2016 AIM Infrastructure And Quality Assurance
People, Organization and Projects

Glenn M. Frieler P.E.
DENVER INTERNATIONAL AIRPORT
November 02nd, 2016
The AIM Organization

- Facilities Management
- Fleet Maintenance
- Field Maintenance
- Technical Maintenance
- Asset Management
- Maintenance Services
- Facilities Services
- Infrastructure Services
- Technical Programs
It’s probably not a good sign to be listed in the Organizational chart underneath the office of plants.
Fact of Life ---
Infrastructure and QA Sections

• Landside Engineering Unit
  • All Roadways, Parking Lots and Utilities that are outside the airfield fence

• Airside Engineering Unit
  • All Runways, Taxiways and Utilities that are inside the airfield fence

• Survey Unit
  • Airfield Paint Layout, TMOSS, Control...

• QA Inspection and Special Inspection Program
  • Inspection and Special Inspection of all CIP and O&M project on DEN property

• QA Materials Testing Program
  • The Testing of concrete, HMA and aggregates used on all CIP and O&M projects on Den property.
People – Who We Are and What We Do

• Supervisors
• Managers
• Project Managers
• Professional Engineers
• Staff Engineers
• Professional Land Surveyors
• Surveyors
• Contract Administrators
• Inspectors
• Testers
The real reasons why construction work takes so long
2017 Infrastructure Projects that did NOT Make the Cut.
Number 5

Dome Pena Boulevard
With solar panels.
Number 4
Multi-level Computerized Automated Parking Facility
Number 3
Contract with Fisher Price to do security screening
Number 2
Hyper Loop from DEN to Union Station

Less than 5 minutes from DEN to Union Station.
Number 1
Partial Beam Transporter

Molecular imaging scanners record each subject's pattern on the quantum level.

Primary energizing coils create the annular confinement beam (ACB).

Phase transition coils perform the actual dematerialization.

Transporter pads are slightly elevated to counteract any static discharge.

A biofilter screens out harmful foreign microbes from incoming subjects.

The pattern buffer is a "tank" where each pattern is held briefly in mid-transport.
Questions?
Airside Engineering Team

Kimberly Watanabe
Airside Engineer Supervisor

Keith Johnson
Senior Engineer

Mark Potadle
Program Manager

Chris Laute
Project Manager

Brent Nichols
Engineer

Jennifer Lynn
Contract Admin

Matt Nutter
Project Manager

Rae Ann Johnson
Senior GIS Analysis

Terry Seifert
Staff Engineer

Russ Carr
Project Manager

Russ Smith
Contract Admin

Clint Sciacca
Staff Engineer

Lynne Walker
Admin

Jared Thill
Engineer Intern

Apron Team
RW 8-26 Complex Pavement Rehab
June – September, 2017

Description:
• Remove and replace deteriorated concrete slabs.
• Eliminate a bump in the runway 3600 feet west of RW 8 threshold
• Improve several electrical & lighting items
• Improve TWs L&M safety areas from ADG 4 to ADG 5
• Remove & replace RW 26 threshold light bar
• Rehabilitate Great Rock St.-ARFF response route
• Install active pavement sensor system
• Add security fence to make project areas unsecured
Description:
The remove and replace concrete panels on the Concourse and Cargo aprons, and taxiways exhibiting distresses. Panels will be removed and replaced, approximately 20,000 SY. The joints associated with these panels will be rehabilitated, as well as crack sealing and spall repairs. The above mentioned work will be performed during day and night time closures.
**Description:**
Pavement around the gates at Concourses have deteriorated and have heaving, ponding, and cracking issues. The pavement will be demolished and replaced utilizing a drainable base layer in the pavement to pull water away from the Concourses and out the outer VSR trench drain. While replacing the pavement, utility and hydrant fueling issues will be addressed. This is a multi-year program and 2017 will be the third season of construction.
Vandriver St Improvements MAY – JUNE, 2017

Description:
Remove and replace deteriorated concrete pavement on the Vandriver VSR south of TW AA (2500 SY). Scope also includes reducing the amount of curvature in the existing alignment.
**DIW System**  
**JUN 2017 – SEP 2017**

**Description:**
Increase capacity of DIW system on the East Airfield to accommodate expansion projects on Concourse Apron. Study currently being conducted.
Allium St. Reconstruction – Phase 2
APRIL – JULY, 2017

