NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST

NAS Jacksonville Airfield Repairs Project Overview

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CNRSE AIR INSTALLATIONS



SIMPLIFIED AIRFIELD CONSTRUCTION HISTORY



PHOTO A. AERIAL PHOTOGRAPH OF NAS JACKSONVILLE. 8 NOVEMBER 1965. 20,000 FT.

PHASE 1 (1940-1941)

RW 9-27, 4-22, 1-19 ,& 13-31 triple bituminous surface treatment, 6" limerock base

PHASE 2 (1952)

RW 9-27:
Added 3" ACC
Added 10" RPCC ends, 6" limerock base (5660' to 8000')

RW 4-22 , 1-19, & 13-31:
Added 3" ACC

PHASE 3 (1956-Present)

Various mill & overlay projects, apron expansion, seal coating, and minor repairs. Conversion of RW 1-19 and 4-22 to TW

PRE-CONSTRUCTION AIRFIELD CONFIGURATION (2015)



PROJECT DRIVER - MISSION AIRCRAFT CHANGE

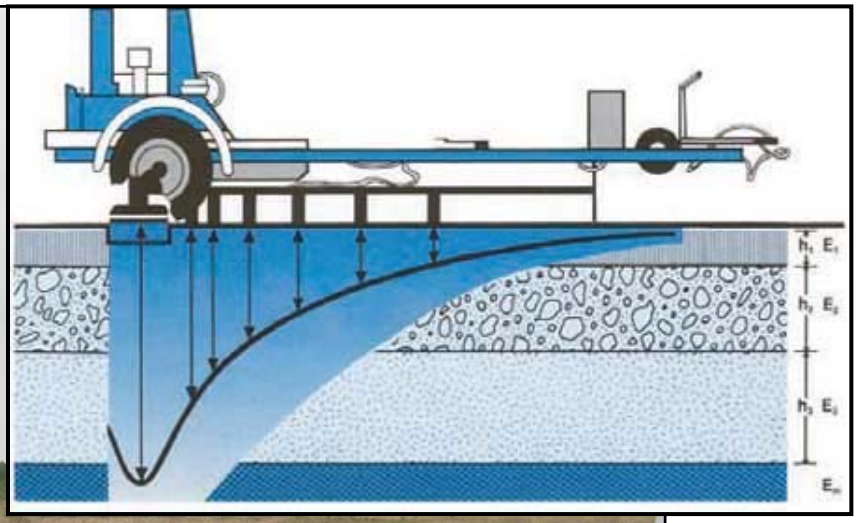


STRUCTURAL EVALUATION – PCN & ACN

