Duluth International Airport Runway 9/27 Reconstruction
Duluth Airport Authority (DAA) Meeting - August 15, 2018
Introductions

• Duluth International Airport
  • Blaine Peterson, Director of Operations

• SEH Team
  • St. Paul Office
    • Benita Crow – Senior Engineer and Aviation Practice Center Lead
    • Shawn McMahon – Senior Engineer and Chief Pilot
    • Kaci Nowicki – Senior Planner and Aviation Planning Group Lead
  • Duluth Office
    • Scott Sannes – Principal

• Federal Aviation Administration (FAA)
  • Lindsay Butler, Deputy ADO Manager (FAA-DMA-ADO)
  • Jake Martin, Program Manager (FAA-DMA-ADO)
Presentation Goals

- What was the plan?
- Why did things change?
- Runway 9/27 – Why now?
- What’s next?
What was the Plan?

DLH Master Plan (Initiated 2009, Approved 2015)

• Extend Runway 3/21
  • 2017 Environmental Assessment
  • 2018 Final Design and Land Acquisition
  • 2020 Reconstruction and Extension, Phase 1 (Extension to 7,000 ft)
  • 2021 Reconstruction and Extension, Phase 2 (Extension to 8,000 ft)
  • Beyond 2021 Reconstruction of Runway 9/27

• Recommended Facilities for Runway 3/21
  • 8,000 ft by 150 ft
  • GPS satellite approach procedures
    • Non-precision Runway 3
    • Precision GPS Runway 21
  • No Instrument Landing System (ILS)
  • No MALSR
  • Visual Aids – REILs and PAPIs
Why did things change?

DAA CONTINUES TO PURSUE REVISED ZONING ORDINANCE. PROCESS IS FOCUSED ON CHANGES TO MINNESOTA STATUTES AND RULES.
Runway 9/27 Reconstruction – Why Now?

• DLH Master Plan (Initiated 2009, Approved 2015)
  • “Full-depth reconstruction anticipated in the 5 TO 10 YEAR PERIOD. Foreign object debris (FOD) becoming an issue.”
  • Pavement Condition Index (PCI) Analysis – “The analysis concluded that the Runway 9/27 pavement was some of the LOWEST SCORING PAVEMENT ON THE AIRFIELD.”
  • Pavement Testing and Engineering Analysis – “The findings of the analysis indicated that the runway concrete panels are on the LOW SIDE OF ADEQUACY IN STRUCTURAL STRENGTH and load transfer.”

• American Engineering Testing (AET) (2009)
  • “It is anticipated that the pavement will be BEYOND ITS USEFUL LIFE IN 5 TO 10 YEARS and will require reconstruction.”

• Braun Intertec Report (2015)
  • Load Transfer Efficiency (LTE) – “Average LTE for all test joints is 45 percent, which differs significantly from the 78 percent presented in the previous report, indicating DETERIORATION IN JOINT CONDITION since that time.”
  • Structural Capacity – “The Aircraft Classification Number (ACN) of the A-320 is greater than the Pavement Classification Number (PCN) in several locations, which suggests LOCAL STRUCTURAL INADEQUACY OF THE EXISTING PAVEMENT within the assumed timeframe.”
Runway 9/27 Reconstruction – Why Now?

- Pavement easily demolished
- No steel reinforcement
- Voids under pavement
Runway 9/27 Reconstruction – Why Now?

Pavement deterioration, October 2016
Why now?

- DLH Master Plan – Available Information
  - Pavement condition of Runway 9/27
    - “Full-depth reconstruction anticipated in the 5 to 10 year period.”
  - DLH Operator Requirements

<table>
<thead>
<tr>
<th>Duluth Operator</th>
<th>Aircraft</th>
<th>Minimum Dry Runway Length</th>
<th>Preferred Inclement Length</th>
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<td>F-16</td>
<td>8,000</td>
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</table>

Deploying
Why now?

Second longest runway in the state
24 lane miles of highway
61,000 cubic yards of concrete
170,000 square yards of concrete
Why now?

