



Transportation

Engineering Qualifications

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ARORA®

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Dear Prospective Client,

Since 1986, Arora Engineers has worked with Transportation agencies across the country on a range of services covering the complete project life cycle. Arora's technical expertise lies in transportation stations as well as systems for bridges and tunnels. Our current customers include Amtrak, SEPTA, MBTA, WMATA, MTA, LIRR, NYCT, NJT, PennDOT, Santa Clara Valley Transportation Authority (VTA) and more.

Arora has done systems planning for large transportation facilities our Geospatial team works on asset management and safety management (SMS) programs.

Station design is at the core of Arora's technical expertise. Ranging from greenfield stations, to expansions and renovations, we can lead or support any of the design and engineering for building systems. We have dedicated disciplines in Mechanical, Electrical, Plumbing, Fire/Life Safety, and Special Systems (Security, Telecom, IT). We design stations with the future in mind and live our tagline of Rethinking Infrastructure as we approach each unique project.

Our Construction and Program Management group (PM/CM) experience ranges from serving as agency extension of staff and owners rep 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

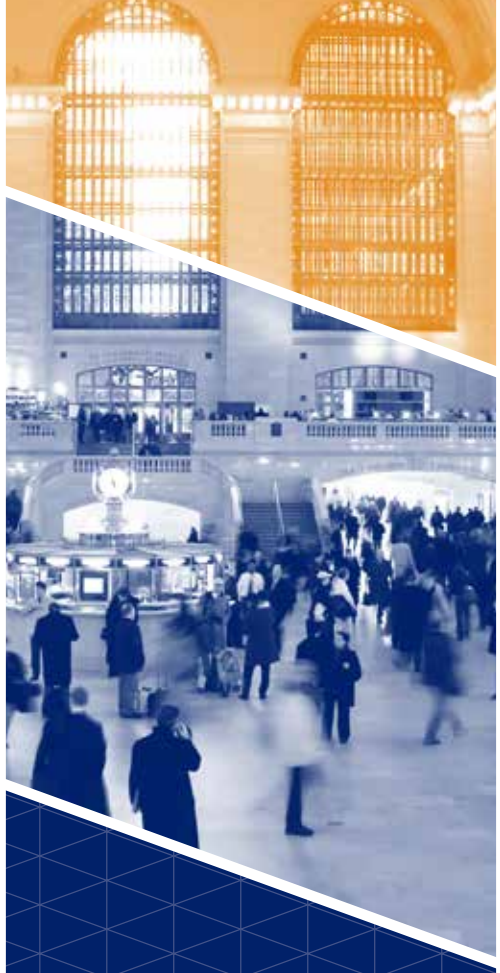


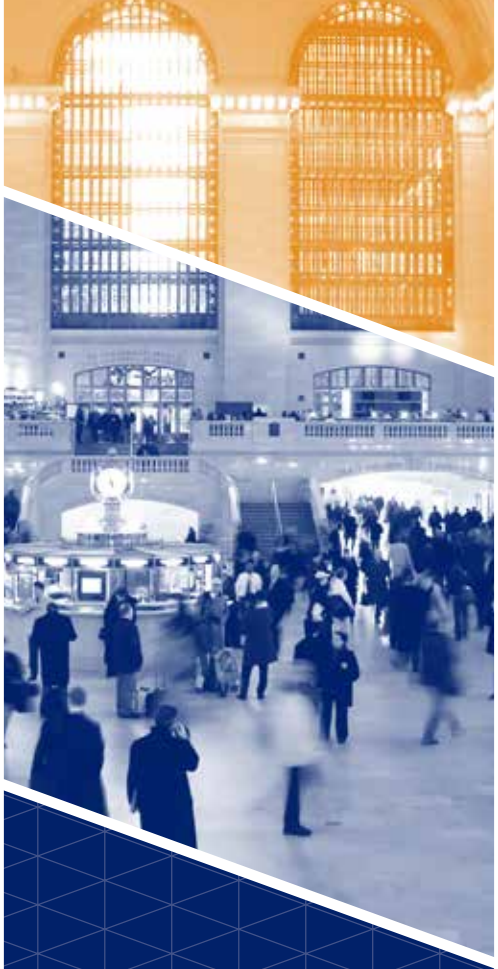
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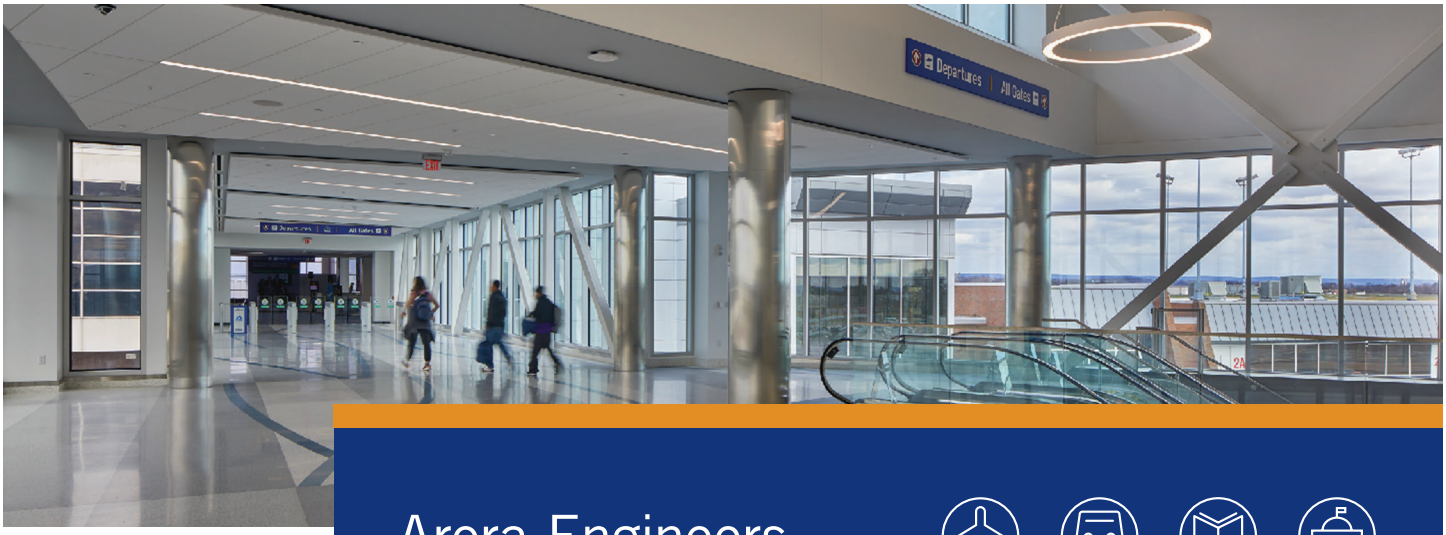
+ Company Overview



+ Rail Experience



COMPANY OVERVIEW



Arora Engineers

At Arora Engineers, we believe infrastructure needs to do far more than provide a seamless, safe, sustainable and comfortable environment. Our goal is to maximize its role, impact and value through highly intelligent solutions that not only meet operational needs, but forward business objectives.

We meet the evolving needs of the world's most critical industries – aviation, transportation and education – through more intelligent, sustainable and connected infrastructure solutions that maximize value for our clients and partners.

Expertise

Since 1986, we have held ourselves to rethinking the role of the traditional MEP firm. As a result, we've evolved our practice to emphasize the technology and processes that connect systems infrastructure, improve operations and longevity and make life safer and easier for those who use it.

Arora specializes in providing engineering services tailored for clients in aviation, transportation, education, government and commercial sectors, and has developed a unique understanding of the challenges and opportunities facing these critical industries.

Services

SPECIAL SYSTEMS / TECHNOLOGY

+ Mass Notification & Public Address
+ WiFi systems
+ Voice/data systems
+ Network architecture
+ Data centers
+ MDF/IDF room layouts
+ Network design via fiber or copper backbone
+ Plant cabling systems
+ Fiber optic and copper structured cabling systems
+ Communications system design
+ CCTV/MATV/CATV systems
+ Program Scheduling & Scheduling Review
+ Access control
+ Duress systems
+ Perimeter intrusion detection
+ Risk and needs assessments
+ Video walls
+ Security operations and procedures evaluation
+ Passenger/customer information display systems
+ Signage systems/Electronic video information display systems (EVIDS)
+ Software and equipment evaluation and recommendations
+ FIDS/BIDS/GIDS/CUPPS/SUPPS
+ Multi-lingual/International traveler



ATLANTA

BOSTON

CHICAGO

DALLAS

DENVER

FORT LAUDERDALE

HOUSTON

LOS ANGELES

NEW YORK

ORLANDO

PHILADELPHIA

PHOENIX

SAN DIEGO

SAN JOSE

SEATTLE

BENGALURU, INDIA

PUNE, INDIA

ELECTRICAL

+ Low and medium voltage power distribution
+ Emergency and standby power systems
+ Lighting design and photometrics
+ Substation/switchgear
+ Grounding and lightning protection
+ Single-line diagrams
+ Short circuit & coordination studies
+ Traffic Studies
+ Roadway and ITS Design
+ Power and lighting equipment selection and specifications
+ Motor control centers
+ Electrical equipment sizing
+ Energy efficient systems
+ Electrical code analysis
+ Electrical plan review and master plan development

AIRFIELD ELECTRICAL

+ Airfield Lighting and Signage
+ Approach Lighting Systems
+ Instrument Landing Systems
+ Navigational Aids
+ Airfield Lighting and Control Systems
+ Runway Incursion Mitigation
+ Pavement Surface Sensor Systems
+ Vertiports

HVAC / PLUMBING

+ Sustainable/Green Building design
+ HVAC
+ Central plant design
+ Underfloor Air Systems design
+ Constant and variable air volume systems
+ Radiant heating systems
+ Geothermal system design
+ Building automation and digital controls
+ Domestic water systems
+ Storm and sanitary system design
+ Fuel system design
+ Lifecycle Costing, Energy Analyses

FIRE PROTECTION AND LIFE SAFETY

+ Fire alarm and detection system design
+ Standpipes & water-based sprinkler system design
+ Foam systems & special hazard suppression design
+ Fire pumps & fire protection water supply system design
+ Smoke management
+ Code analysis and consulting
+ Plan review
+ Due diligence reports
+ Performance based analysis
+ Risk/hazard assessment
+ Site conditions survey

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

+ Database setup and implementation plans
+ CAD to GIS conversion plans
+ FAA Airport GIS program compliance
+ Legacy data access integration
+ Web-based GIS portal development
+ Asset and utility data management
+ Field inspection and inventory
+ GPS data capture and attribution