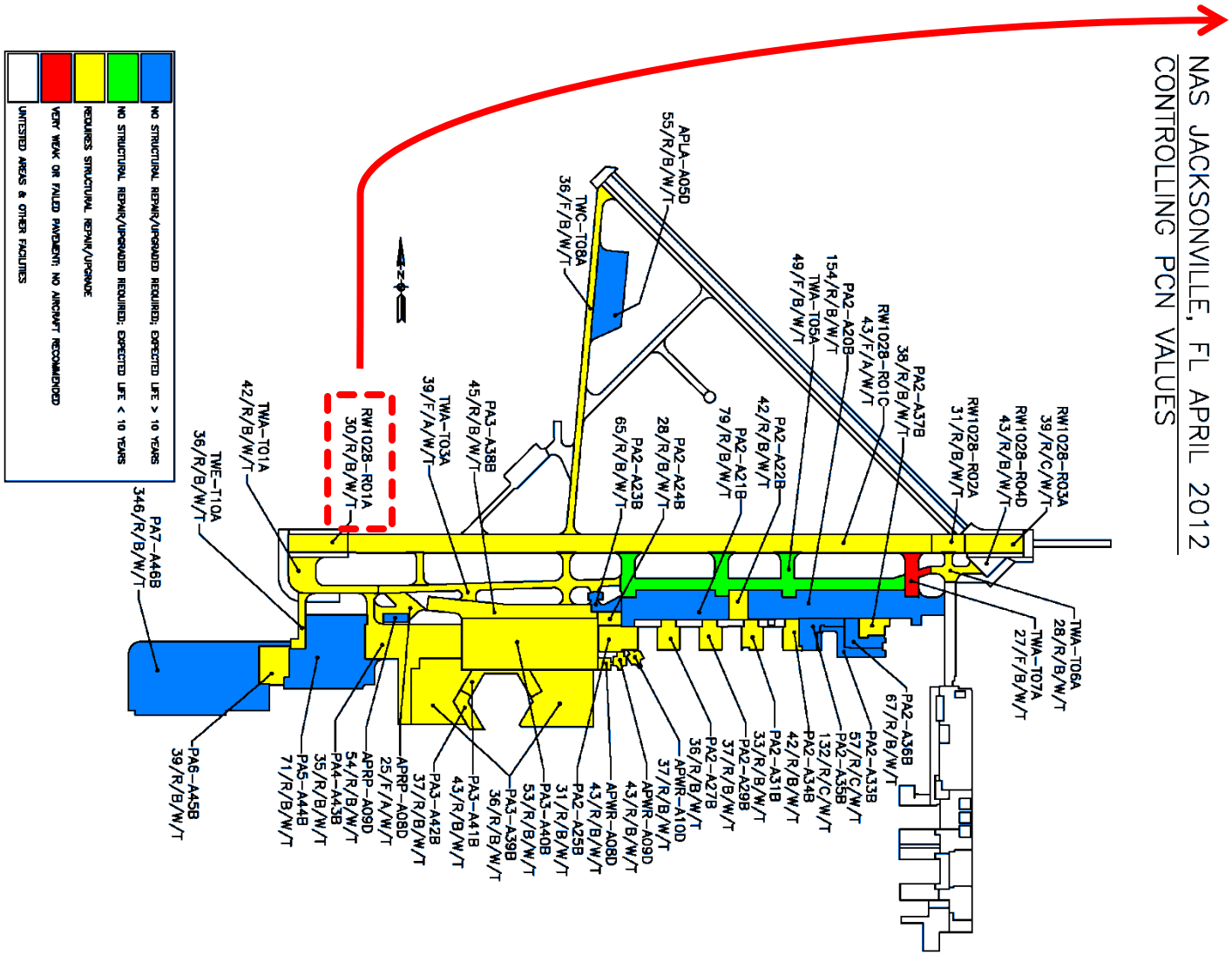
- The ability of an airfield pavement to support a given aircraft comes from an evaluation of PCN and ACN.
- What is PCN?
  - PCN: Pavement Classification Number
  - The PCN represents the bearing capacity of a pavement section for unlimited aircraft operations (single type of aircraft) at a given load. Simply, strength.
- What is ACN?
  - ACN: Aircraft Classification Number
  - The ACN represents the relative effect of an aircraft on a pavement for a specified standard subgrade. It is unique for each aircraft and published.
  - The ACN Depends on two major variables:
    - Aircraft - weight, C.G. position, landing gear geometry, and tire pressure
    - Pavement - Rigid or flexible, Subgrade category
- When ACN/PCN > 1.0 pavement is susceptible to failure
- When ACN/PCN ≤ 1.0 pavement is structurally capable of supporting the aircraft.