Least Impactful Solution

- 148th Fighter Wing was planned to be deployed during original proposed construction schedule for Phase 1
- Localizer for Runway 9 (off Runway 27 end) was planned to be replaced by FAA during original proposed construction schedule for Phase 1
- Best weather months for construction
- Resolve “hot spots” on Runway 9/27
- A320 expected to be able to use Runway 3/21 based on runway length data collected as part of the Master Plan, as well as operational data
- Funding support from the FAA and MnDOT
What’s Next?

Phase 1B - 2017 Construction

Phase 2 - 2017 Construction

Phase 3 - 2019 Construction
What’s Next?
Runway 9/27 – Phase 3

• The FAA required additional planning beyond what was completed in the Master Plan to resolve the Hot Spots on the Runway 27 end.

• Hot Spots must be resolved as part of the Runway 9/27 East (Phase 3) reconstruction.

• A new Runway 27 layout was needed.
Runway 9/27 Reconstruction
Phase 3 Planning – Resolving Taxiway Echo Hot Spot

- **Hot Spot**: History or potential risk of collision or runway incursion
- **Re-evaluate solution to Hot Spots**
  - Non-standard inline taxiway
  - Direct apron to runway access
What’s Next?
Runway 9/27 – Phase 3

• Planning was completed through multiple processes:

- Alternatives analysis – 8+
  Alternatives
  December, 2015 – April, 2016

- Detailed evaluation and planning
  for Alternative 8
  Noise contours & environmental
  review
  Airport Layout Plan Update
  July, 2016 – Present

- December, 2017 – July, 2018

RUNWAY 9/27
RUNWAY LENGTH JUSTIFICATION
AND ULTIMATE GEOMETRY STUDY

TRIGGERING EVENT
MASTER PLAN & ALP UPDATE

FINAL DESIGN
What’s Next?
Runway 9/27 – Phase 3

• Planning stakeholder engagement
  • Extensive meetings with FAA (ADO, Part 139 Inspector, Flight Procedures, Tech Ops, Air Traffic Control Tower)
  • Multiple Special Tenant Meetings
  • DAA Board Meetings
  • Multiple meetings in each phase with stakeholders regarding alternatives and proposed alternative
    • ANG 148th
    • Airlines
    • Monaco
    • Joint Airport Zoning Board
    • DGS
    • RSAT meetings
    • Airport User meeting
    • Environmental stakeholders
    • Others
Duluth International Airport Runway 9/27
Phase 3 – Runway 27 Alternatives
Duluth International Airport
Runway 9/27 – Phase 3 – Runway 27 Alternatives
Existing Layout
Phase 3 Overview
Phase 3 Overview
Phase 3 Overview
Declared Distances – RWY 9

Landing / Departing Runway 9
TORA - 10,599'
TODA - 11,160'
ASDA - 10,062'
LDA - 10,062'

TORA = 10599'
TODA = 11160'
ASDA = 10062'
LDA = 10062'

Exsit. OFA
1000'

Exsit. RSA

Fut. Clearway

Exsit. RSA

Exsit. RFA
Declared Distances – RWY 27

Landing / Departing Runway 27
TORA = 10,599’
TODA = 10,599’
ASDA = 10,599’
LDA = 10,062’
Noise Contour Development

- Contours developed for an “Average Annual Day”:
  - Engine Thrust and Power Settings
  - Arrival and Departure profiles
  - Operations: Commercial, General Aviation, & Military
  - Runway Use
  - Distribution between:
    - Day (7am-10pm)
    - Night (10pm-7am) – 10 dB increase

- DLH Inputs developed from coordination with MnANG 148th Wing, Air Traffic Control Tower, Lake Superior Helicopters & Airport Management
Preliminary - Existing Noise Contours
Preliminary - Alternative 8 Noise Contours
Runway 9/27 Reconstruction
Phase 3 – Project Area Overview
Runway 9/27 Reconstruction
Phase 3 – Phasing Overview

Phase 3A

Phases 3B-3E

Phase 3A
Runway 9/27 Reconstruction
Phase 3A – Taxiway A and Taxiway E2/Hotel Work

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PHASE 3A RUNWAY 9/27 RECONSTRUCTION

Phase 3A includes completing work on Taxiway A and Taxiway E2.