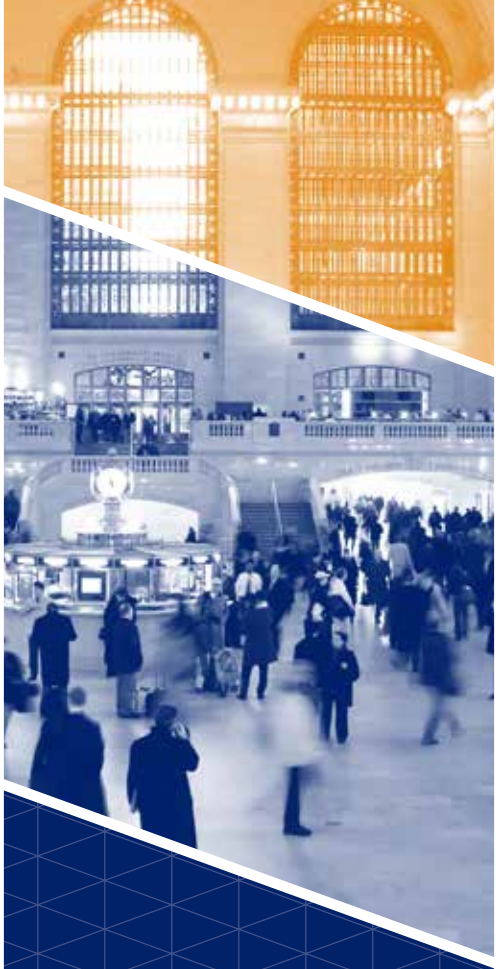
PROGRAM MANAGEMENT

+ Project management
+ Procurement coordination
+ Information management
+ All-inclusive project control
+ Runway Incursion Mitigation
+ Pavement Surface Sensor Systems
+ Airfield Lighting Vaults and Power Distribution
+ Sustainable Solutions
+ Construction Safety and Phasing
+ Multi-Airport Program Management

CONSTRUCTION MANAGEMENT & INSPECTION

+ Project administration
+ Master systems integrator
+ Daily inspection
+ Project documentation
+ Submittal review/tenant permit reviews
+ Design Development & Management
+ Owner's Representative
+ Feasibility & Planning Studies
+ Project controls
+ Design Development & Review
+ Quality Control & Quality Assurance
+ Constructibility reviews
+ Value engineering
+ Runway Incursion Mitigation
+ Airfield Lighting Vaults and Power Distribution
+ Pavement Surface Sensor Systems
+ Construction Safety and Phasing

ARORA®



RAIL EXPERIENCE

PROJECT DETAILS AMTRAK

DESIGN AND CONSTRUCTION PHASE SERVICES FOR MULTIPLE STATIONS NATIONWIDE

Various Locations, USA

Client

STV Incorporated
Stephen Diehl
Project Manager
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Construction

Varies by task.

Project Start

2021

Project Completion

Ongoing

Highlights

+ Electrical engineer, design, and bid phase services for ADA improvements at Amtrak stations across the country

Arora Engineers (Arora), serving as a subconsultant to STV, Inc., provided design services in support of the American with Disabilities Act (ADA) Station Program. Section 12162(e) of the ADA required that all stations in the intercity rail transportation system be made accessible to and usable by individuals with a disability.

Scope of work included:

Arora provided engineering design and construction phase services to the team to ensure that Amtrak's goal of implementing its ADA Stations Program to bring the stations it served and for which it had ADA responsibility into compliance with ADA requirements in the most timely, integrated, and efficient way possible.

Task Order #1 - St. Cloud, MN ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project at the Amtrak Station located at 555 E St Germain St, St Cloud, MN 56304. The scope of work included providing power and lighting design to document the electrical work associated with the new platform lighting including foot candle calculations, convenience receptacles, providing branch circuits for any relocated equipment, and electrical demolition. Bid Phase services were provided.

Task Order #2 – Marshall, TX (MHL) ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project at the Amtrak Station located at 800 North Washington Street, Marshall, TX 75670. The scope of work included providing power and lighting design to document the electrical work associated with the new platform lighting including foot candle calculations for a 19 foot wide by 300 foot long platform. Lighting controls and dedicated branch circuit were provided for the platform lighting. Bid Phase services were provided.

Task Order #3 – Lamy, NM ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project at the Amtrak Station located at 152 Old Lamy Trail, Lamy, NM 87540. The scope of work included documenting the electrical work associated with the door replacement and restroom renovation ADA project. Bid and Construction Phase services were provided.

Task Order #4 – Richmond, CA ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project at the Amtrak Station located at 1700 Nevin, Avenue, Richmond, CA 94801. The scope of work for this task included documenting the electrical work associated with the replacement of the existing lighting fixtures. Arora's design services included drawings and specifications including the new fixture layouts, foot candle

calculations, panel schedules identification of new branch circuits, and performance of voltage drop calculations, as well as electrical details. Two site visits were performed to document existing electrical room conditions, measure light levels / foot candle readings during the design phase, as well as measuring lighting levels / foot candle readings when the project was completed to ensure all Amtrak Engineering Stations Standard Design Practices were met.

Task Order #5 – Arkadelphia, AR ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project at the Amtrak Station located at 798 South, 5th Street, Arkadelphia, AR 71923. This task included the replacement of existing platform, including new lighting fixtures, and the expansion of the existing restroom to comply with ADA turning space requirements. Arora documented existing electrical conditions and provided drawings and specifications including the new fixture layout, foot candle calculations, panel schedules identifying new branch circuits, performance of voltage drop calculations, and provision of electrical details.

Task Order #6 – Benson, AZ ADA Project

Arora provided electrical engineering, design, and construction phase services for the ADA Improvement Project at the 105 E. 4th St. Amtrak Station in Benson, AZ. This task included the replacement of the Station's existing 600-foot asphalt platform with a new 300-foot concrete platform, including new lighting fixtures and a lighting control system. New lighting fixtures were also provided for the 70 foot public right of way at plaza. Arora's services included documenting existing electrical conditions, and providing drawings and specifications including the new fixture layout, foot candle calculations, and panel schedules identifying new branch circuits. Our team also performed voltage drop calculations and provided electrical details.

During the construction phase, Arora's services included responding to contractor RFIs, assisting in development of Bulletins as required, and reviewing equipment submittals.

Task Order #7 – Glasgow, MT ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project at the Amtrak Station located at 424 First Avenue South, Glasgow, MT 59230. This task included the replacement of the existing platform, including new lighting fixtures. Arora documented existing electrical conditions and provided drawings and specifications including the new fixture layout, foot candle calculations, panel schedules identifying new branch circuits, performed voltage drop calculations, and provided electrical details.

Task Order #8 – Schriever, LA ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project located at 145 Burlington Court in Schriever,LA. This task included the construction of a new approximately 500-foot concrete platform and egress path, including new lighting fixtures, and a lighting control system. Arora performed two site visits, the first was during the design phase where the Arora team documented existing electrical conditions, the second was during construction where our team reviewed the electrical installation to document any deficiencies and prepare a punchlist. Arora provided drawings and specifications including the new fixture layout,

foot candle calculations, and panel schedules identifying new branch circuits. Our team also performed voltage drop calculations and provided electrical details.

During the construction phase, Arora's services included responding to contractor RFIs, assisting in development of Bulletins as required, and reviewing equipment submittals.

Task Order #9 – Sedalia, MO ADA Project

Arora provided electrical engineering and design services for the ADA Improvement Project located at Pacific Street and North Osage Avenue in Sedalia, MO. This task included the construction of a new, approximately 350-foot concrete platform, including new lighting fixtures, and a lighting control system. Arora performed two site visits, the first was during the design phase where the Arora team documented existing electrical conditions, the second was during construction where our team reviewed the electrical installation to document any deficiencies and prepare a punchlist. Arora provided drawings and specifications including the new fixture layout, foot candle calculations, and panel schedules identifying new branch circuits. Our team also performed voltage drop calculations and provided electrical details.

During the construction phase, Arora's services included responding to contractor RFIs, assisting in development of Bulletins as required, and reviewing equipment submittals.

Task Order #10 – Route 128 Restroom Project, Westwood, MA

Arora provided electrical engineering and design services for the Restroom Improvement Project located at Amtrak's Route 128 facility located at 50 University Ave in Westwood, MA. The scope of work included documenting the electrical work associated with the renovation of two restrooms. Arora provided drawings and specifications including the new lighting fixture layout, foot candle calculations, and panel schedules identifying new branch circuits for restroom equipment requiring an electrical connection. We also performed voltage drop calculations and provided electrical details.

Arora's Bid Phase services included responding to contractor pre-bid Requests for Information (RFIs) and assisting in the development of Addenda as required.

In the Construction Phase, Arora responded to contractor RFIs, assisted in the development of Bulletins as required, and reviewed equipment submittals.

PROJECT DETAILS

Client

Gilbane Building Company
Scott Mucci
1200 Intrepid Ave
Ste 405
Philadelphia, PA 19112
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(410) 649-7584

Construction

$527,000,000

Project Start

2020

Project Completion

Est. 2025

Highlights

+ Multidisciplinary mechanical, electrical, plumbing, special systems and fire/life safety engineering services
+ $10 million of upgrades to station's HVAC and MEP systems
+ 30,000SF of renovated retail space
+ Redevelopment and retrofit of the North and South Office Towers flanking the Main Hall to provide office space and commercial development opportunities

AMTRAK

WILLIAM H GRAY III 30TH STREET STATION

Philadelphia, PA

Arora Engineers (Arora) provided multidisciplinary design/build engineering services to Gilbane Building Company, a member of the team led by Plenary Infrastructure Philadelphia (PIP), for the redevelopment of Amtrak's William H Gray III 30th Street Station. Under this master development partnership via ground lease, which reached financial close in September 2021, the PIP Consortium will refurbish and improve the historic building, with PIP responsible for financing the improvements and maintaining the station for the next 50 years. The restoration of the approximately 8-acre station, built between 1929 and 1934, includes extensive enhancements to the neoclassical station's infrastructure to bring it into a state of good repair, improved transit and pedestrian circulation, consolidated station operations, rejuvenated retail offerings, and improved pedestrian transit safety with landscaping and streetscaping.

The project was divided into several packages beginning with renovations to the major building systems and utilities and the infrastructure supporting them. Improvements to Market Street Plaza and the exterior canopy followed, along with the renovation and fit out of the level 1 stations, level 1 mezzanine, and platform service level including historical preservation, retail, signage, lighting design, furniture and finishes. The subsequent packages addressed the renovation and fit out of the North and South Office Towers flanking the Main Hall to provide commercial development opportunities along with temporary swing space to ensure seamless station operations during construction and a temporary corporate office swing space.

Arora provided mechanical, electrical, plumbing, fire protection, fire alarm and special systems Engineering for this design/build project.

+ **Mechanical Engineering:** Arora's mechanical engineers provided design services for the removal of the existing Veolia district steam service for the portions of the station renovated, and replaced it with a new hot water boiler plant located in the Platform level mechanical equipment room. The new boiler plant design consisted of gas fired condensing type boilers, which supply relatively low temperature heating hot water to various air handling units (AHUs) and terminal heating equipment. Additionally, the building design included removal of the majority of



AMTRAK

WILLIAM H GRAY III 30TH STREET STATION

Philadelphia, PA

dated legacy pneumatic controls and air compressors, and replacement with an all new digital Building Automation System (BAS) that monitors and controls all building energy using systems.