STRUCTURAL EVALUATION – FINDING PCN





DUE DILIGENCE - STRUCTURAL EVALUATION RESULTS



RW 1028-R01A
30/R/B/W/T

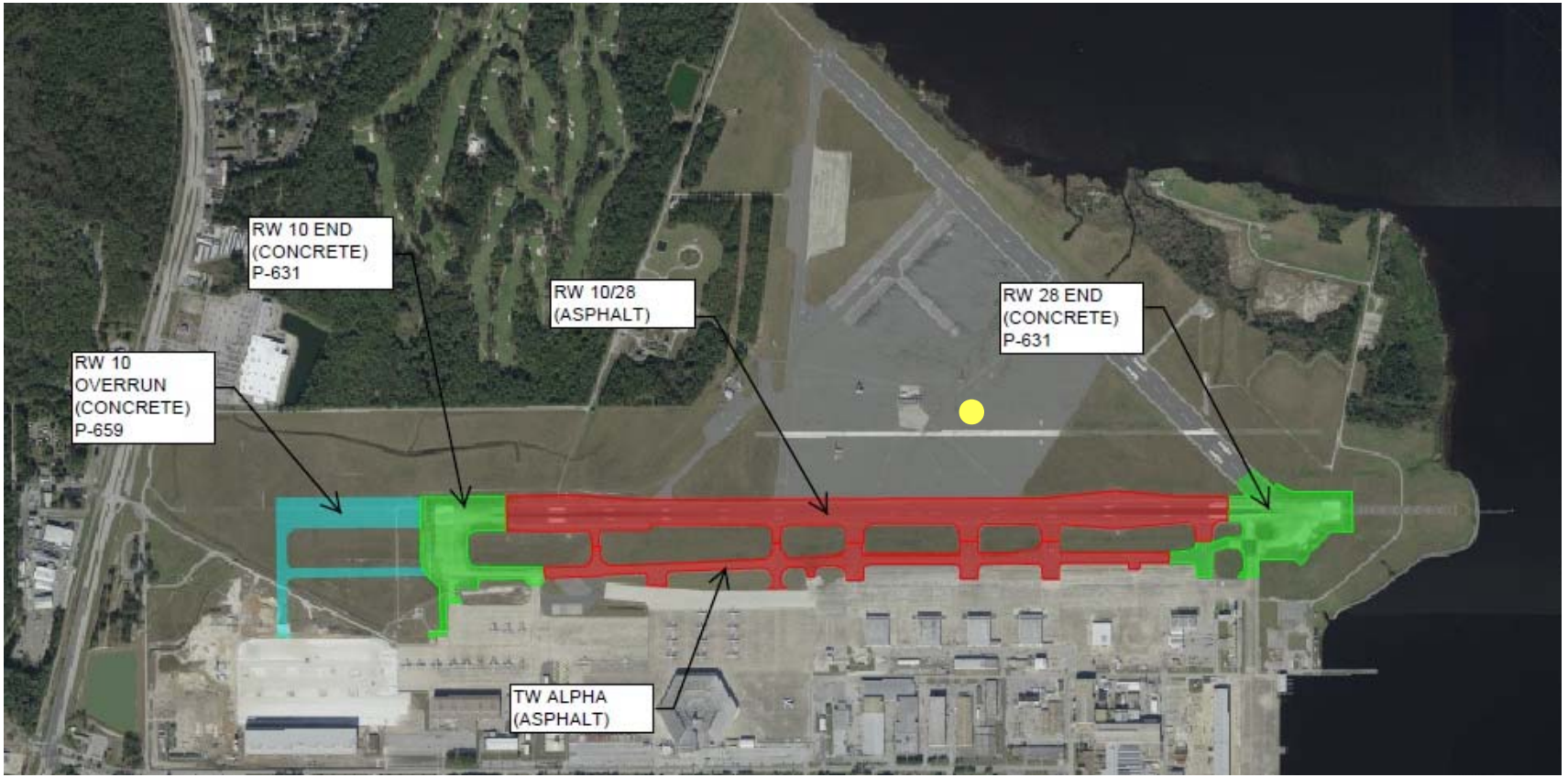
P-8A Poseidon
ACN rigid = 55.8

ACN/PCN > 1.0
Therefore, failure imminent

What does "failure" mean for airfield pavement?

