifications to airfield lighting and control system

Arora prepared contract documents for the realignment of Westside Taxiways at LaGuardia Airport. The project area is located northwest of Runway 4-22 adjacent to a newly constructed Police Crisis Command Center (PCCC) and Aircraft Rescue and Firefighting Facility (ARFF). This area was identified for realignment because the PCCC & ARFF currently occupy a portion of the existing Taxiway 'Y'. In addition, the FAA indicated additional modifications to the existing taxiway configuration must be completed because of this impact to the air operations area. The primary scope of work entailed the removal and installation and/or relocation or adjustment of taxiway drainage and electrical infrastructures, the milling and overlay of asphalt pavements, full-depth installation of asphalt pavements, and the revision of pavement markings and signage.

SCOPE OF WORK INCLUDED:

As an extension of PANYNJ staff, Arora was responsible for electrical tasks including airfield lighting fixtures, underground distribution, manhole/handhole modifications, signage, helipad lighting, and electrical distribution to facilitation pavement construction. Electrical Infrastructure was either removed and replaced or adjusted to finished grade in accordance with all relevant FAA advisory circulars and PANYNJ standards.

Design phase services were completed on time and within budget. Contract documents included drawings, specifications, sole source letters, engineering calculations, and an estimate of probable construction costs.

Arora also provided construction administration services to the PANYNJ during construction including shop drawing review and responses to requests for information (RFI).

Photo by Patrick Handrigan

Port Authority of New York and New Jersey

Rehabilitation of Taxiways A, M and ZA

LaGuardia Airport, New York, NY

PROJECT DETAILS

CLIENT

Port Authority of New York and New Jersey
Greg Gadomski, Staff Engineer
2 Gateway Center, 16th Floor SW
Newark, NJ 07102
ggadomski@panynj.gov
973-792-4445

CONSTRUCTION

$2,000,000

PROJECT START

2012

PROJECT COMPLETION

2014

HIGHLIGHTS

+ Demolition of existing airfield lighting and signage to facilitate taxiway realignment
+ Design and layout of airfield lighting, signage and associated base cans
+ Series lighting system distribution to modified airfield lighting and signage
+ Life cycle cost and load capacity analysis for airfield lighting fixtures and associated cables
+ Modifications to airfield lighting and control system

Arora prepared contract documents for the rehabilitation of Taxiways A, M and AZ at LaGuardia Airport. These existing asphalt concrete taxiways required mill and overlay to maintain a “state of good repair” and extend the useful life of the pavement. The primary scope of work entailed the removal and installation and/or relocation or adjustment of taxiway drainage and electrical infrastructures, the milling and overlay of asphalt pavements, full-depth installation of asphalt pavements, and the revision of pavement markings and signage.

As an extension of PANYNJ staff, Arora was responsible for electrical tasks including airfield lighting fixtures, underground distribution, manhole/handhole modifications, signage, and electrical distribution to facilitate pavement construction. Electrical Infrastructure was either removed and replaced or adjusted to finished grade in accordance with all relevant FAA advisory circulars and PANYNJ standards.

Design phase services were completed on time and within budget. Contract documents included drawings, specifications, sole source letters, engineering calculations, and an estimate of probable construction costs.

Arora also provided construction administration services to the PANYNJ during construction including shop drawing review and responses to requests for information (RFI).

PORT AUTHORITY OF NEW YORK AND NEW JERSEY

Rehabilitation of Taxiways West of Runway 4-22

LaGuardia Airport, New York, NY

PROJECT DETAILS

CLIENT

Port Authority of New York and New Jersey
Danielle Stewart, PE
Staff Engineer
2 Gateway Center, 16th Floor SW
Newark, NJ 07102
dstewart@panynj.gov
973-792-4398

CONSTRUCTION

$2,000,000

PROJECT START

2014

PROJECT COMPLETION

2015

HIGHLIGHTS

+ Demolition of existing airfield lighting and signage
+ Design and layout of LED airfield lighting, LED signage and associated base cans
+ Series lighting system distribution to modified airfield lighting and signage
+ Life cycle cost and load capacity analysis for airfield lighting fixtures and associated cables
+ Modifications to airfield lighting and control system

Arora is currently preparing contract documents for the rehabilitation of Taxiways West of Runway 4-22 at LaGuardia Airport.