1. Reconstruction of Taxiway A and installation of taxiway centerline lighting
2. Construct portions of new Taxiway A5
3. Concrete batch plant site prep
4. Paint “island” on commercial service apron

CLOSURES

5. Taxiway A will be closed east of Taxiway A5
6. Taxiway E2 will be closed South of 9/27

AVAILABLE AIRFIELD

7. Runway 9/27 Full Length
8. Runway 3/21 Full Length
9. All tenants have access to available airfield

INSTRUMENT APPROACH PROCEDURE IMPACTS

10. There will be no impact to instrument approach procedures during Phase 3A

DURATION

11. Phase 3A will be completed in 30 calendar days
Runway 9/27 Reconstruction
Phase 3B

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PHASE 3B RUNWAY 9/27 RECONSTRUCTION

**PHASE INFORMATION**
Phase 3B includes installing the displaced threshold on Runway 9/27.
Work elements will include:
1. Install runway end stop bars
2. Install displaced threshold bar and REILs
3. Remove existing paint markings
4. Paint new displaced runway markings
5. Cover runway distance remaining signs and complete prep work for new signs

**CLOSURES**
1. Runway 9/27 will be closed
2. Taxiway E1 will be closed
3. There will be no 148th Fighter Wing operations during Phase 3B

**AVAILABLE AIRFIELD**
1. Runway 3/21 full length
2. All tenants have access to available airfield

**INSTRUMENT APPROACH PROCEDURE IMPACTS**
1. All approach procedures to Runway 9 and 27 will be unavailable for Phase 3B
2. Available approaches include RNAV (GPS) Runway 3, RNAV (GPS) Runway 21, VOR or TACAN to Runway 3, and VOR/DME or TACAN to Runway 21
3. Approach minimums vary depending on aircraft size and capabilities. Approximately 400 ft. ceiling and 11/8 mile visibility

**DURATION**
Phase 3B will be completed in 3 calendar days.
Runway 9/27 Reconstruction
Phase 3C

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PHASE 3C RUNWAY 9/27 RECONSTRUCTION

**Phase Information**
- Phase 3C includes completing work on Runway 9/27, Taxiway E2, and Taxiway A5. Runway 27 will be operating with a temporary displaced threshold.

**Work elements will include:**
- Runway 9-27 Reconstruction (East end)
- Relocate MALS/PRR threshold bar
- Pavement removal from blast pad between Runway 9/27 and Taxiway E2
- Paint green island between blast pad and Taxiway H

**Closures**
- Runway 9/27 shortened to 7,454 feet and with a displaced threshold in place
- Runway 9 Declared Distances
- Runway 27 Declared Distances
- Taxiways E2/H closed
- Taxiways E1, A5, & C north of Taxiway A will be closed
- Taxiway H/E2 will be closed for night work 5 nights from 6pm to 6am
- Large aircraft access to 148 FW will be closed
- Runway 3/21 will be closed
- All tenants have access to available airfield, except 148th airfield access during the 5 coordinated night closures

**Available Airfield**
- Runway 9/27 lengthened to 7,454 feet and with a displaced threshold in place
- Runway 9 Declared Distances
- Runway 27 Declared Distances

**Instrument Approach Procedure Impacts**
- ILS to Runway 9 and 27 will be unavailable during Phase 3C
- IAP’s to Runway 3/21 will be unavailable during Phase 3C

**Duration**
- Phase 3C will be completed 60 calendar days
- The work on Taxiway H/E2 will be completed during 5 nighttime (6pm to 6am) closures during the 60 day closure period, coordinated with 148 FW operations

Approach minimums vary depending on aircraft size and capabilities. Runway 9 LPV - 200 foot ceiling and 1/2 mile visibility. Runway 9 RNAV - 500 foot ceiling and 1 mile visibility.
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Instrument Approach Procedures – 3 Types

**Visual Approach**
- Visual guidance
- Nice weather, high clouds, if any

**Non-Precision Approach**
- Horizontal guidance
- Average cloudy day

**Precision Approach**
- Horizontal and vertical guidance
- Foggy, low visibility
Duluth International Airport
Precision ILS Overview
# Duluth International Airport
## Instrument Approach Procedures