An extensive suite of utility submeters was provided throughout to monitor all significant utility usages (electricity, domestic water, outdoor and exhaust airflow, natural gas, heating hot and chilled water, etc.). This permits real-time monitoring of all energy usages and allows instantaneous remedial action to minimize Amtrak's utility costs.

+ **Electrical Engineering:** Arora's electrical engineers reviewed existing electrical systems and recommended all distribution equipment, along with the feeders, branch circuits, etc., be replaced. Additionally, engineers provided designs for the replacement of the existing CETC generator and provided designs for a new generator-powered back-up distribution system, segregated into National Electrical Code (NEC) loads: emergency (i.e. life safety), legally-required, and optional standby. Electrical design included two new substations (north and south) to be located in the West Garage.
+ **Plumbing Engineering:** Arora's plumbing engineers provided design services for the removal of all existing piping systems and replaced it with new piping to maintain the building for the next 50 years. The design included new chases, piping risers and new restroom configuration while maintaining the historic facades in the building.

  A new domestic water system design included a new building entry service and new triplex VFD domestic water booster. The new entry point for the water service is located on the platform service level rather than in the subplatform area. This will help to protect the building water supply from any contamination due weather related flooding. The new location also allowed the existing water service to remain while the new water service was installed, limiting downtime to the plumbing system.

  A new natural gas service was designed to support the new boiler plant and retail tenant fit out while becoming independent from the district steam service.

  An entire new sanitary system and storm system conveys waste water to the existing PWD connections.
+ **Fire Protection Engineering:** A new fire pump was designed to be supplied by connections to no fewer than two water mains located in different streets. Separate supply piping was provided between each connection to the water main and the fire pump. Engineers determined that a standpipe system was also required for the building. An automatic wet Class I standpipe ensured a fully sprinklered building. Separate standpipes were provided in each required exit stairway. In addition, the team of engineers provided design services for sprinkler coverage for the platform level back of house, ground level, mezzanine level, second floor office tower north and south, and eighth floor.
+ **Fire Alarm Engineering:** The Arora team participated in design services for the necessary Fire Command Center (FCC), containing the emergency voice/alarm communication system, fire department communication system, fire detection and alarm system annunciator, elevator control, status controls for air distribution systems, fire fighter control panel for fire fighter communications, control for unlocking interior exit stairway doors, sprinkler valve and waterflow detection, computer graphic workstation, emergency and standby power status indicators,

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WILLIAM H GRAY III 30TH STREET STATION

Philadelphia, PA

telephone for fire department use, fire pump status indicators, building plans detailing life safety systems, building information cards, work table, generator supervision devices with manual start and transfer features, elevator fire recall switch, elevator emergency or standby power selector switches, and ability to provide emergency and non-emergency announcements where required. Design services also included a complete, fully automatic fire alarm system, automatic smoke detection, emergency voice/alarm communication system, and emergency responder radio coverage.

+ **Special Systems:** Arora provided specialized services for the data and communication aspect of this station renovation project. The scope of work included new telecommunication equipment, systems, and data/communication to provide a comprehensive, centralized telecommunications network infrastructure. The engineers provided new structured cabling systems, which ensured interconnections between telecommunications rooms, equipment rooms, main terminal space, and entrance facilities. The scope involved backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords and jumpers used for backbone-to-backbone cross-connections. The backbone also extended between buildings in a campus environment. Additionally, a new main telecommunications distribution room was established for the facility (MDC).

PROJECT DETAILS

Client

AECOM
Nathaniel Ureta, PE
Senior Structural Engineer
510 Carnegie Center
Princeton, NJ 08540
nathaniel.ureta@aecom.com
609-720-2000

Project Start

2017

Project Completion

2023

Highlights

+ Existing conditions survey
+ Design services
+ Full construction documentation and service

AMTRAK

NEW CARROLLTON PLATFORM RECONSTRUCTION

New Carrollton, MD

Arora Engineers (Arora) was chosen to join the team, led by AECOM, in the design and development of a new high level-platform on Track 1 for the New Carrollton Station for Amtrak for design of a new 48" at top of rail center platform and platform head house, station signage, and modifications to the existing station. Arora's specific scope included mechanical, plumbing, electrical, and fire/life safety engineering services.

Scope of work included:

The objectives of this project were to survey and document existing conditions suitable for use in future projects, as well as utilize the 15% design documents provided as a starting point for the design development. The discipline-specific tasks included the evaluation of existing utilities:

+ **Mechanical (HVAC)**
  + ***Existing HVAC:*** Combined appendix 15% design document report recommended replacing the existing air handling unit and associated ductwork in the existing station.
  + ***New HVAC:*** Extended the existing ductwork system to provide conditioned air to the new upper platform and increase the capacity of the newly replaced air handling unit to accommodate.
+ **Plumbing**
  + ***Existing Plumbing:*** Renovated the existing public restrooms.
  + ***New Plumbing:*** Implemented new storm water management for the new upper platform and connect to the existing storm water management system.



AMTRAK

NEW CARROLLTON PLATFORM RECONSTRUCTION

New Carrollton, MD

+ **Electrical (Power)**
  + ***Existing Electrical Room:*** Renovated the existing electrical equipment located in electrical and mechanical spaces. Determined if the existing electrical devices needed to be upgraded or updated.
  + ***New Electric:*** Provided power and panel(s) to the new equipment as required. This included the circuiting of light fixtures designed by another team member.

Addtional Services

Infrastructure Phase II - Bid Cycle and Construction Services Supplement: Project scope of services included the following:

Bid Cycle Services

+ Provided final signed and sealed drawings that incorporated past 100% design comments and constructability review comments
+ Confirmed that the winning bid considered all MEP work and did not exclude anything
+ Upon award of the construction contract, provided a conformed set of drawings and specifications

Construction Phase Support Services (CPS)

+ Attended meetings/site visits on an as-needed basis
+ Review of submittals within 15 calendar days of receipt and any resubmittal within seven calendar days
+ Provided support on change orders related to unforeseen conditions or changes requested by Amtrak
+ Provided support in the investigation of Non-Conformance Reports (NCR's)
+ Reviewed preliminary commissioning plan
+ Reviewed final commissioning plan
+ Provided support for developing facility inspection and maintenance plan
+ Provided support for developing facility inspection and maintenance plan estimate
+ Reviewed all material and equipment testing required of the contractor by the contract documents and recommend acceptance or rejection
+ Witnessed factory testing of products and provided written report

Infrastructure Phase II - WMATA Coordination Assistance Supplement:

Supplemental Design Scope

+ Arora provided Amtrak with WMATA design coordination support associated with the planned improvements at New Carrollton Station associated with 2021 Next Generation High-Speed Rail.
+ Specific scope included mechanical (HVAC), plumbing, electrical (Power)

Amtrak - New Carrollton Platform Reconstruction Design Phases 6 & 7: Under this assignment, Arora performed the following services:

+ Evaluation of existing utilities for HVAC, plumbing, electrical, and fire protection/fire alarm systems

AMTRAK

NEW CARROLLTON PLATFORM RECONSTRUCTION

New Carrollton, MD

+ For the existing HVAC, the team combined 15% design document report recommends to replace the existing air handling unit and associated ductwork in existing station.
+ For the new HVAC, the team provided designs to extend existing ductwork system to provide conditioned air to new upper platform. In addition, they increased the capacity of the newly replaced air handling unit to accommodate these loads.
+ Provided plumbing services for the renovations to existing public restrooms.
+ Designed new storm water management for new upper platform and connections to existing storm water management system.
+ For the new electrical room, the team prepared renovations to existing electrical equipment located in electrical and mechanical spaces and determined whether the existing electrical devices needed to be upgraded or updated.
+ Provide new lighting layout and calculations for applicable spaces, as well as convenience power where required and power and disconnecting devices for new mechanical equipment.
+ Design services for renovations to the existing sprinkler system and fire alarm monitoring system affected by the other renovations.
+ Provided new notification and initiation devices in new upper platform as well as new monitoring devices as required for mechanical and fire protection devices. Connected all new addressable fire alarm devices to the existing fire alarm network and provided new fire protection sprinkler and standpipe system to upper platform, as well as extended a standpipe network to new outdoor platform and connected back to existing system for monitoring.

Headhouse, Platform and Backhouse Redesign: Arora's scope of work included mechanical (HVAC), plumbing, and electrical (power) for the design of the emergency systems, building automation system (BAS), personalized information display (PIDs) support and CADD standards revisions to all files and drawings for the headhouse, platform, and backhouse redesign.

Mechanical BAS Design: Scope of work included the State of Good Repair (SOGR) & Accessibility (ADA) compliant design supplement for the New Carrollton Station. The objectives of the project were to enhance the remainder of the New Carrollton Station following the design of the Platform Reconstruction Project. The project had four phases, 30%, 60%, pre-final and issue for bid design submissions to develop an integrated ADA-accessible station. Discipline-specific tasks, which Arora identified, included the following:

Plumbing

+ Existing platform (Tracks 2 & 3) renovation
+ Shelter room drainage issues
+ Platform stormwater drainage system
+ Exterior enclosure and roof renovations to address SOGR issues
+ Storefront perimeter drainage/leakage issues
+ Roof leaks (end of useful life)

Electrical

+ New lighting associated to modified platform and enclosure roofs

PROJECT DETAILS

Client

WSP

Matteo Ferrucci

Lead Geotechnical Engineer

250 W. 34th Street

New York, NY 10119

matteo.ferrucci@wsp.com

212-532-9600

Construction

Approx. $28,580,000

Project Start

2019

Project Completion

Est. 2023

Highlights

+ Arora provided Electrical design engineering services for the Port Authority Trans-Hudson Corporation (PATH) rehabilitation of Exchange Place and Grove Street stations during 2019 through 2023.
+ Performed field surveys in coordination with the Authority to assess the condition of existing electrical equipment.
+ Preparation of Stage III Contract Documents and providing Stage IV Post Award Construction Services

PORT AUTHORITY OF NEW YORK & NEW JERSEY

REHABILITATION OF PATH EXCHANGE PLACE AND GROVE STREET STATIONS

Jersey City, NJ

Arora Engineers (Arora), serving as a subconsultant to WSP, provided electrical design engineering services for the Port Authority of New York & New Jersey (PANYNJ) Port Authority Trans-Hudson Corporation (PATH) rehabilitation of Exchange Place and Grove Street stations.



Existing Station Condition

The objective of this project was to rehabilitate current damage as a result of Superstorm Sandy and prevent future potential damages at the Exchange Place and Grove Street stations. The overall work included rehabilitation of architectural finishes, structural components, mechanical, plumbing, fire protection, electronics, electrical facilities, and other infrastructure at platforms and mezzanine levels necessary to maintain the integrity and useful life of each respective station. Each station was rehabilitated based on the selected recommendations developed as a part of the Stage I Report.