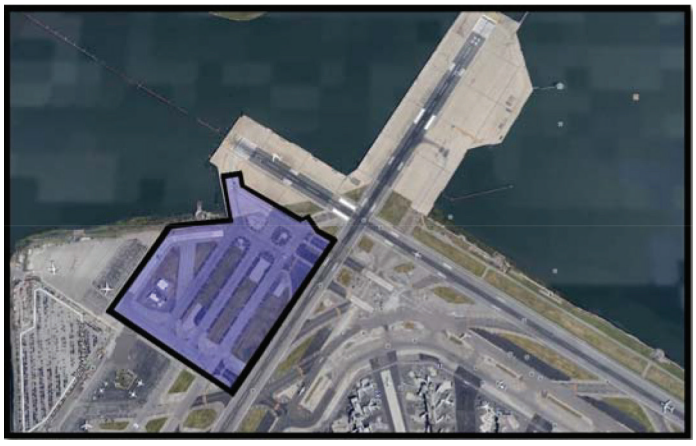
These existing asphalt concrete taxiways required mill and overlay to maintain a “state of good repair” and extend the useful life of the pavement. The primary scope of work entailed the removal and installation and/or relocation or adjustment of taxiway drainage and electrical infrastructures, the milling and overlay of asphalt pavements, full-depth installation of asphalt pavements, and the revision of pavement markings and signage.

SCOPE OF WORK INCLUDED:

As an extension of PANYNJ staff, Arora is responsible for electrical tasks, including LED airfield lighting fixtures & signage, underground distribution, manhole/handhole modifications, and electrical distribution to facilitate pavement construction. Electrical Infrastructure will be either removed and replaced or adjusted to finished grade in accordance with all relevant FAA advisory circulars and PANYNJ standards.

Design phase services are currently being completed on time and within budget. Contract documents shall include drawings, specifications, sole source letters, engineering calculations, and an estimate of probable construction costs.

Arora will also provide construction administration services to the PANYNJ during construction including shop drawing review and responses to requests for information (RFI).



SOUTH JERSEY TRANSPORTATION AUTHORITY

Terminal Apron Expansion

Atlantic City International Airport, Egg Harbor Township, NJ

PROJECT DETAILS

CLIENT

South Jersey Transportation Authority
Samuel L. Donelson, Jr., PE
Deputy Chief Engineer
Route 54 and Trooper Lane
Hammonton, NJ 08037
sdonelson@sjta.com
609-561-6643

CONSTRUCTION

$13,000,000

PROJECT START

2006

PROJECT COMPLETION

2011

HIGHLIGHTS

+ Evaluation of existing airfield lighting, load analysis and configurations for electrical distribution
+ Airfield lighting and signage upgrades in new taxiway pavement and apron area
+ Airfield lighting and control system modifications
+ Field lighting vault modifications
+ Introduced LED lighting within apron/taxiway environment
+ Cost benefit analysis for design concepts (PVC vs. RGS, single vs. dual loop edge lighting, etc.)

Arora prepared contract documents for all electrical tasks associated with the Terminal Apron Expansion project at Atlantic City International Airport. This project is part of the overall master plan to expand the airport terminal on both ends of the existing terminal facility. Arora's airfield electrical tasks included the design for the removal/replacement of taxiway centerline and edge lighting systems within the extended taxiway and new apron surfaces. These tasks were performed under two bid packages which included a majority of the terminal apron expansion.

SCOPE OF WORK INCLUDED:

The new centerline and edge lighting system utilized new LED light fixtures and were spaced to the advisory circular requirements for low visibility lighting. A new complex manhole system was designed within the new apron pavement and was adjusted to the final finished grade. The manhole system is interconnected by a minimum of 8-way, 4" ductbank to accommodate electrical and communication distribution. New high mast light poles were constructed at a height and angle to prevent glare to the adjacent aircraft. The new high mast lighting providing light distribution to ground crew and did not penetration the runway approach surfaces. Additional design elements included FAA coordination, airfield signage, grounding grid, field lighting vault revisions, and the relocation of existing utilities. The existing circuits were modified to accommodate the apron expansion with the circuits recalibrated during the airport lighting and control system modifications.

Arora provided electrical inspection services for the duration of construction. A perimeter fence was reconstructed around the work area to enable a longer work period.