<table>
<thead>
<tr>
<th>Approach Type</th>
<th>Runway 9/27</th>
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<th>Runway 3/21</th>
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<td>RWY 9</td>
<td>RWY 27</td>
<td>RWY 3</td>
<td>RWY 21</td>
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<tr>
<td></td>
<td>Ceiling (feet)</td>
<td>Visibility (miles)</td>
<td>Ceiling (feet)</td>
<td>Visibility (miles)</td>
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<tr>
<td>Ground Based</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ILS – CAT II</td>
<td>101</td>
<td>1200 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ILS – CAT I</td>
<td>200</td>
<td>1/2</td>
<td>300</td>
<td>3/4</td>
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<tr>
<td>Localizer</td>
<td>600</td>
<td>1 1/4</td>
<td>500</td>
<td>7/8</td>
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<tr>
<td>VOR</td>
<td></td>
<td></td>
<td>400</td>
<td>1 1/8</td>
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<td>TACAN</td>
<td>500</td>
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<tr>
<td>Satellite Based</td>
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<tr>
<td>LPV</td>
<td>200</td>
<td>½</td>
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<td>LNAV/VNAV</td>
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<td>LNAV</td>
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# Duluth International Airport
Instrument Approach Procedures – Runway 9/27 Closed

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<tr>
<th>Approach Type</th>
<th>Runway 9/27</th>
<th>Runway 3/21</th>
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<td>RWY 9</td>
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<td>Visibility (miles)</td>
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<td>VOR</td>
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### Instrument Approach Procedures – Runway 27 Displaced

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<td>RWY 21</td>
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Duluth International Airport
Precision ILS Overview
Duluth International Airport
Precision ILS Overview – Critical Areas

Runway 9 Approaches
- Glide Slope Critical Area
- Localizer Antenna
- Phase 3 Construction Area impacts the Localizer Critical Area

Runway 27 Approaches
- Glide Slope Critical Area
- Localizer Antenna
- Phase 3 construction impacts glide slope critical area and RNAV touchdown point

Localizer Antenna
- Provides lateral guidance

Localizer Critical Area
- Precision OFZ
- Runway 9 Approaches
- Runway 27 Approaches
## Duluth International Airport
### Instrument Approach Procedures – Runway 27 Displaced & Runway 3/21 Closed

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<thead>
<tr>
<th>Approach Type</th>
<th>Runway 9/27</th>
<th>Runway 3/21</th>
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Runway 9/27 Reconstruction - Phase 3D

Duluth International Airport

PHASE 3D RUNWAY 9/27 RECONSTRUCTION

LEGEND
- CLOSED PAVEMENT
- CONSTRUCTION AREA (CLOSED)
- CONSTRUCTION AREA WITHIN TXY C/RWY 9-27 INTERSECTION WILL BE COMPLETED IN 1 WORKING DAY
- LOW PROFILE BARRICADE
- 3B & 3D HAUL ROUTE UNDER RADIO CAR ESCORT
- AIRCRAFT ROUTE
- LIGHTED CLOSING CROSS

Phase 3D includes the removal of the temporary displaced threshold on Runway 27.

Work elements will include:
1. Remove displaced threshold markings on Runway 27
2. Remove temporary lighting
3. Paint Runway 27 markings
5. Install distance remaining signs along Runway 9/27
6. Disassemble and restore batch plant area

CLOSURES
7. Runway 9/27 will be closed for Phase 3D
8. Taxiway C / Runway 9/27 intersection will be closed for 1 calendar day
9. Taxiway A3 will be closed for Phase 3D
10. No 148th FW airfield access or operations during phase 3D

AVAILABLE AIRFIELD
11. Runway 3/21 full length
12. All tenant access, except 348th Fighter Jet access

IAP
13. All approach procedures for Runways 9 and 27 will be unavailable during Phase 3D

INSTRUMENT APPROACH PROCEDURE IMPACTS
14. Available approaches for Runway 3/21 include RNAV (GPS) Rwy 3, RNAV (GPS) Rwy 21, VOR or TACAN to Rwy 3, and VOR/DME or TACAN to Rwy 21
15. Approach minimums vary depending on aircraft size and capabilities. Approximately 400 ft ceiling and 11/8 mile visibility

DURATION
16. Phase 3D will be completed in 3 calendar days
17. The work inside the Taxiway C / Runway 9/27 intersection will be completed in 1 calendar day
Runway 9/27 Reconstruction
Phase 3E(A)

Duluth International Airport

**PHASE 3E(A) RUNWAY 9/27 RECONSTRUCTION**

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**PHASE INFORMATION**

Phase 3E-A includes groove and jointing work on Runway 9/27.