The task order services included the following:

A. Stage III Final Design and Contract Documents

B. Stage IV Post Award Construction Services

Scope of work included:

Arora provided electrical design engineering services for the rehabilitation of Exchange Place and Grove Street stations. The services consisted of assisting the Authority in the preparation of Stage III Contract Documents and providing Stage IV Post Award Construction Services for engineering and architectural services.

Arora began the project by reviewing all the relevant project information, including as-built documents and selected recommendations developed as part of the previous Stage I study. Arora also reviewed ongoing and planned projects at PATH Exchange Place and Grove Street Stations to ensure a complete understanding of the project scope. The team coordinated with other trades to understand their impact on the electrical scope of work.

Arora performed field surveys in coordination with the authority to assess the condition of existing electrical equipment and identify existing cables, conduit, material, and equipment that needed to be removed and replaced or maintained and protected in place. The team also assessed the constructability, phasing, and duration of the rehabilitation work.

PORT AUTHORITY OF NEW YORK & NEW JERSEY

REHABILITATION OF PATH EXCHANGE PLACE AND GROVE STREET STATIONS

Jersey City, NJ

In the areas where existing equipment was temporarily removed or relocated, Arora provided necessary staging plans required to maintain operations at the stations. The team also provided a complete set of design documents outlining the removal and replacement of all electrical and lighting systems including wiring, connections, accessories, and electrical devices.

Exchange Place Station

+ Arora provided designs for the replacement of all electrical conduits and cables under the platform level except for traction power and control cables.
+ Coordinated with the contractors performing work pertaining to the replacement of electrical conduits.
+ Above the station platform level, Arora recommended cleaning all surface debris off the electrical conduits, conduit supports, duct banks, junction boxes, and conduits.
+ Installed missing covers on conduits and junction boxes.
+ Suggested the removal of light surface rust and painted entire length of conduits and pipes for uniform appearance.

Grove Street Station

+ Removal and replacement of all electrical conduits and cables under the platform level.
+ Above the platform level, recommended cleaning all surface debris off the electrical conduits, conduit supports, duct banks, junction boxes, and conduits.
+ Installed missing covers on conduits and junction boxes.
+ Suggested the removal of surface rust and painted entire length of conduits and pipes for uniform appearance.
+ Electrical room equipment removed light surface rust on the affected areas.
+ Cleaned all surface debris off the conduits and painted entire length of conduit for uniform appearance.

Stage III Final Design

Electrical Engineering Services included the following:

+ Review of basis of design as established by the Stage I Report and finalized design accordingly.
+ Obtained and reviewed record construction documents, performed further surveys, and gained approval by the authority.
+ Identified and traced back to source all cables and conduits for removal and repair and documented in cable conduit schedules.
+ Prepared contract documents and specifications for the removal and installation of electrical equipment, conduits, and cables components. Contract documents included removal and installation plans of electrical equipment, cables and conduits, details, sections, panel schedules and cable conduit schedules, single line diagrams, and control wiring diagrams.
+ Redesigned lighting system and components as required.
+ Provided staging requirements to ensure that the removals and installation minimized disruption to the stations.
+ A detailed list of repairs and remediation to the electrical equipment.

PORT AUTHORITY OF NEW YORK & NEW JERSEY

REHABILITATION OF PATH EXCHANGE PLACE AND GROVE STREET STATIONS

Jersey City, NJ

+ Identification of all existing electrical cables and conduits back to source. Collecton of data and preparation of panel schedule.
+ Coordination of electrical systems and designs with other disciplines regarding trade removals and installations.
+ Preparation of construction estimate.

PROJECT DETAILS

Client

AECOM/HNTB GLX Joint Venture
George Katsoufis, AIA, ENV, LEED
Associate Vice President
One Federal St., Suite 800,
Boston, MA 02110
George.Katsoufis@aecom.com
(781) 439-5136

Construction

$2,300,000,000

Project Start

2012

Project Completion

2017

Highlights

+ Design Responsibilities: MEP, Fire Protection and Fire Alarm
+ Design of new Transit Stations along the Green Line in Boston
+ Design of a 15,000 SF Vehicle Maintenance Storage Facility

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

GREEN LINE EXTENSION PROJECT

East Cambridge, Somerville, and Medford, MA

Arora Engineers (Arora) was part of the AECOM/HNTB joint venture team responsible for design development for the Green Line Extension Project's advanced conceptual design. The project was an initiative of the Massachusetts Department of Transportation(MassDOT) and the Massachusetts Bay Transportation Authority (MBTA) to provide a direct rail link connecting the underserved areas of Downtown Boston to Union Square in Somerville and College Avenue in Medford.

The project extended the existing Green Line service from a relocated Lechmere Station in East Cambridge to Somerville and Medford. Designs for the project included six stations, 4.3 miles of Green Line light rail tracks, the relocation of four miles of double track commuter rail, extensive bridge repair and development, and a vehicle maintenance storage facility.

Scope of work included:

Arora was tasked with systems design and documentation for the stations and the transportation office building. Arora was responsible for engineering design of the following: mechanical, electrical, plumbing, fire protection and life safety systems. Arora was also responsible for the development of the building information modeling (BIM) relative to each discipline. Arora contributed to the development of both the BIM execution plan and BIM standards for the project.

The design of a 15,000 SF Rail Vehicle Maintenance Storage Facility was also included with the project. The facility features a seven-track car shop for the light rail vehicles used on the Green Line. This project aimed to provide additional shop space for the larger number of vehicles that will provide service on the expanded system. The new car repair facilities included inspection pits, a wheel lathe, and vehicle wash facilities. Building services included compressed air systems in addition to conventional heating and plumbing systems. A radiant floor heating system was



MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

GREEN LINE EXTENSION PROJECT

East Cambridge, Somerville, and Medford, MA

designed to provide a comfortable working environment for shop personnel. The project also featured office space for the maintenance facility's administrative support staff and a parking garage for employee cars and MBTA trucks was located over the rail vehicle storage yard to maximize real estate utilization in a congested urban location.

This important project greatly improves public transit service in some of the most densely-populated municipalities in Massachusetts. Among its many benefits, the Green Line Extension Project: Provides new and better opportunities for residents and visitors to travel within their communities and within the region; provides environmental benefits by reducing the number of vehicles on the road; and support municipal plans for sustainable growth and development.

While the overall program ran into budget issues and as a result, corresponding schedule delays, the Design Team JV met the design and submittal schedules set by the MBTA's team. The team did so within the allocated and authorized budgets. The MBTA temporarily halted the project to terminate the contracts of the PM/CM and construction team members, however, the Design Team JV was retained and was trusted by the MBTA to evaluate and redefine the program as a Design/Build project.

PROJECT DETAILS

Client

Southeastern Pennsylvania Transportation Authority
Jack McElwee
Sr. Project Manager
1234 Market Street
Philadelphia, PA 19107
jmcelwee@septa.org
215-580-3787

Construction

$150,000,000

Project Start

2010

Project Completion

Targeted 2025

Highlights

+ New fare line design with SEPTA new payment technology
+ Expanded CCTV and video recording storage
+ Coordination of design and construction with the Center City District project for Dilworth Plaza
+ Expanded fire alarm station system

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

15TH ST. STATION RENOVATION, DILWORTH PLAZA, AND CITY HALL

Philadelphia, PA

The Southeastern Pennsylvania Transportation Authority (SEPTA) City Hall Subway and Trolley Complex, comprised of Dilworth Plaza, the 15th Street Station and the City Hall Station, is the primary transportation hub for the City of Philadelphia, serving tens of thousands of passengers every day.

The complex provides easy access via subway and trolley cars to numerous city transportation stations along the Market Frankford Line, the Broad Street Line, the Blue and Green Trolley Lines, as well as access to Regional Rail Lines through Suburban Station and 30th Street Station, including direct access to the Philadelphia International Airport (PHL) and local buses. This project was particularly challenging as there were three levels of overlapping track beneath City hall—the tallest masonry load-bearing structure in the world—containing no steel support structure.

The Center City District (CCD) undertook this major multi-phase renovation of the City Hall complex, committing approximately $150 million dollars in improvements. Starting with the transformation of the former City Hall's Dilworth Plaza into the current Dilworth Park, renovations assured Americans with Disabilities Act (ADA) accessibility via no fewer than 14 elevators providing direct access to various subways and trolley platforms.

The upgrades also included numerous ADA and code compliance updates to the mechanical, electrical, security and life safety systems; structural enhancements; and aesthetically appealing, durable interior finishes and custom artwork, making this Philadelphia historic landmark a welcoming and efficient transit gateway for years to come.

Arora Engineers (Arora) provided mechanical, plumbing, electrical, special systems/



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SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

15TH ST. STATION RENOVATION, DILWORTH PLAZA, AND CITY HALL

Philadelphia, PA

security, and fire/life safety systems engineering services as a subconsultant to the BLT Architects team throughout seven phases of this project as detailed below.

Scope of work included:

Dilworth Plaza, Phases 1, 2 and 3

The Dilworth Plaza phase consisted of the renovation of Dilworth Plaza, located at Philadelphia's City Hall, transforming it into Dilworth Park. The design objective was to make City Hall accessible and welcoming by eliminating walls, barriers, stairs, and changing elevations, in addition to creating an active gathering place for civic and cultural events. This was accomplished by establishing a level surface for the entire plaza and the widening an interstation corridor as well as adding the new corridor for improving access. Arora also aided with waterproofing and the addition of new ventilation shafts up to the plaza level. Modifications were made for elevator installations and the renovation of the fare lines within the concourse level.

A comprehensive set of construction drawings, specifications, and an estimate of probable construction costs was created for third-party construction. LEED requirements were also added to the scope of this project, and the Arora team designed the project to achieve LEED Silver accreditation. Arora provided engineering services to support the construction administration phase as part of Dilworth Plaza renovations.

Arora provided construct administrative services for Dilworth Plaza that included reviewing shop drawings, preparing and issuing bulletins, attending regularly scheduled construction meetings, and completing prefinal and final punch lists of the mechanical, plumbing, electrical, security, and life/safety systems.

15th Street Station, Phases 4 and 7



SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

15TH ST. STATION RENOVATION, DILWORTH PLAZA, AND CITY HALL

Philadelphia, PA

Arora provided engineering design and construction administration support as well as bid cycle support as part of the15th Street Station phase of the renovation. In addition to enhancements and replacement of mechanical, plumbing, electrical, and fire/life safety systems, Arora provided special systems design and engineering services such as an expansion of SEPTA's data network, CCTV systems, access control system, audio visual and public address systems, and integrated control consoles.

This design included new network node equipment for IP-based CCTV cameras as well as off-site and local storage devices. Provisions were designed into the system to allow other agencies access to recorded video and local viewing for booth attendants. Access control included fare lane gates, maintenance gates, and several emergency exits. Integrated control consoles were designed for each attendant booth to operate access control doors and initiate emergency and maintenance calls. Audio, visual, and public address systems design included speaker arrays and VMS signs.