SOUTH JERSEY TRANSPORTATION AUTHORITY

Runway 31 Arm/Disarm Apron

Atlantic City International Airport, Egg Harbor Township, NJ

PROJECT DETAILS

CLIENT

South Jersey Transportation Authority
Michael Bent, Airport Manager
Route 54 and Trooper Lane
Hammonton, NJ 08037
mbent@sjta.com
(609) 645-7895

CONSTRUCTION

$4,000,000

PROJECT START

2008

PROJECT COMPLETION

2011

HIGHLIGHTS

+ Evaluation of existing airfield lighting
+ Load analysis and configurations for electrical distribution
+ Airfield lighting and signage upgrades in new taxiway pavement and apron area
+ Airfield lighting and control system modifications
+ Field lighting vault modifications
+ Introduced LED lighting within apron/ taxiway environment
+ Led coordination efforts with FAA and ACY maintenance staff

Arora prepared contract documents for arm/disarm pads for the New Jersey National Guard at Atlantic City International Airport. The project was funded through the American Recovery and Reinvestment Act of 2009.

The arm/disarm concrete pad locations are located on both the Runway 13 and Runway 31 ends with clearances based on Group IV aircraft. An earthen revetment east of the apron, 20 feet high was installed to intercept any misfire ordinance during the arming or disarming process.

SCOPE OF WORK INCLUDED:

Arora's airfield electrical tasks included the design for the removal/ replacement of taxiway centerline and edge lighting systems within the extended apron surfaces. The centerline and edge lighting systems utilized new LED light fixtures and were spaced to the requirements of the FAA advisory circulars. Additional design elements included FAA coordination, airfield signage, and the relocation of existing FAA utilities. The existing circuits were modified to accommodate the arm/disarm apron expansion with the circuits recalibrated during the airport lighting and control system modifications.

Arora provided construction management and inspection services for the duration of construction. The project was completed within budget and several months ahead of schedule.

MARYLAND AVIATION ADMINISTRATION

Airfield Standards and Pavement Rehabilitation Project

Baltimore/Washington International Thurgood Marshall Airport, Baltimore, MD

PROJECT DETAILS

CLIENT

Maryland Aviation Administration
Paul L. Shank, P.E., C.M., Chief Engineer
991 Corporate Blvd
Baltimore, MD 18109
pshank@bwiairport.com
410-859-7061

CONSTRUCTION

$350,000,000

PROJECT START

2012

PROJECT COMPLETION

Ongoing

HIGHLIGHTS

+ Compliance with FAA Federal Runway Safety Area Compliance Mandate
+ Design of Runway Status Lights (RWSL's)
+ New LED light fixtures
+ New Airfield Lighting Vaults
+ Construction Administration

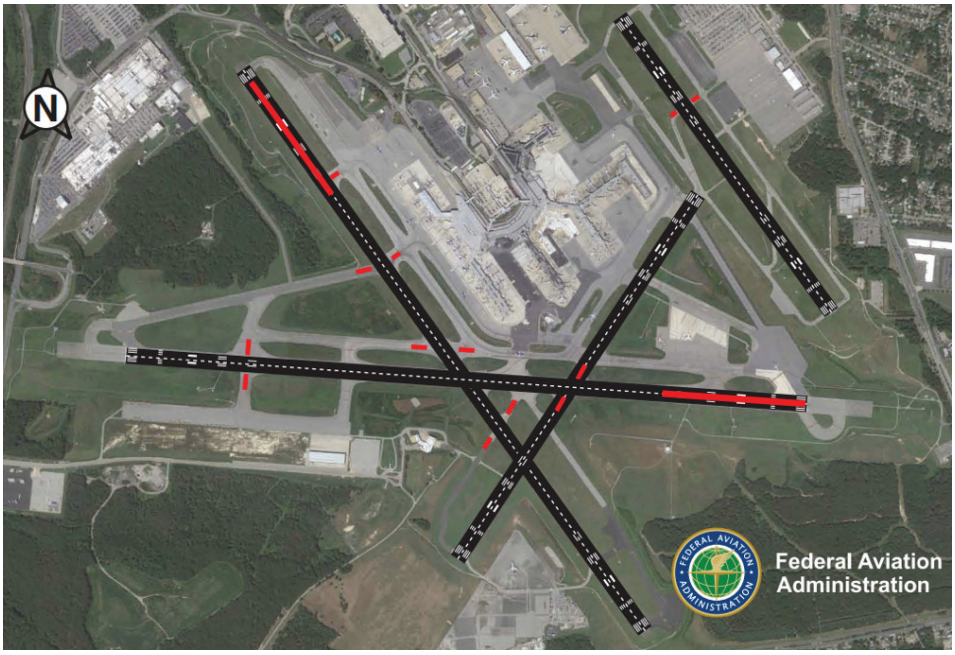
As an extension of the Maryland Aviation Administration (MAA) staff and construction management division, Arora is currently providing construction administration support for the airfield lighting components associated with the $350 million Airfield Standards and Pavement Rehabilitation Project at BWI Airport.