Description:
Continuation of the reconstruction of Allium Street. Increasing the structural capacity of the roadway to withstand heavy hauling operations for construction vehicles.
Upcoming Airfield Design Projects

- TWY Safety Area Upgrades
- Airside Design Services On-call
- RW 17R-35L Complex Pavement and Lighting
Airfield On-call Projects

Design Services:
• Airfield Electrical Evaluation
• Safety Area Upgrades
• DIW System Evaluations
• RW 7-25 Complex Pavement and Lighting Rehab
• Vandriver at TWY AA

Construction Services:
• Allium St. Reconstruction Phase 1
• TWY CN Storm Inlet
• TWY P & P7 Erosion Control
AIRFIELD PLANNING OVERVIEW

• Concourses
  • Hold Rooms
  • Gate Utilization

• Aircraft Gate Layout & Paint Markings

• Runway & Taxiway System
AIRSPACE PROTECTION

• Maintain safe and navigable airspace
  • Obstructions
  • Construction
  • Compatible land use

• 7460 – Notice of Proposed Construction
  • Required for **ALL** projects that occur at DEN
  • FAA determination **required** prior to the start of work
  • 90 day FAA review time
  • DEN Planning submits all 7460’s for airport projects
CONSTRUCTION COORDINATION

- Work closely with PM to minimize impacts to airport & airlines
- Project phasing – early coordination critical
- Adjusting to unforeseen circumstances
- Airport planners can help
STUDIES & NEEDS ASSESSMENTS

- Master Plans
- Gate Requirements
PRIMARY JOB DUTY
LANDSIDE ENGINEERING PROJECTS
2017

CATHERINE RAFFERTY, P.E.  SENIOR ENGINEER
MICHELLE MARTIN, P.E.  LANDSIDE ENGINEERING SUPERVISOR
NOVEMBER 02, 2016
LANDSIDE ENGINEERING

• What we do:
  • Roads, parking lots, bridges (generally) outside the security fence
  • Drainage & wet utility systems

• Who we are:

- **Landside Engineering**
  - Michelle Martin – Engineering Supervisor

  - **Contract Administrator**
    - Annette Kimble
    - Bridget Tetteh

  - **Drainage & Wet Utilities**
    - Catherine Rafferty – Sr. Eng.

  - **Project Manager & Engineering Staff**
    - Mike Cloud – PM II
    - Irene Chhor – Staff Eng.
    - Bryan St. Martin – Staff Eng. (PB)
    - Chris Loupee – Staff Eng. (PB)
**DESIGN:** PIKES PEAK PARKING LOT RECONSTRUCTION PHASE I – BUS LANES

- Solicitation for the design of Phase I of this project: reconstruction of the bus lanes in the Pikes Peak Parking Lot
- Replace existing asphalt drive lanes with concrete
- Phasing to maintain access/egress into the parking lot
- Requests for Proposal (RFP) – 1st Quarter 2017
DESIGN: PEÑA BLVD – PHASE II (IB/OB I-70 TO 64TH AVE)

• Solicitation for the design of Phase II of the Peña Blvd project

• Design includes the reconstruction & expansion of Peña both Inbound & Outbound from 2-lanes to 3-lanes (each direction), 7.5 miles total
  • Widening of 10 structures

• Requests for Proposal (RFP) – 1st Quarter 2017
  • RFP to be advertised by the Peña Project Management Team (PMT)
DESIGN/BUILD: PEÑA BLVD – PHASE I
(IBM/OB JACKSON GAP TO TERMINAL)

• Solicitation for a design/build team for this section of Peña Blvd (Phase I)

• Design & construction of both Inbound & Outbound Peña Blvd (3.5 miles total), and the modification of 3 structures

• Realignment of Peña Blvd to promote operational efficiency & development
  • DEN to provide needs of parking, ground transportation, and DEN Real Estate

• Request for Qualifications (RFQ) – January 2017
CONSTRUCT: ANNUAL PAVEMENT REHAB - LANDSIDE 2017

• Annual repair & maintenance of roadways, including Peña Blvd, secondary roads, and parking lot pavements

• Scope includes: asphalt overlay, asphalt maintenance (crack seal, slurry seal coat), partial & full-depth panel replacements, spall repairs, and concrete pavement diamond grinding

• Work on Peña during night hours only

• Advertise for bids – January 2017
CONSTRUCT: QUENCY & QUEENSBURG REHAB

• North Airfield access roads; asphalt pavement surface rehabilitation

• Replace approximately 1,250 existing patches with 4’ x 12’ asphalt patches (all roads)