Additionally, Arora was involved in bid cycle efforts under the direction of the team lead, which included the clarification of responses to written questions, preparation of addendums, and assisting in the bid selection process.

Arora also provided construct administrative services for the 15th Street Station, including shop drawing reviews, preparing and issuing bulletins, attending regularly scheduled construction and field coordination meetings, and completing prefinal and final punch lists of the mechanical, plumbing, electrical, security, and life/safety systems.



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SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

15TH ST. STATION RENOVATION, DILWORTH PLAZA, AND CITY HALL

Philadelphia, PA

City Hall Station, Phases 5 and 6

During this phase of work, Arora provided mechanical, plumbing, electrical, security, and life/safety systems design services related to the renovations of the City Hall Station. Within this phase, there were three subphases: The Underpinning Phase, known as Phase A5, the EAP (Early Action Package) Phase, known as Phase A5.1, and the Final Fit-out Phase of the City Hall Station, known as Phase A6.

Because of defined hazardous conditions, significant analysis was performed to define the scope of work to limit the potential for hazardous working conditions and understand the overall effect on transit operations.

The Underpinning Phase 5A Design was scheduled to be complete by mid-summer of 2020. The major efforts associated with this phase included designing the systematic removal of nearly every mechanical, plumbing, electrical, security, and life/safety systems to coincide with the station's major structural design modifications. This required numerous site surveys to document existing conditions and multiple coordination sessions with the structural engineer and the architect to assure proper sequences were well documented for systems to be retained, relocated, or removed throughout the station.

The EAP (Early Action Package) Phase A5.1 was completed and issued for construction. The design efforts during this phase were associated with the installation of mechanical, plumbing, electrical, security, and life/safety systems retained ahead of finalizing Phase 5. These new systems and upgrades to existing systems infrastructure were key to retaining the full and safe operation of the City Hall Station until the Phase 5 demolition phase began.

City Hall Station, known as Phase A6 was scheduled to be completed before the end of 2020. During this phase of work, Arora provided design services related to the final renovations at City Hall Station.

New mechanical, plumbing, electrical, security, and life/safety systems were designed to complement the new structural openness of the City Hall Station platforms and blend with the new architectural design elements and artwork Examples include the following:

+ New energy-efficient LED Lighting to illuminate the new wider platforms
+ Security camera to cover the entire City Hall Station, including the four new elevators
+ Plumbing, life/safety, and, passenger assist systems enhancements exceeded in quality and quantity of those previously installed yet blended with the new finishes to present cohesive unobstructed passenger areas

As Phase A5, A5.1, and Phase A6 moved into construction, Arora provided construct administrative services including the reviewing shop drawings, preparing and issuing bulletins, attending regularly scheduled construction and field coordination meetings, and completing prefinal and final punch lists of the mechanical, plumbing, electrical, security, and life/safety systems.

PROJECT DETAILS

Client

Delaware River Port Authority
Steve DeVillasanta,
Project Engineer
2 Riverside Drive
PO Box 1949
Camden, NJ 08101
srdevillasanta@drpa.com
856-968-2063

Construction

Approx. $3 Million

Project Start

2018

Project Completion

2020

Highlights

+ Performed evaluation of fire protection and water service for over 89,000 SF of PATCO facilities at the Lindenwold Maintenance Yard.
+ Lead preliminary and final design as well as bid phase services.

DELAWARE RIVER PORT AUTHORITY

PATCO LINDENWOLD FIRE PROTECTION SPRINKLER SYSTEM

Lindenwold, NJ

Arora Engineers (Arora) was selected as a prime consultant by the Delaware River Port Authority to provide comprehensive planning and engineering design services for the fire protection sprinkler system upgrades at the PATCO Lindenwold Maintenance Yard.

The project entailed the evaluation of the existing buildings, fire protection, and underground water services for the PATCO Lindenwold Maintenance Yard. The project area included the 8,000 SQ FT Way and Power Equipment Building (Building 6), the 62,000 SQ FT Shop and Offices (Building 1), the 7,700 SQ FT Car Wash (Building 1C), the 12,200 SQ FT Vehicle Maintenance (Building 5), and the Berlin Road and Meeting House Lane water services.

Scope of work included:

The project was completed in three phases— preliminary design, final design, and bid. Preliminary design services included

+ Review of existing documents.
+ Verification of existing conditions.
+ Review of regulations and other requirements.
+ Evaluation of the Way and Power Equipment Building to determine if fire protection was required.
+ Evaluation of the Lindenwold Shop and Offices, Car Wash, and Vehicle Maintenance Building including:
    + Evaluation of the structural capacity of the roof with respect to the proposed fire protection systems.



DELAWARE RIVER PORT AUTHORITY

PATCO LINDENWOLD FIRE PROTECTION SPRINKLER SYSTEM

Lindenwold, NJ

- Evaluation of the MEP systems as they related to the proposed fire protection systems.
- Development of WaterCAD models based on New Jersey American Water flow test data to evaluate the fire protection and water service scenarios.

+ Development of a Conceptual Fire Protection Design, including:
  - Definition of building occupancy and hazard classification.
  - Location of fire pumps, underground water services, fire protection mains, and fire department connections.
  - Location of fire alarm panels to monitor new fire protection systems.
  - Location of power supply for diesel fire pump enclosures.
  - Identification of the hydraulically most demanding sprinkler design area.
  - Performance of preliminary hydraulic calculations of the proposed sprinkler systems.
+ Evaluation of the Berlin Road and Meeting House Lane Water Services:
  - This evaluation was developed to determine if the Berlin Road water service was solely adequate for the facilities needs and if the Meeting House Lane service could be abandoned.
  - The domestic water demand of the facilities was based upon fixture counts as required by applicable plumbing codes. Additional domestic demands for the car wash and similar industrial equipment were determined through the review of shop drawings, inspecting the actual equipment installed, and interviews with PATCO staff. Arora also reviewed available water meter records to compare to the calculated demand.
+ Evaluation, repair, and rehabilitation.
+ Definition of sustainability strategies.
+ Development of design criteria.
+ Development and submission of a Preliminary Design report.

Upon completion of the preliminary design phase, Arora submitted a Preliminary Design report to the DRPA for approval. This report detailed the results of each Preliminary Design task noted above and became be the basis for the Final Design phase.

Upon DRPA approval, Arora began the Final Design phase. The objective of this phase was to further develop the Preliminary Design phase concepts and create documents to be used in bidding. Under this phase, Arora performed the following tasks:

+ Development of design calculations.
+ Development of contract plans, specifications, and estimates.
+ Provision of 90% and 100% review submissions.
+ Submission of final deliverables.

The Bid phase included supporting DRPA by attending the pre-bid meeting, responding to contractor questions, and providing bulletins.

PROJECT DETAILS

Client

Southeastern Pennsylvania Transportation Authority
c/o Pennoni
Brian M. Diehl, PE
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Philadelphia, PA 19104
bdiehl@pennoni.com
215-254-7810

Construction

$9,800,000

Project Start

2016

Project Completion

Ongoing

Highlights

+ New MRL elevators
+ Improvements to electrical and lighting systems
+ HVAC, plumbing, drainage, ventilation, and life safety systems
+ Restroom ADA upgrades
+ Communications systems upgrades to AVPA, emergency call boxes and HD security cameras
+ Transformer room evaluations and upgrades

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

SUSQUEHANNA / DAUPHIN STATION UPGRADES

Philadelphia, PA

This project included design and construction for the rehabilitation of the Susquehanna-Dauphin Station on the Broad Street Line. Station improvements included energy efficient lighting, wall, floor, and ceiling finishes, customer amenities, signage, passenger control and cashier facilities, platform tactile warning strips, an A/V public address system, and the installation of elevators. The results of this project, in concert with other proposed improvements, made the station ADA accessible.

Arora Engineers (Arora) provided mechanical, electrical, plumbing, fire alarm and fire suppression, and special systems engineering services for new, modified, and relocated systems. Design documents associated with the station upgrades included drawings and specifications from conceptual design through to construction documents and construction administration.

Scope of work included:

+ **Mechanical:** energy-efficient designs for the heating, cooling, and exhaust equipment and distribution system
+ **Electrical:** the upgrade to the electrical system included power distribution, receptacles, elevator power, and lighting
+ **Plumbing:** as needed designs for ADA modifications, including hot and cold water as well as sanitary, drainage system at stations
+ **Fire Alarm/Suppression:** designs for Fire Alarm and Detection system consisted of a control panel, annunciators, wire, and conduit for new elevators – Arora laid out all devices including smoke detectors, pull stations, monitor and relay modules, horn, and strobes, and recall devices
+ **Special Systems:** design for AVPA, emergency call boxes, and HD security cameras for the North and Southbound stations as well as the elevators



PROJECT DETAILS

Client

Southeastern Pennsylvania Transportation Authority
Dan Ferrante
Project Manager, Power
SEPTA EM&C Power Department
1234 Market Street
Philadelphia, PA 19107
DFerrante@septa.org
215-580-7625

Construction

$130.4 million

Project Start

2016

Project Completion

2019

Highlights

+ Included 16 substations to be rehabilitated
+ One new construction substation facility
+ Locations included catenary, under street, and stand-alone units
+ Complete systems assessment and upgrade recommendations
+ TPSSs were completely overhauled and upgraded by the team
+ 21-month design schedule

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

SUBSTATION REHABILITATION PROJECT

Philadelphia, PA

Arora Engineers (Arora), as a subconsultant to HDR and HNTB, provided mechanical/plumbing, fire/life safety, special systems, and electrical services for 16 substations and facilities. The overall objective of the project was to provide SEPTA with upgraded substations throughout the Regional Rail (RRD) and Center City Transit (CCT) divisions of SEPTA. There was a total of 16 existing substations that were rehabilitated and one new substation that was built.

Scope of work included:

+ **Phase 1** of this project included site assessments of all systems and preparation of a conceptual report for each station detailing the condition of and recommendations for each individual system by site.
+ **Phase 2** consisted of preparation of 30% and 50% design packages for recommended upgrades to be taken over by the awarded design builder at 50%. Woodbourne station was the exception as this was a new greenfield site and design was taken to 100%.
+ **Phase 3** entailed construction-related services to review submittals and shop drawings, respond to RFIs, as-built/record documentation, and as-needed technical assistance.

The mechanical services included design for the HVAC, ventilation, and exhaust systems in the buildings. The plumbing services included design for the bathrooms, as necessary, the eyewash stations, and the rainwater conductor systems for each of the buildings. Design was in accordance with all applicable codes and standards.

The fire/life safety design included fire alarm and detection systems for each building. Heat and smoke detection systems were required throughout and communicated to



SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

SUBSTATION REHABILITATION PROJECT

Philadelphia, PA

SEPTA's operations center. Design was in accordance with all applicable codes and standards, including NFPA 70, 72 and 130.

The special systems design included security, CCTV, and communications for each of the buildings. An intrusion detection and alarm system were provided for each building.

The electrical design was related to the non-TPSS systems and included general convenience power and receptacles and lighting.