The RSA portion of this program is required for compliance with the Federal Runway Safety Area Compliance Mandate that stipulates all commercial airport runways must meet FAA standards for Runway Safety Area (RSA) dimension, grading, and frangibility by the end of 2015.

SCOPE OF WORK INCLUDED:

During design development Arora provided comprehensive plans to outfit the airfield with Runway Status Lights (RWSL's) as part of the FAA's RWSL program. Design elements included LED light fixtures, modified underground distribution and junction structures to new Airfield Lighting Vaults and fiber optic cables for control of the RWSL system components.

Construction is scheduled to conclude in 2017.



LEE COUNTY PORT AUTHORITY

Midfield Terminal Apron Expansion and Associated Taxiways

Southwest Florida International Airport, South Fort Myers, FL

PROJECT DETAILS

CLIENT

Lee County Port Authority
Southwest Florida Int'l Airport
Mark Fisher, AAE
Deputy Executive Director
11000 Terminal Access Road,
Suite 8671
Fort Myers, FL
239-590-4600

CONSTRUCTION

$150,000,000

PROJECT START

2008

PROJECT COMPLETION

2014

HIGHLIGHTS

+ Part of RSW's Runway 6R-24L development program
+ Provided MEP system designs for RSW's airfield lighting vault
+ Design included airfield lighting and signage

Southwest Florida International Airport (RSW) is a public, county-owned airport located in South Fort Myers, FL. It is a "primary focus city" for AirTran Airways and is one of the top 50 busiest airports in the United States.

In September 2005, a $438 million Midfield Terminal Complex opened, increasing demand capacity to 10 million

passengers annually. The terminal complex is currently in the planning phases for expansion, which includes two new concourses (Terminals D & E) and 37 additional gates. Also in the planning phase is a Runway 6R-24L development program. This undertaking entails a new runway, associated connector taxiways, an Air Traffic Control Tower, an airport rotating beacon, an aircraft rescue and firefighting building, and an airfield lighting vault. >>

LEE COUNTY PORT AUTHORITY

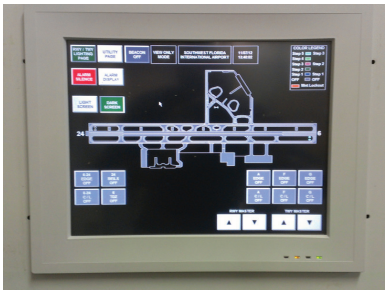
Midfield Terminal Apron Expansion and Associated Taxiways

Southwest Florida International Airport, South Fort Myers, FL

<<

SCOPE OF WORK INCLUDED:

Arora successfully performed several design tasks under the Runway 6R-24L development program. Design efforts included MEP design for upgrades to the existing Airfield Lighting Vault, LED light fixtures, modified underground distribution, junction structures, and LED airfield signage. Construction concluded in 2014 on time and within budget.



CONNECTICUT DEPARTMENT OF TRANSPORTATION

Airfield Lighting Vault Relocation

Bradley International Airport, Windsor Locks, CT

PROJECT DETAILS

CLIENT

Connecticut Department of Transportation
Theodore H. Nezames, PE
Transportation Principal Engineer
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546
theodore.nezames@ct.gov
860-594-3298

CONSTRUCTION

$5,000,000

PROJECT START

2009

PROJECT COMPLETION

2012

HIGHLIGHTS

+ Replacement of airfield lighting and control system
+ Demolition of existing airfield lighting equipment within existing light vault to facilitate Terminal B demolition
+ Design and layout of vault electrical equipment including constant current regulators, power feeds, panels, computers, series cutouts, FAA equipment and building lighting
+ Designed emergency generator and above ground diesel storage tank for new vault
+ Designed card key access system for vault access doors

Arora prepared contract documents for the relocation of Bradley International Airport's airfield lighting vault. The vault relocation is an enabling project for the airport terminal redevelopment. Arora provided full electrical engineering design for the demolition of the existing vault as well as a new 25' x100' vault to the house airfield power and control infrastructure.