• Slurry seal coat - Quency St/Way & 114th Ave

• 3-inch asphalt overlay - Queensburg St; and, reduce roadway width from 4-5 lanes to 2 lanes due to low traffic volume

• Advertise for bids – January 2017
**CONSTRUCT: ROADWAY EROSION CONTROL 2017 (GUN CLUB RD & 78TH AVE)**

- Roadway and channel erosion mitigation along Gun Club Rd & 78th Ave

- Remove and replace existing shoulder with concrete shoulder, curb & gutter

- Channel/ditch restoration & armoring

- Advertise for bids – February 2017
CONSTRUCT: MANHOLE REHABILITATION

• System-wide repair & rehabilitation of sanitary infrastructure

• Work has been phased over 5 years (2014 – 2019) to minimize operational disruptions

• Remaining 236 manholes & 3 point repairs, located airside & landside, must be completed between 2017 and 2019, as required by State Consent Order

• Advertise for bids – 1st Quarter 2017
LANDSIDE PLANNING-
AIRPORT INFRASTRUCTURE
MANAGEMENT

THOMAS REED, SUPERVISOR-LANDSIDE PLANNING
DENVER INTERNATIONAL AIRPORT
NOVEMBER 18, 2015
LANDSIDE PLANNING

• All airport infrastructure outside the Air Operations Area (AOA)
• Parking Facilities, Roadways, Rental Car Facilities, Support Facilities, etc.
• Land Use Compatibility Issues with surrounding local governments
• Landside Planning Studies
  • Peña Boulevard Corridor Transportation Study
  • On-Call Land Planning
  • FAA 7460 Coordination (*Notice of Proposed Construction or Alteration*)
    • Aviation Impact Analyses – Airspace Determinations
DEN REAL ESTATE

OPPORTUNITIES

DENVER INTERNATIONAL AIRPORT OFF SITE DEVELOPMENT OPPORTUNITIES

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Key Deal Points

• Denver City Council and Adams County Commissioners refer measures to Nov 2015 ballot
• 1,500-acre pilot program for DIA to attract broader commercial uses than 1988 IGAs allow
• 50-50 revenue split with Adams County (total estimate: $150M to $270M over 30 years)
• Denver provides Adams County with $10M upon voter approval in both counties
• DIA retains all ground lease revenue ($95M to $185M over 30 years)
• 1,500-acre pilot program could be expanded at any time if Adams County agrees
  – 20-35 years to develop 1,500 acres
    • 12,300 new jobs
Denver and Adams County create regional entity to:
- Initially jointly market new on-airport development opportunities and region
- Over time, undertake the planning, funding and developing of integrated infrastructure

Elimination of land-use restrictions in the “Clear Zones” on periphery of DIA
- Adams County communities retain 100% of tax revenue
- DIA retains 100% of ground lease revenue

Non-compete provision with CU Anschutz Medical Campus and Fitzsimons Innovation Campus

All other elements in the 1988 IGAs will remain in place
IGA JURISDICTIONS

- DEN
- Denver
- Adams County
- Aurora
- Brighton
- Commerce City
- Federal Heights
- Thornton
AMENDMENT 1A PASSED
(Modified Original 1988 IGA)

- **IGA Amendment Area** - DEN property within Denver allows for development of up to 1,500 net-leaseable acres of non-accessory (commercial/industrial) uses (area has not been defined).

- **Clear Zones** - DEN property in Adams County allowed to have development subject to Airport Operational Use Restrictions.
Real Estate Asset Classes

Office: Example would be the development of office buildings to support airport and IGA compliant industries.

Retail: Examples would be additional retail facilities in support of passengers visiting the DEN Airport.

Tourism & Hospitality: Examples would include additional hotel facilities to support airport visitors.

Industrial: Examples would be flex warehouse space and large manufacturing facilities to support IGA compliant industries.

Agriculture: Examples include greenhouses, fish farms, packaging and cold storage facilities.