Work elements will include:

1. Sawcut and seal pavement joints
2. Groove new concrete pavement
3. Paint runway pavement

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**CLOSURES**

4. Runway 9/27 will be closed
5. No 148th FW operations during the phase

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**AVAILABLE AIRFIELD**

6. Runway 3/21 full length
7. All tenants have access to available airfield

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**IAP**

8. All approach procedures to Runway 9 and 27 will be unavailable for Phase 3E.
9. Available approaches include RNAV (GPS) Rwy 3, RNAV (GPS) Rwy 21, VOR or TACAN to Rwy 3, and VOR/DME or TACAN to Rwy 21 (Phase 3E-A only)
10. Approach minimums vary depending on aircraft size and capabilities. Approximately 400 ft ceiling and 1 1/8 mile visibility

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**DURATION**

11. Phase 3E-A will be completed October 1 through 7, 2019
12. Taxiway C/Runway 9/27 intersection will be reopened once work is completed
Runway 9/27 Reconstruction
Phase 3E(B)

Legend:
- CLOSED PAVEMENT
- CONSTRUCTION AREA (CLOSED)
- LOW PROFILE BARRICADE
- CONSTRUCTION HAUL ROUTE
- AIRCRAFT ROUTE
- LIGHTED CLOSING CROSS

PHASE 3E(B) RUNWAY 9/27 RECONSTRUCTION

Phase 3E(B) includes grooving and jointing work in the Runway 9/27 and Runway 3/21 intersection.

Work elements will include:
1. Saw cut and seal pavement joints
2. Grove new concrete pavement
3. Paint runway pavement

Closures:
4. Runway 9/27 will be closed
5. Runway 3/21 will be closed

Available Airfield:
6. Select taxiways only
7. All tenants have access to available taxiways
8. Helicopter operations remain available

Instrument Approach Procedure Impacts:
9. All approach procedures to DLH will be unavailable during the 6 nighttime closures

Duration:
10. Phase 3E(B) will be completed October 1 - 7, 2019 during 6 nighttime closures (11pm-5am).
# Runway 9/27 Reconstruction

## Phase 3 Scheduling Overview

<table>
<thead>
<tr>
<th></th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUGUST</th>
<th>SEPTEMBER</th>
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</thead>
<tbody>
<tr>
<td>2019</td>
<td></td>
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<td>☢️</td>
<td>☢️</td>
<td>☢️</td>
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<tr>
<td>MAY 15</td>
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<tr>
<td>SEPTEMBER 1</td>
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</table>

- ☢️: Airshow July 19-21
Runway 9/27 Reconstruction
Phase 3 Scheduling Overview

<table>
<thead>
<tr>
<th>2019</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUGUST</th>
<th>SEPTEMBER</th>
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<tbody>
<tr>
<td>MAY 15</td>
<td>MAY 15</td>
<td>3A (TAXIWAY A AND E2)</td>
<td>JULY 19-21</td>
<td>AIRSHOW</td>
<td>SEPTEMBER 1</td>
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<tr>
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<td>MAY 15</td>
<td>3B (TEMPORARY RUNWAY SET UP)</td>
<td>JULY 19-21</td>
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<td>SEPTEMBER 1</td>
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<tr>
<td>MAY 15</td>
<td>MAY 15</td>
<td>3C (RUNWAY CONSTRUCTION)</td>
<td>JULY 19-21</td>
<td>AIRSHOW</td>
<td>SEPTEMBER 1</td>
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<tr>
<td>MAY 15</td>
<td>MAY 15</td>
<td>3D (TEMPORARY RUNWAY REMOVAL)</td>
<td>JULY 19-21</td>
<td>AIRSHOW</td>
<td>SEPTEMBER 1</td>
</tr>
<tr>
<td>MAY 15</td>
<td>MAY 15</td>
<td>3E (RUNWAY GROOVING)</td>
<td>JULY 19-21</td>
<td>AIRSHOW</td>
<td>SEPTEMBER 1</td>
</tr>
</tbody>
</table>