PROJECT DETAILS

Client

GFP (Gannett Fleming/ Parsons JV)
David Burrows, PE, PMP, LEED AP
Task Manager
800 I Street NW, 6th Floor
Washington, DC 20001
dburrows@gfnet.com
(202) 969-3178

Project Start

2017

Project Completion

2021

Highlights

+ On-site data entry into a web-based portal containing the WMATA inventory
+ Surveyed 280 Train, Bus, and Administrative facilities
+ Complete Systems Design Packages and CA
+ Staff Augmentation

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

GENERAL ARCHITECTURAL AND ENGINEERING CONSULTANT SERVICES – FACILITIES IDIQ

Contract No. FQ1519, Washington, D.C. Metropolitan Area

Arora Engineers (Arora) was part of the Gannet Fleming / Parson Joint Venture (GFP) team for the Washington Metropolitan Area Transit Authority (WMATA) General Architectural and Engineering Consultant Services – Facilities Indefinite Delivery Indefinite Quantity (IDIQ) contract No. FQ1519. Arora provided GFP with mechanical, plumbing, electrical, fire life safety and special systems support on various task order contracts as the need arose.

Scope of work included:

Task 1 - Arora performed an inventory assessment project for various facilities managed by the Washington Metropolitan Area Transit Authority (WMATA). Known as the Transit Asset Inventory and Condition Assessment (TAICA), the project featured asset inventories and condition assessments to allow WMATA to determine current and future capital needs. The assessment was a continuation effort of previously surveyed Tier A & B facilities. The Tier C & D facilities consisted of 280 freestanding traction power substations and tie breaker station passenger facilities encircling the WMATA metro lines.

The project's goal was to import the data collected into an Enterprise Assset Management System for critical asset lifecycle management. TAICA was intended to be the cornerstone in ensuring a complete, consistent, accurate, and centralized repository of relevant asset-related data to support compliance, capital investment prioritzation, and data-driven maintenance.

Arora provided assessors for surveying the 280 Tier C & D facilities for WMATA. Arora's scope included mechanical, plumbing, electrical, lighting, fire protection, and fire alarm disciplines for survey. The assessors examined and identified the condition and remaining lifecycle of the various equipment categorized by the above listed disciplines into an online database. Arora also compared the results of the field



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

GENERAL ARCHITECTURAL AND ENGINEERING CONSULTANT SERVICES – FACILITIES IDIQ

Contract No. FQ1519, Washington, D.C. Metropolitan Area

survey with existing condition drawings for completeness and accuracy to improve the on-going asset inventory database for WMATA. The results enabled WMATA to provide accurate data-driven maintenance procedures and determine prudent capital replacement activities.

Task 2 - A detailed design package was developed for the rehabilitation of station platforms along C and J Lines in Virginia and G and D lines in Maryland. This was accomplished through site inspections, followed development of a Design Report, then development of both 50% and 100% submittals. Arora was scheduled for five stations under Phase 1a and three stations under Phase 2. The specific disciplines included electrical, mechanical, fire alarm, and special systems.

Task 3 - For this task order, Arora was provided A/E services staff augmentation for a Project Controls Specialist. This position, working with the contract support group, prepared cost estimates, performed cost analyses, developed pre-negotiation positions, reviewed claims, and supported contract negotiations. This position was a minimum of a one-year assignment.

Task 4 – For this task order, Arora was provided A/E services staff augmentation for Yard 2 project. The construction manager provided support to WMATA in site surveys, scope development, and future contract generation, as well as in field coordination and administrative support for the future rail yard facilities' rehabilitation projects. Responsibilities included: maintaining full familiarity with plans, specifications, construction schedules, and contractor's plans on assigned contracts, distributing information to office and field staff and internal stakeholder offices, establishing and maintaining job record files, reviewing contractor's Critical Path Method or bar chart progress schedules, participating in engineering package reviews, and ensuring all work is performed per plans and specifications via coordination with QA procedures.

Task 5 – For this task order, Arora provided electrical and special systems survey and design services for the Metropolitan Transit Police Department (MTPD) District III Substation at Morgan Blvd. Arora also provided a fully LEED Silver Certifiable project. The tasks included:

- Project management, which included a design schedule and monthly update, monthly reports, meeting agendas, and meeting minutes.
- Site survey, which included identifying the deficiencies within the existing building systems and property that may result in the inability for WMATA to use the facility and property as outlined in the Program of Requirements. The team surveyed the fire suppression system, plumbing back-flow preventers, electrical service and equipment, and doors, windows, and sealant/caulking.
- Contract package, which included the design drawings and specifications based on the recommendations from the Site Survey Report. The design documents included architectural floor plans, elevations, locations of mechanical and electrical equipment, and all other drawings required to convey the design.

Task 6 – For this task order, Arora provided electrical, mechanical/plumbing, and special systems/communication engineering and design services for the replacement of drainage pumping stations (DPS) and discharge line piping. WMATA combined the individual site designs (45 locations) into three separate Issued for Bid (IFB) bid packages of various DPS sites each, based on the Scope of Work Matrix. Arora's scope was associated with the following packages:

- DPS Package 1 included: Attending the kick-off meeting and badging for Arora employees and attending the Baseline Design Schedule meeting.

PROJECT DETAILS

Client

VHB, Inc.
Tom Velleca
Senior Site/Civil Manager
Two Penn Plaza, Suite 2602
New York, NY 10121
TVelleca@VHB.com
212-857-7354

Project Start

2016

Project Completion

2018

Highlights

+ Reconstruction / modernization of train station
+ Coordination between NYCT, LIRR, and AirTrain
+ Design review
+ Construction administration

MTA – NEW YORK CITY TRANSIT AUTHORITY

WILLETS POINT-METS STATION MODERNIZATION

New York, NY

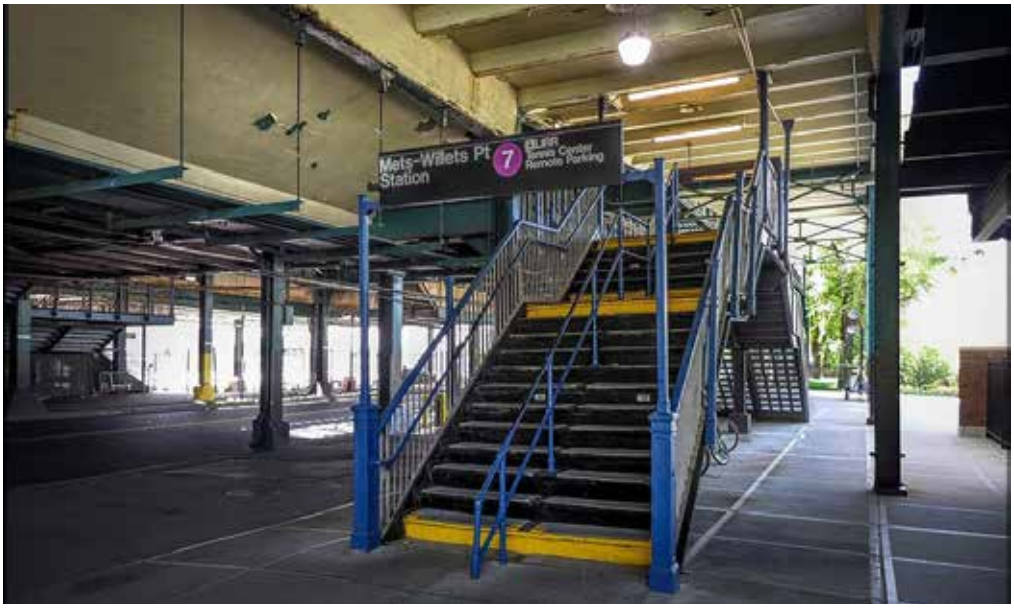
Arora Engineers (Arora) was selected as part of a team that provided mechanical, electrical, plumbing, fire/life safety, and special systems engineering services and construction administration oversight for this project for the Station Reconstruction / Modernization Program at Willets Point carried out by the Long Island Rail Road (LIRR) and New York City Transit (NYCT).

Specific goals of the Willets Point-Mets Station Reconstruction/Modernization Program included:

+ Coordination of plans to ensure a common “21st Century” station design vision, including design compatibility with a planned AirTrain terminal providing connectivity to LaGuardia Airport;
+ Design services to meet the ever-increasing demand placed upon NYCT and LIRR stations
+ Development of underlying station aesthetics through design innovation and excellence.

Scope of work included:

+ **Station Design Review –** The Arora team provided review services and acted in an advisory capacity throughout the design process. Arora also provided critiques on program concepts to ensure the design focused on the passenger experience and the vision of an underlying station aesthetic.
+ **Station Design Coordination -** Provided critiques on station design difference between NYCT and LIRR stations with respect to design goals for AirTran LaGuardia terminal.



PROJECT DETAILS

Client

DelDOT
Bradley Damtoft, PE, Project Manager
800 Bay Road, P.O. Box 778
Dover, DE 19903
Bradley.Damtoft@delaware.gov
302-760-2357

Construction

$20,000,000

Project Start

2016

Project Completion

2020

Highlights

+ MEP, life safety and, special systems
+ Three-phased development reflected in the approach to documentation
+ Lighting for the Station Building, Pedestrian Bridge, access stairs from College Avenue
+ Security systems including CCTV, access control, surveillance, and emergency call boxes
+ Life safety systems including detection, audible and voice announcement, fire protection system with stand pipe

DELAWARE DEPARTMENT OF TRANSPORTATION

MEP SERVICES FOR THE NEWARK REGIONAL TRANSPORTATION CENTER

Newark, DE

The Delaware Department of Transportation embarked on a significant upgrade to the Newark Regional Transportation Center. The project included the replacement of a small station/security facility with a new, full service Station Building equipped with a Pedestrian Bridge leading to a 950' Platform constructed within a five-track Right-Of-Way. The existing parking area was revitalized to accommodate 540 spaces and bus traffic operated by DART. The Southeast Pennsylvania Transit Authority (SEPTA) and Amtrak use the station. Arora Engineers (Arora), as part of the team led by Whitman, Requardt & Associates, provided MEP, fire/life safety, and special systems design for the upgrades.

Due to the requirements of the funding vehicle(s) and the multiple entities involved in the project, including DelDOT, DTA, DART, SEPTA, and Amtrak as owners/users and the City of Newark and the University of Delaware as most interested parties, the project was divided into three phases. The first phase was the Parking Lot improvements, including lighting, security, and electric car charging station. The Station Building was included in Phase 2 and the Pedestrian Bridge to the new Platform in Phase 3. Each phase will be constructed in sequence.