Infrastructure: Examples include parking lots, CONRAC, renewable energy fields, and waste-to-energy plants.
The Colorado study area boundaries define an area of influence that impacts or will be impacted by the current and future economic conditions both on and off airport.
AEROTOPOLIS VISIONING STUDY TALKING POINTS

- Funded by FHWA and led by CDOT, the Aerotropolis Visioning study created a forum for jurisdictions and stakeholders to share ideas, information, and visions for realizing the opportunities presented by an aerotropolis.
- CDOT administered the study as a neutral 3rd party.
- A proactively planned Aerotropolis has significant economic potential but also challenges to implement.
- Biggest challenges are infrastructure and governance.
- For more information on the study visit:
  - [https://www.codot.gov/projects/aerotropolis](https://www.codot.gov/projects/aerotropolis)
DEN QUALITY ASSURANCE and CONTRACTOR QUALITY CONTROL

A COLLABORATIVE & PARALLEL PROCESS

JEFF HANSON, QUALITY ASSURANCE PROGRAM MANAGER
DENVER INTERNATIONAL AIRPORT
NOVEMBER 02, 2016
• The DEN Quality Assurance and Contractor Quality Control Programs are aligned to provide adequate assurance and documentation that all Work performed by the Contractor is in conformance with the Contract Documents, Drawings, Technical Specifications and Governing Authority Regulations.
DEN QA & QC

• DEN Quality Assurance Program
• Contractor Quality Control Program

SAME OBJECTIVE

• Work performed = Work Specified
• Same Key Performance Indicators
QUALITY DEFINED

- Quality can be both objective and subjective. The focus of DEN Quality Assurance is on the **objective definition**.

- **Objective Quality** – well defined and communicated bottom up:
  5. Contract and General Contract Conditions
  4. Specifications Division 1, General Requirements
     A. DEN Quality Assurance
     B. Contractor Quality Control
     C. Contractor’s Material Testing Agency
  3. Approved Submittals and Manufacturer's Recommendations
  2. Technical Specifications and Referenced Standards
     1. IBC/CCD Building Codes, CDOT and FAA Requirements provide a **firm foundation** as a baseline of **minimum** objective criteria.
DEN QUALITY ASSURANCE

• The DEN QA Team consists of qualified and experienced QA Inspectors and QA Materials Testing Field and Laboratory Technicians.

• Our core group of Landside and Airside Infrastructure Chief Inspectors and Testing Technicians provide consistency and continuity year over year to our QA Program.

• The primary role of the DEN Quality Assurance team is to enforce the Contract Document quality requirements and a Contractor’s compliance with its approved Contractor’s Quality Control Plan.

• The DEN Project Management Guidelines (PMG) establish our procedural process and approach to Quality Assurance and are available for review on the flydenver.com website.
DEN QUALITY ASSURANCE

- DIA QA Personnel roles and lines of authority are aligned with current industry standards with **clear lines of authority** for Quality Assurance and an independent reporting structure.

- QA Inspector’s responsibilities include a **key role in logistical coordination** with Landside, Airside and Terminal Operations.

- QA Inspectors **monitor compliance** with DEN safety and security requirements.

- QA Inspection and Testing activities **identify, document and record work progress & quantities, deficient or non-conforming work**.

- DEN QA Inspectors **utilize the latest iPad and BIM 360 technology** in the field for CD reference and QA Daily Report documentation.
CONTRACTOR’S QUALITY CONTROL PROGRAM

• A DEN Contractor is **solely responsible** for Quality Control of its Work as objectively defined throughout the Contract Documents.

• The **Contractor Quality Control Specification** - Key elements:
  
  • Developing and submitting a project specific **Quality Control Plan** for approval by DEN. The QC Plan is a living document.
  
  • Designating a qualified **Quality Control Manager and staff** with independent QC **authority** and reporting structure.
  
  • Developing an **Inspection and Testing Matrix** based upon the requirements of each Technical Specification Section.
  
  • Submitting **QC Daily Reports** of work progress, quantities, inspections and tests performed and results.
DEN CONTRACTOR’S QUALITY CONTROL PROGRAM

• Submitting **QC Weekly Reports** of all work activities, QC tests, test results and inspections conducted during that period, summarized by Tech Spec Section.

• Diligent **Coordination** of all Contractor inspection and testing activities with DEN QA inspection and testing personnel.

• The **Contractor Material Testing Agency (MTA) Specification**.

• DEN approval of a qualified MTA and personnel. A Contractor’s MTA must be **AASHTO or CCRL accredited**.

• The **Standard Forms Specification** includes an array of standardized QC forms to be used for reports by the Contractor and its MTA.
DEN QA & CONTRACTOR QC JOINT RESPONSIBILITIES

• Quality is each party’s goal and each party has defined responsibilities that need to be coordinated and scheduled in a collaborative process.