SCOPE OF WORK INCLUDED:

The existing series lighting cable and incoming service was relocated from the existing terminal and redistributed through new underground infrastructure to the new vault. The upgraded distribution included a fiber communications link to the control tower and a new airfield lighting and control system. The new vault was designed to be expandable in consideration of the airport master plan with separate rooms for dedicated runway equipment and incoming power.

Arora's scope of work also included engineering design, estimates of probable construction costs, FAA coordination, drawing development, engineering calculations, construction phasing, bid phase services, and construction related administrative services.

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Runway 1-19 Safety Area Improvements

Republic Airport, Farmingdale, NY

PROJECT DETAILS

CLIENT

AECOM
Jennifer Lutz
Associate Vice President, Planning
4 North Park Drive
Suite 300
Hunt Valley, MD 21030
Jennifer.lutz@aecom.com
410-891-9415

CONSTRUCTION

$5,000,000

PROJECT START

2016

PROJECT COMPLETION

2016

HIGHLIGHTS

+ Airfield Lighting and Signage
+ Conditions Assessment
+ Cost Benefit Analysis
+ LED lighting
+ Construction Safety and Phasing Plan

Arora has recently completed design services for the Runway 1-19 Safety Area Improvements and relocation of Taxiway G. The improvements include shifting and extending the Runway 1 threshold north, and reclaiming the displaced threshold on the Runway 19 end. Taxiway G requires relocation to conform to FAA runway to taxiway separation requirements.

The design elements include new LED runway/taxiway edge lighting & airfield signage, circuit distribution modifications, supplemental windcone upgrades, LED type Precision Approach Path Indicators (PAPI) lamp housing assemblies, and LED type Runway End Identifier Lights (REILS) units.

SCOPE OF WORK INCLUDED:

+ New and Relocated Airfield Signage
+ New LED edge lighting
+ Runway 1 and Runway 19 PAPI Assembly
+ Runway 1 and Runway 19 REIL Assembly
+ Modifications to the Airfield Lighting Vault and Airfield Lighting and Control System.

Arora performed an analysis of existing conditions, using value engineering & expert judgement to develop the design documents. Design documents include contract drawings, specifications and an estimate of probable construction costs in strict conformance to FAA design standards for a fully functional airfield lighting, signage and economy approach aid upgrade. In addition, Arora will be providing procurement and bid award services and construction administration services.

SUSQUEHANNA AREA REGIONAL AIRPORT AUTHORITY

Rehabilitation of Runway Lights

Capital City Airport, Harrisburg, PA

PROJECT DETAILS

CLIENT

Susquehanna Area Regional Airport Authority
Harrisburg International Airport
David Spaulding
One Terminal Drive, Suite 300
Middletown, PA 17057
dspaulding@saraa.org
717-948-3900

CONSTRUCTION

$500,000

PROJECT START

2009

PROJECT COMPLETION

2013

HIGHLIGHTS

+ Rehabilitation and upgrade of airfield lighting systems and lighting vault
+ Study featured an extensive evaluation electrical and lighting infrastructure
+ Identified areas for improvement that will reduce lighting loads and streamline maintenance needs

The Susquehanna Area Regional Airport Authority (SARAA) has tasked Arora with providing engineering design to rehabilitate and upgrade the airfield lighting systems and airfield lighting vault at Capital City Airport (CXY). A preliminary design study was completed by Arora as part of a general services on-call agreement with SARAA to identify existing infrastructure, phasing constraints and probable construction costs for replacement of the outdated equipment.

SCOPE OF WORK INCLUDED:

Specifically, the design study evaluated the existing edge lighting systems, underground distribution and components of the electrical vault and determined the infrastructure exceeded its normal life span. New technology was proposed to reduce lighting loads and provide better maintenance history for airport personnel. The Federal Aviation Administration (FAA) and SARAA utilized the information within the design study to program funding and submit project criteria for final design documents and construction.