- 3A (TAXIWAY A AND E2) 30 DAYS- NO RUNWAY CLOSURE
- 3B (TEMPORARY RUNWAY SET UP) 3 DAYS
- 3C (RUNWAY CONSTRUCTION) 60 DAYS
- 3D (TEMPORARY RUNWAY REMOVAL) 5 DAYS
- 3E (RUNWAY GROOVING)
Runway 9/27 Reconstruction
Phase 3 Scheduling Overview

*Airshow can happen during phase 3 but construction must stop for 3 days.

- **3A (TAXIWAY A AND E2)**
  - 30 DAYS - NO RUNWAY CLOSURE

- **3B (TEMPORARY RUNWAY SET UP)**
  - 3 DAYS

- **3C (RUNWAY CONSTRUCTION)**
  - 60 DAYS

- **3D (TEMPORARY RUNWAY REMOVAL)**
  - 5 DAYS

- **3E (RUNWAY GROOVING)**

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Building a Better World for All of Us
Runway 9/27 Reconstruction
Phase 3 Scheduling Overview

- **3A (TAXIWAY A AND E2)**
  - 30 DAYS - NO RUNWAY CLOSURE

- **3B (TEMPORARY RUNWAY SET UP)**
  - 3 DAYS

- **3C (RUNWAY CONSTRUCTION)**
  - 60 DAYS

- **3D (TEMPORARY RUNWAY REMOVAL)**
  - 5 DAYS

- **3E (RUNWAY GROOVING)**

**Timeline:**
- **MAY 15**
- **AIRSTAION JULY 19-21**
- **SEPTEMBER 1**
# Runway 9/27 Reconstruction Phase 3 Draft Public Involvement Plan

## 2018 Runway 9/27 Reconstruction Phase 3

### PUBLIC INVOLVEMENT

### In Person Engagement

**Airport Board Meetings**
- ANG 148th
- Monaco
- AAR
- LSC
- Cirrus
- Airlines
- ATCT
- Tech Ops
- ARFF
- Others

**Special Tenant Meetings/Workshops**

**Weekly Tenant Meetings**

**Airport User Meetings**

**Construction Meetings**

### Written and Online Engagement

**Press Release**

**Off-Airport Stakeholder Project Overview Construction Notice & Newsletters**
- Notices & Newsletters to Stakeholders (mailing and visits as needed)

**Project Overview & User Construction Notice**
- Distributed to on-Airport Stakeholders

**Project Newsletter**
- Published every Friday (2 weeks prior to through at least 2 weeks post construction)

**Project Page on DAA Website**

**Social Media Posts**

**Terminal Public Outreach & Signage**

**Other Potential Tools**

**DNT Article**

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### Timeline

#### Project Phases

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td><strong>PROJECT PLANNING/PRE-CONSTRUCTION</strong></td>
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<tr>
<td><strong>CONSTRUCTION</strong></td>
<td>🔄</td>
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<tr>
<td><strong>POST-CONSTRUCTION</strong></td>
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</table>
Public Outreach– Continue with newsletters and airfield and community notices.
Runway 9/27 Reconstruction

Project Costs

<table>
<thead>
<tr>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
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<tbody>
<tr>
<td>$17,392,002</td>
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Total Costs
Runway 9/27 Reconstruction
Project Funding

<table>
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<tr>
<th>PHASE 1</th>
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<th>PHASE 3</th>
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<tbody>
<tr>
<td>FAA: $12,358,802</td>
<td>FAA: $6,960,968</td>
<td>FAA: $11,445,641</td>
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<tr>
<td>MnDOT: $4,366,600</td>
<td>MnDOT: $773,441</td>
<td>MnDOT: $1,271,738</td>
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<td>Direct Appropriation: $666,600</td>
<td>Direct Appropriation: $1,271,738</td>
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<tr>
<td>Local:</td>
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Questions?