Scope of work included:

+ Mechanical systems for the Station Building and Platform support rooms
+ New electrical service augmented by whole-project emergency power
+ Telecommunication enhancements for the Station Building and Platform including Public Information Display in the Station Building and on the Platform coordinated with SEPTA and Amtrak
+ High-efficiency lighting design and in-pavement lighting
+ Secondary power distribution for the new platform



DELAWARE DEPARTMENT OF TRANSPORTATION

MEP SERVICES FOR THE NEWARK REGIONAL TRANSPORTATION CENTER

Newark, DE

+ CCTV, access control, emergency call boxes, PA systems
+ Platform emergency egress pathway security and illumination
+ Lightning arrestor and upgraded grounding systems
+ Standpipe system for the station building, pedestrian bridge, and the platform accessible from both sides of the tracks
+ Payphone design
+ Point of sale and ticket machine voice and data design

PROJECT DETAILS

Client

Southeastern Pennsylvania Transportation Authority
c/o McCormick Taylor, Inc.
Lennox Hyman, ENV SP, Project Manager
2001 Market St, 10th Floor
Philadelphia, PA 19103
215-592-4200

Construction

$15,000,000

Project Start

2016

Project Completion

Ongoing

Highlights

+ New heating, cooling and exhaust equipment and distribution system
+ Power distribution, convenience receptacles, and lighting
+ Hot and cold water designs as well as sanitary
+ Fire alarm and detection system
+ CCTV system for building

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

NOBLE STATION UPGRADE

Jenkintown, PA

Arora Engineers (Arora) provided professional mechanical, electrical, plumbing, fire alarm, lighting, and special system engineering services for the renovation of two buildings at SEPTA's Noble Station in Jenkintown, PA.

The primary building was 1,000 SF and featured passenger shelter space, two restrooms, administrative area, and utility space. Design services were also provided to repurpose a 500 SF former freight house for use as an additional heated passenger shelter area.

The project's mechanical upgrades utilized energy-efficient designs and equipment to reduce energy costs. Additionally, Arora selected LED lighting to reduce maintenance needs and conserve energy.

Scope of work included:

+ **Mechanical:** Energy-efficient designs for heating, cooling, exhaust equipment, and distribution system
+ **Electrical:** Upgrades to electrical system included power distribution, convenience receptacles, and lighting for building interior and exterior
+ **Plumbing:** Designs that included hot and cold water, sanitary, rainwater conductors, and storm sewer tie-in.
+ **Fire Alarm:** Upgrades to fire alarm and detection system included control panel, annunciators, wire, conduit, and all devices, including smoke detectors, pull stations, monitor and relay modules, horn, and strobes.
+ **Special Systems:** Security measures included a CCTV system including interior and exterior cameras with network recording functionality to provide remote monitoring capability



PROJECT DETAILS

Client

Port Authority of New York and New Jersey
Atul Ragoowansi
Project Manager
aragoowa@panynj.gov
201-595-4039

Construction

N/A

Project Start

2015

Project Completion

2017

Highlights

+ Design services for the upgrade of the entire PATH fire alarm network.
+ Campus type network composed of various fire alarm manufacturers interconnected via fiber optic cable.
+ Intelligible voice evacuation systems for public spaces
+ Preparation of a detailed construction cost estimate
+ Code consulting utilizing NFPA, NY, NYC, NJ and UL codes and standards

PORT AUTHORITY OF NEW YORK AND NEW JERSEY

PATH FIRE ALARM REPLACEMENT STAGE III AND IV

Various Port Authority Trans Hudson (PATH) Facilities, NY and NJ

Arora Engineers, Inc. (Arora) has recently been awarded, as a sub-consultant, the Stage III and Stage IV design services for the upgrade of the Port Authority Trans Hudson (PATH) fire alarm systems. The scope included the complete fire alarm upgrade and associated IP based communication between 50 plus light rail facilities. associated with the PATH system located in both New York and New Jersey.
The project included the survey of existing systems, the development of design documents and construction support services.

Scope of work included:

The project objective wa to upgrade and unify all the fire alarm systems protecting the various PATH facilities. The scope included the design of a code compliant dedicated fire alarm system for the entire PATH system and Fire Alarm network over the PATH SONET to enable IP digital alarm communicator transmitter (DACT) communications between the Fire Alarm Panels at each Facility and the Proprietary Supervising Stations. The system included monitoring by designated external Central Monitoring Station (CMS) located outside the PATH premises and other monitoring stations located within the PATH facilities.

The design was based on the Stage I design criteria, survey of existing conditions of each facility, and included the overall PATH fire alarm network and the fire alarm systems located at each of the facilities. The systems included fire alarm panels, power supplies, voice evacuation equipment, initiation devices (manual pull stations, smoke/heat detectors, duct, etc.), notification appliances (speakers, horns, strobes,



PORT AUTHORITY OF NEW YORK AND NEW JERSEY

PATH FIRE ALARM REPLACEMENT STAGE III AND IV

Various Port Authority Trans Hudson (PATH) Facilities, NY and NJ

etc.), network communication equipment and all other equipment required for a code compliant fire alarm system. The system design included all interface to other systems required to be supervised or operated by the fire alarm system to provide ancillary fire/life safety functions.

The scope included the development of detailed design drawings, specifications and cost estimates to be used for bidding purposes. The documents were developed through a progressive design process with multiple submittals. Upon completion Arora provided support services throughout the duration of construction including review and response to RFI's, review of submittals, punchlist surveys and review of close out documentation.

PROJECT DETAILS

Client

MTA East Side Access
William Connors, PE
Engineering Manager/Sr. Fire Protection Engineer
469 7th Avenue, 16th Floor
New York, NY 10018
WConnors@MTACC-ESA.INFO
212-695-5137

Construction

$11,000,000,000

Project Start

2010

Project Completion

2022 (construction)

Highlights

+ $11 billion effort spanning ten city blocks
+ Project brought the LIRR into a new station below historic Grand Central Terminal
+ Fire suppression systems included clean agent systems for sensitive areas

MTA LONG ISLAND RAIL ROAD (LIRR)

EAST SIDE ACCESS PROJECT

New York, NY

Arora Engineers (Arora) provided fire protection engineering service for the East Side Access (ESA) project, one of the largest transportation infrastructure projects in the United States. ESA provided new, direct LIRR service into a new concourse below Grand Central Terminal on Manhattan's East Side, reducing commutes into Manhattan by upwards of 30 minutes. ESA was part of the Long Island Railroad's expansion initiative that aimed to reduce passenger crowding, train congestion, and automobile traffic while providing connections with additional regional transportation options such as Metro North Railroad and New York City Transit subways.

The ESA concourse project spanned ten city blocks, from 40th St. to 50th St., and the rest of the project consisted of tunnels, caverns, rail yards, and ventilation buildings, and included 8 miles of tunneling and 40 miles of tracks. Once finished, East Side Access served approximately 162,000 customers a day, providing them with a faster and easier commute from Long Island and Queens to the east side of Manhattan in a new eight-track terminal and concourse below Grand Central Terminal. The project was expected to open to the public in December 2022.

Scope of work included:

Arora's role included the fire protection design at Grand Central Terminal, its tunnels, and other highly sensitive areas.

+ Wet-pipe sprinklers systems (100 zones)
+ Manual standpipe systems (500 outlets, 100,000 feet of linear piping)
+ Clean agent fire extinguishing systems (80 systems)
+ Code consulting and analysis
+ Egress analyses
+ Utility coordination

Arora also provided onsite design staffing to support the ESA project.



PROJECT DETAILS

Client

MTA Metro-North Railroad
Harry Hall, Jr., Senior Engineer
420 Lexington Avenue
New York, NY 10017
harry.hall@mnr.org
212-499-4469

Construction

$38,000,000

Project Start

2014

Project Completion

2017

Highlights

+ Upgrades to historic Grand Central Terminal's fire standpipe
+ Interfaced existing system infrastructure with new detection systems
+ Provided code consulting to ensure compliance with applicable standards

MTA / METRO-NORTH RAILROAD (MNR)

WATER CONVEYANCE UTILITY UPGRADES

Grand Central Terminal, New York, NY

At the request of the MTA, Arora Engineers (Arora) updated and repackaged the previously designed upgrades to Grand Central Terminal's existing fire standpipe system. In 2010, after approximately three years of design work, Arora and Louis Berger Group issued 100% design documents for the upgrade of the facilities water services and fire standpipe systems. In 2014, it was deemed by the client that the fire standpipe portion of the project would be more manageable from a budgetary, bidding, and construction standpoint if broken into multiple packages.

Scope of work included:

Under this project, Arora reviewed the existing documentation developed in 2010 and separated the existing design package into multiple bid packages. The specific design tasks included the following:

+ Review existing design package.
+ Perform site survey to verify existing conditions and specific design issues.
+ Perform hydraulic analysis based on new design criteria.
+ Analyze primary and back-up fire pump sequence of operation.
+ Determine package delineations with respect to cost, constructability, and phasing.
+ Revise system design in accordance with package delineations and develop temporary work scope to ensure continued functionality of entire systems during phased construction.
+ Present project scope of work to Grand Central Terminal's Fire Safety Department and the facility's Operations and Maintenance staff.
+ Coordinate with facility fire alarm vendor for expansion of existing system.
+ Develop revised cost estimates.



Photo credit if needed

MTA / METRO-NORTH RAILROAD (MNR)

WATER CONVEYANCE UTILITY UPGRADES

Grand Central Terminal, New York, NY

+ Develop estimated construction schedules.

Due to the size of the facility, this project required a significant amount of time to understand the systems' architecture and how best to divide the design package while minimizing downtime and temporary fixes to ensure continuous operations. This required an extensive review of the existing design documents and multiple site surveys. Through extensive research and meaningful interactions with facility staff, the design re-package met the project goals.

PROJECT DETAILS

Client

SimplexGrinnell
Ron Roemer
Contract Account Executive
ESSR
519 8th Avenue, 17th Floor
New York, NY 10018
rroemer@simplexgrinnell.com
212-372-4200

Construction

$2.4 Billion

Project Start

2011

Project Completion

2015

Highlights

+ Analysis and Code Review
+ Review of design drawings and specs
+ Developed shop drawings and documentation
+ Assisted with O&M manuals

MTA – NEW YORK CITY TRANSIT AUTHORITY

7 LINE EXTENSION FIRE ALARM DESIGN

New York, NY

Arora Engineers (Arora) assisted in the construction phase of the MTA 7 Line Extension project by providing expert fire alarm design services to the project's electrical and fire alarm contractors. The 7 Line Extension project extended the existing line approximately 1.5 miles from the Port Authority Bus Terminal and included the construction of a new station located at 34th St. and 11th Ave as well as multiple ventilation buildings along the track extension.

The project required the design of multiple networked fire alarm panels to service each building and two-way communication with the MTA operations command center through the existing SCADA network. The fire alarm systems provided smoke and heat detection in mission critical areas such as communication and electrical rooms as well as visual notification and voice evacuation throughout the public areas. The systems were designed in accordance with NFPA-72, NFPA-130, and additional requirements as detailed in the bid documents.