SUSSEX COUNTY COUNCIL

Runway 4-22 Extension

Sussex County Airport, Georgetown, DE

PROJECT DETAILS

CLIENT

Sussex County Council
Jim Hicken, Airport Manager
21553 Rudder Lane
P.O. Box 589
Georgetown, DE 19947
jhickin@sussexcountyde.gov
302-855-7774

CONSTRUCTION

$5,000,000

PROJECT START

2011

PROJECT COMPLETION

2013

HIGHLIGHTS

+ Evaluation of existing airfield lighting and NAVAIDs
+ Load analysis and configurations for electrical distribution
+ Load analysis and configurations for a new MALS shelter and associated equipment
+ LED lighting design for new Taxiway segment
+ Navigational aid Improvements
+ Airfield lighting and signage upgrades in new runway/taxiway pavement
+ Airfield lighting and control system modifications
+ Cost/benefit analysis for design concepts

Arora prepared contract documents for the Runway 4 extension project at Sussex County Airport, which incorporated a 500 foot extension on the Runway 4 end.

SCOPE OF WORK INCLUDED:

The project was divided into two packages. Arora was responsible for electrical and airfield electrical design engineering. The first package included runway safety area and navigational aid improvements for the extension of full strength pavement 500' x 150' on the Runway 4 end. The runway extension required parallel Taxiway A to be extended 780' x 50' to tie into the extended Runway 4 end. Runway 22 required a displaced threshold of 170 feet to eliminate obstructions to the runway approach surfaces. Arora's package two scope involved lighting to accommodate the mill and overlay of the full-length runway and installation of a MALS system on the Runway 4 end.

Additional design services include the relocation of PAPI systems on both runway ends and modifications to the distance remaining signs and lens colors of existing runway edge lighting. Package two design documents included a new airfield lighting and control system and Runway 4 MALS and associated shelter. Arora's design services also included field investigations, record document reviews, meeting attendance, engineering design and calculations, preparation of drawings, technical specifications, cost estimations, and bid reviews.

TOWN OF HAMMONTON, NEW JERSEY

Airfield Lighting Renovations

Hammonton Municipal Airport, Hammonton, NJ

PROJECT DETAILS

CLIENT

L.R. Kimball
Ronald N. Morris, PE, CM
4400 Deer Path Road
Suite 105
Harrisburg, PA 17110
Ron.Morris@lrkimball.com
(717) 221-8820

CONSTRUCTION

$1,000,000

PROJECT START

2013

PROJECT COMPLETION

2014

HIGHLIGHTS

+ General Aviation Airport
+ Replacement of RW and TW Edge lighting
+ Upgrades to electrical vault

Arora provided airfield electrical services including quality control review for the Airfield Lighting Renovations at Hammonton Municipal Airport in Hammonton, New Jersey. This project included the Design and Bidding Phases of a project for the removal and replacement of the existing incandescent Runway and Taxiway Edge lighting system with an LED system and other electrical improvements. This project also included upgrades to the existing electrical vault to accommodate the more efficient edge lighting system.

SCOPE OF WORK INCLUDED:

+ Proposed cable size and type for each cable run.
+ Evaluation, recommendations, and design of a new electrical service entrance.
+ Evaluation, recommendations, and design of a new airfield lighting control panel.
+ Evaluation, recommendations, >>

TOWN OF HAMMONTON
NEW JERSEY

Airfield Lighting Renovations

Hammonton Municipal Airport, Hammonton, NJ

<< and design of emergency disconnects.

+ Evaluation, recommendations, and design of new constant current regulator(s).
+ Evaluation, recommendations, and design of new FAA L-854 Radio Control Equipment.
+ Proposed Electrical Vault Equipment Demolition Plan and Notes.
+ Proposed Electrical Vault Renovations Plan and Notes.
+ Electrical Vault Equipment Technical Specifications and Special Provisions in a format as presented in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5370-10F, Standards for Specifying Construction of Airports.
+ Electrical Design and Computations Report summarizing design criteria/ computations, assumptions, evaluations, recommendations and Engineers Opinion of Probable Cost. The report shall contain reference materials, pictures and exhibits as required depicting the design intent.

In addition, Arora provided overall quality control review of the construction documents at the 60% and 90% design stages including written comments and a recommendation report in preparation of the Final Contract Bid Documents.

Rethinking Infrastructure®

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