• DEN’s expectation is that the Contractor’s QC Program will be robust and proactively managed to prevent deficiencies in the work from occurring.

• When deficiencies occur, it is both party’s responsibility to identify, document and resolve them.

• The Contractor shall propose a remedy for DEN approval and resolve deficiencies collaboratively to mitigate impact to the project.

• Deficiencies identified by either party are to be recorded and tracked in an Issue Log in BIM 360 Field.
DEFICIENCY and NCR RESOLUTION

• DEN Project Managers will determine if an identified defect or non-conforming work issue can be resolved as a Deficiency or warrants a Non-Conformance Report (NCR).

• If a deficiency initiated by the Contractor’s QC or by DEN QA is believed to be minor and can be remedied by the Contractor in less than ten (10) calendar days, it will be entered and tracked as a Deficiency in the Issue Log.

• If a deficiency is determined that it constitutes a violation of (i) a CCD Building Code or (ii) an FAA Regulation, or if (iii) the issue is more substantial and requires Designer of Record (DOR) involvement, DEN may issue an NCR to the Contractor.

• An NCR can also be issued for a Deficiency that has not been acceptably corrected or in progress within 10 days.
REFERENCE THE PMG for QA – QC WORK FLOWS

FIELD QUALITY ASSURANCE / QUALITY CONTROL PROCESS

CONTRACTOR

START

QUALITY CONTROL

CONTRACTOR INITIATED

NO

DIA PROJECT STAFF

QUALITY ASSURANCE

DIA INITIATED

CORRECT AS DEFICIENCY

YES

YES

NO

GET TO DEFICIENCY PROCESS

GET TO NEW PROCESS
DEFICIENCY

PROCESS TIME = 2-17 DAYS

CONTRACTOR

1. CONTRACTOR LOGS DEFICIENCY IN DAILY REPORT & DEFICIENCY LOG
2. CONTRACTOR PROPOSES RESOLUTION & REASONABLE (<14 DIA) TIMEFRAME
3. CONTRACTOR COMPLETES FIELD RESOLUTION OF DEFICIENCY

PROJECT MANAGER

1. DIA OR CONTRACTOR IDENTIFIES A DEFICIENCY
2. DIA LOGS DEFICIENCY IN DAILY REPORT AND DEFICIENCY LOG
3. DIA EVALUATES RESOLUTION

SOLUTION ACCEPTABLE?

YES

1. DIA STAFF MONITORS RESOLUTION
2. DEFICIENCY RESOLVED?

YES

DIA CLOSES DEFICIENCY

NO

GO TO NEXT PROCESS

NO

1. DIA CLOSES DEFICIENCY

DESIGNER OF RECORD (DOR) SHOULD BE ABLE TO VIEW ALL DEFICIENCY LOGS

DENVER INTERNATIONAL AIRPORT
NON-CONFORMANCE REPORT

PROCESS TIME = 24 DAYS

CONTRACTOR

- Contractor logs NCR in daily report
- Contractor submits proposal for corrective action
- Contractor implements corrective action
  - 2-10 days
  - NO
  - YES

PROJECT MANAGER

- DIA approves acceptance of NCR, distributes and closes NCR
- DIA releases withheld payment

- DIA issues NCR form CM-23A
- DIA logs NCR in NCR log CM-60
- DIA evaluates NCR resolution
  - 1 day
  - YES
  - NO

- A deficiency item has not been resolved in the allocated time
- DIA/contractor/special inspector/FAA identifies non-conformance

DESIGNER OF RECORD

- Designer of record evaluates recommendation as necessary
  - 1-5 days
  - YES
  - NO

- Designer of record is informed work completed and accepted
RECAP OF KEY POINTS

• START WITH A COMPREHENSIVE QUALITY CONTROL PLAN
• PROVIDE A PROACTIVE QUALITY CONTROL MANAGER
• SELECT AN ACCREDITED MATERIAL TESTING AGENT
• COORDINATE AND COLLABORATE THROUGH DETAILED SCHEDULES, PRE-WORK PLANS and PRE-ACTIVITY MEETINGS
• COMMUNICATE DAILY IN THE FIELD WITH YOUR DEN QA INSPECTORS AND TESTING TECHNICIANS
• COLLABORATE IN IDENTIFYING AND RESOLVING DEFICIENCY ISSUES
• YOUR DEN QA INSPECTOR IS YOUR OPS LOGISTICS COORDINATOR