Scope of work included:

+ Review project design drawings and specifications
+ Code analysis
+ Develop shop drawings and documentation
+ Assistance in developing operational and maintenance manuals including sequence of operations and calculations
+ Assistance in the selection of devices and equipment
+ Performing battery calculations
+ Attending construction coordination meetings
+ Attending design review meetings and incorporating comments

This project required a significant effort to maintain a coordinated design with multiple disciplines as the project continued to evolve as well as maintaining effective communication through the hierarchal structure of the project team as well as the client. In collaboration with the construction team, Arora successfully developed coordinated construction documentation based on the project's bid drawings and specifications.

PROJECT DETAILS

Client

HDR, Inc.
Thomas Lench, PE
11 Stanwix Street, Suite 800
Pittsburgh, PA 1522
Thomas.lench@hdrinc.com
412-497-6266

Construction

$5,300,000

Project Start

2015

Project Completion

2018

Highlights

+ Provided mechanical, electrical, plumbing, fire protection, life-safety, and special systems design services for the transit support facility.
+ Repurposed pre-engineered building for restrooms, offices etc.
+ Provided a vehicle wash bay, maintenance bay and bus storage addition, which can house 25 vehicles.

CRAWFORD AREA TRANSPORTATION AUTHORITY (CATA)

CATA TRANSIT FACILITY

Meadville, PA

Arora Engineers (Arora) was tasked with providing mechanical, electrical, plumbing, fire protection, life-safety, and special systems design services for the Crawford Area Transportation Authority (CATA) transit support facility.

Scope of work included:

Arora's scope of work included repurposing an existing pre-engineered building (80' x 120') for restrooms, offices, maintenance, and a vehicle wash bay with a new bus storage addition (86' x 120'), to accommodate approximately 25 vehicles of varying sizes. The facility qualified for use as both Compressed Natural Gas (CNG) vehicle storage and code-defined major repairs. The project satisfied PennDOT's Made in America guidelines. Arora's tasks included the following:

+ Site and schematic building design
+ Advanced building design
+ Final building design and cost estimating
+ Construction Phase support
+ Redesign of emergency generator
+ Additional consulting during construction
+ Construction Management/Administration



PROJECT DETAILS

Client

McCormick Taylor
Kristian Bellotti, PE
Director, Transportation Engineering
1818 Market St., 16th Floor
Philadelphia, PA 19103
kbellotti@mccormicktaylor.com
(215) 592-4200

Construction

$18.5 Million

Project Start

2020

Project Completion

2022

Highlights

+ Electrical and Fire Life Safety & Fire Protection Engineering Design services for new SEPTA Wissahickon Transportation Center.
+ Arora provided the conceptual designs for the Fire Alarm and Detection system.
+ Arora provided circuiting for lights within the building.
+ Arora provided conceptual designs for the Fire Sprinkler system and connectivity to the Fire Alarm System.

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY (SEPTA)

WISSAHICKON TRANSPORTATION CENTER

Philadelphia, PA

Arora Engineers (Arora), serving as a subconsultant to McCormick Taylor, provided Electrical and Fire Life Safety & Fire Protection Engineering Design services for new Southeastern Pennsylvania Transportation Authority (SEPTA) Wissahickon Transportation Center. The new Wissahickon Transportation Center is located at 5000 Ridge Avenue, Philadelphia PA, adjacent to the existing SEPTA facility.

The $18.5 million transportation center is Center is crucial to SEPTA's success, if not its survival, in a post-COVID world. To ensure that all the buses have enough room to easily maneuver, SEPTA purchased a four-acre site. The new facility has two parts: a waiting area along Ridge Avenue and a three-sided depot lined with bus bays. This will make it easy for commuters to get off one bus and walk quickly to the next.

With 12 parking bays, SEPTA will also be able to run more buses, increasing its service on the 10 routes by 20%. The extra capacity will also allow SEPTA to enhance express bus service on Roosevelt Boulevard. Together, those measures could cut commuting times significantly.

Scope of work included:

Arora provided the following scope of design services:

Electrical – Arora anticipated that the incoming service to the site is salvageable and that the upgrade to the electrical system would include power distribution, convenience receptacles, and lighting for both the building interior and exterior. Site lighting was designed by the civil engineer and Arora provided circuiting for it within the building. Arora anticipated LED lighting technology were to be used throughout to reduce maintenance and energy usage.



Rendering Courtesy of SEPTA

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY (SEPTA)

WISSAHICKON TRANSPORTATION CENTER

Philadelphia, PA

Fire Alarm – Arora provided the conceptual designs for the Fire Alarm and Detection system that will consist of a control panel, annunciators, wire, and conduit. Arora did a layout of all devices including smoke detectors, pull stations, monitor and relay modules, horn, and strobes.

Fire Protection – Arora provided conceptual designs for the Fire Sprinkler system including diagrammatic piping layouts incoming fire service, head end equipment and connectivity to the Fire Alarm System.

Arora also attended project meetings to coordinate procedures, technical approach, review designs, and one site survey. The Design Team conducted on-site surveys of existing Electrical, Fire Protection and Special System conditions. The scheduled facility visit was coordinated in advance so that operations were not affected.



Courtesy of Septa

PROJECT DETAILS

Client

STA Joint Venture
C/O STV Incorporated
Anthony G. Cracchiolo, P.E.
225 Park Avenue South
New York, NY 10003
Anthony.Cracchiolo@stvinc.com
(212) 777-4400

Construction

$160,000,000,000

Project Start

2012

Project Completion

2021

Highlights

+ Arora provided special systems and fire/life safety engineering services and document control services for the new Moynihan Station Program project.
+ The new Moynihan Train Hall relieved station crowding and improved passenger comfort and security.

AMTRAK, MOYNIHAN STATION DEVELOPMENT CORPORATION

MOYNIHAN STATION PROGRAM PROJECT

New York, NY

Arora Engineers (Arora) served as a subconsultant to AECOM and Tishman Construction and provided fire/life safety engineering services as well as document control services for the new Moynihan Station Program project. The $1.6 billion project transformed the 100-year-old James A. Farley Post Office building into a state-of-the-art transit hub. The 225,000 SF Moynihan Train Hall nearly doubled the existing Penn Station rail complex's concourse space. The expansion of Amtrak's passenger services into the new Moynihan Train Hall relieved previous station crowding and improved passenger comfort and security.

This project was owned by Amtrak, in partnership with the New York Empire State Development Corporation (ESD) and its subsidiary Moynihan Station Development Corporation (MSDC). The Moynihan Station Program project included enhanced passenger facilities for Amtrak's Northeast Corridor (NEC) and long-distance travelers, including accessibility for passengers with disabilities, all within a new, grand train hall.

The project was constructed into two phases. Phase I created the West End Concourse. The new concourse provided new stairs and elevators to boarding platforms, passenger circulation space, and a new entrance across 8th Avenue from Penn Station. Arora provided construction management and controls support for this phase, maintaining document control and shop drawings, construction monitoring, and providing cost estimating support by performing quantity take-offs.

Phase II entailed the Moynihan Train Hall, a new, enhanced intercity and commuter passenger boarding concourse for Amtrak and MTA-Long Island Railroad



Rendering Courtesy of SOM | Volley

AMTRAK, MOYNIHAN STATION DEVELOPMENT CORPORATION

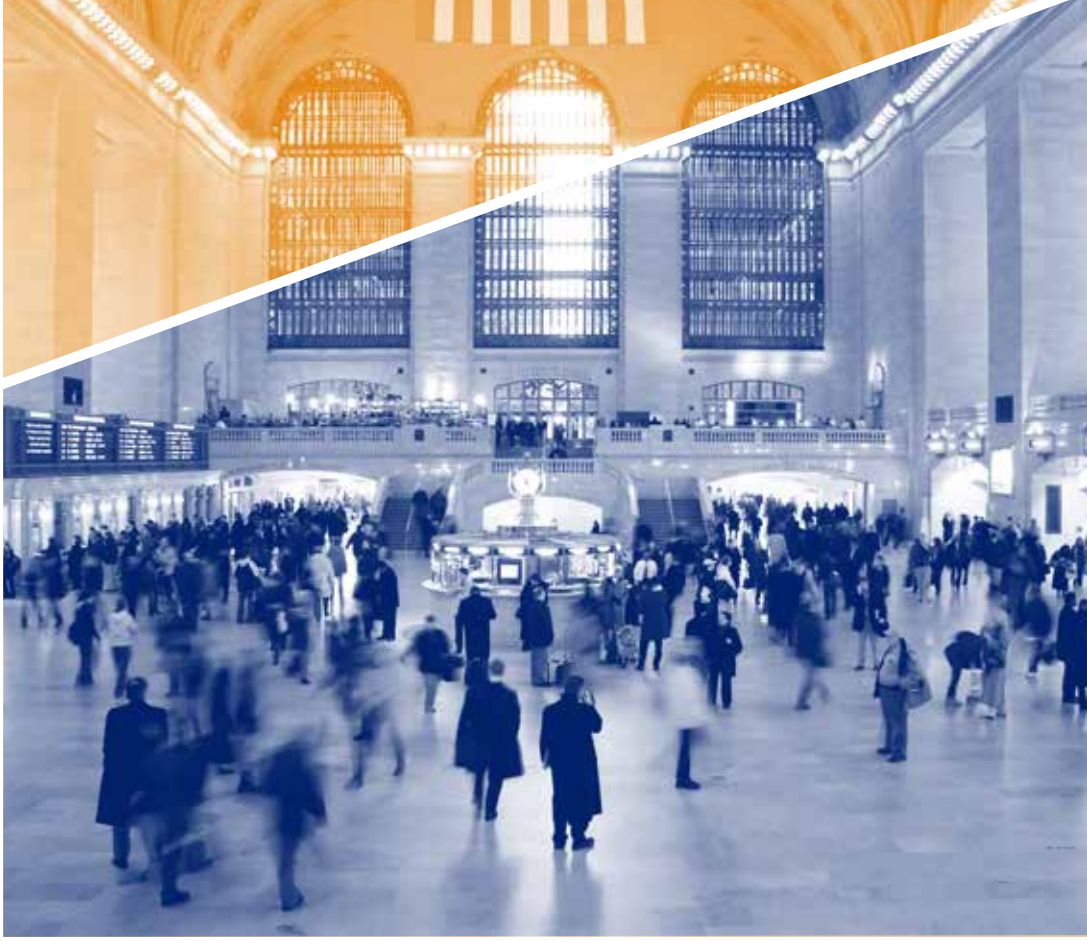
MOYNIHAN STATION PROGRAM PROJECT

New York, NY

passengers. The Moynihan Train Hall included a sunlit atrium boarding concourse, a combined ticketing and baggage unit, a new Metropolitan Lounge, a new reserved customer waiting room, casual waiting space features, retail, and food shops. Arora provided full-time, on-site project controls including the preparation of monthly cost reports for CM services, assembly and update of the project management plan, construction management plan, and financial management plan, as well as preparation of monthly project progress reports and creation of project progress tracking drawings in AutoCAD to demonstrate project development. In addition, Arora performed QA/QC of submittals and RFIs, attended design and construction management coordination meetings, and supported the construction field office.

Moynihan Train Hall opened to the public in January, 2021.

Rethinking Infrastructure®



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