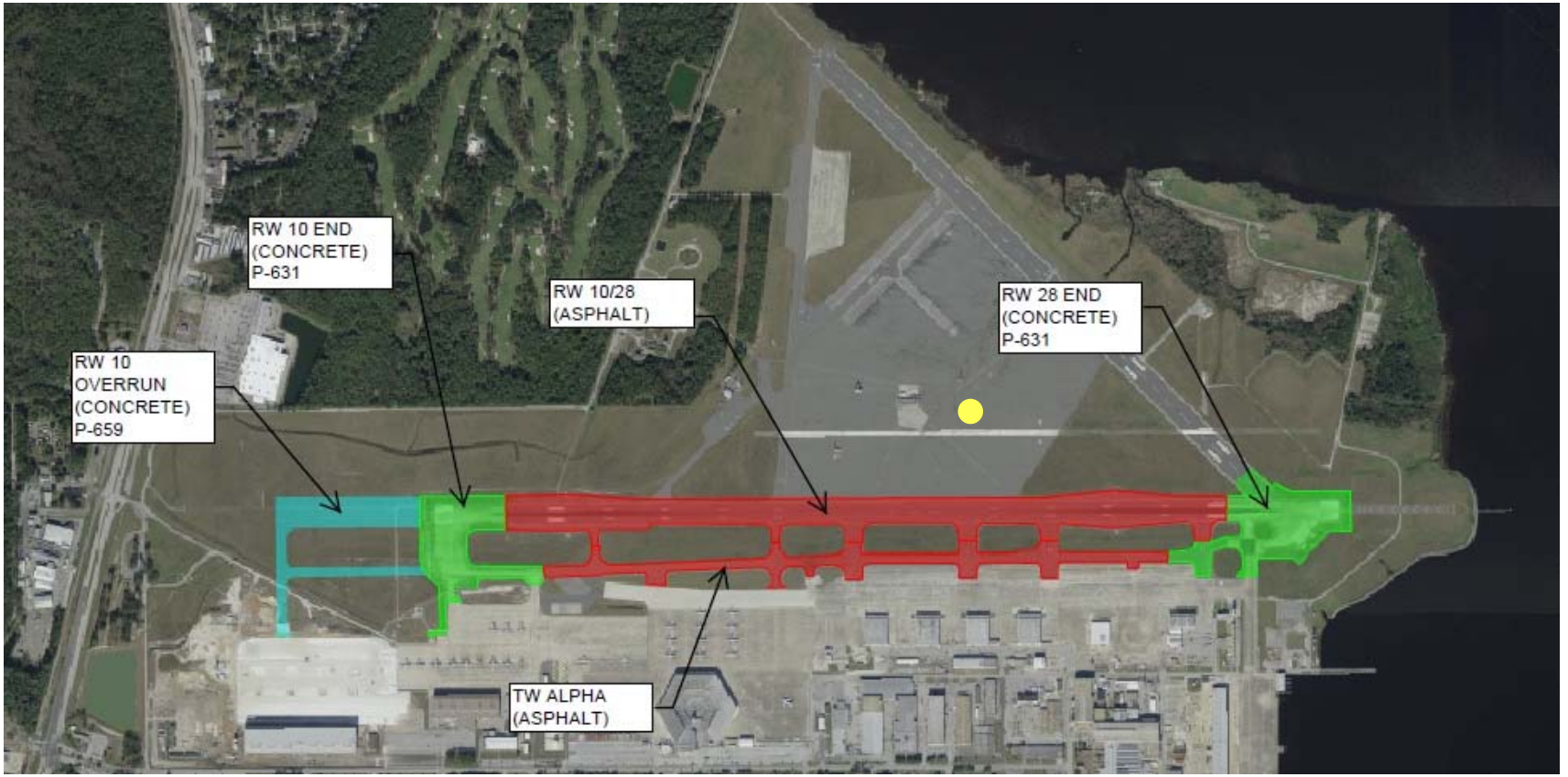
Project is needed, more thorough site investigation needed…

SCOPE OF PROJECT



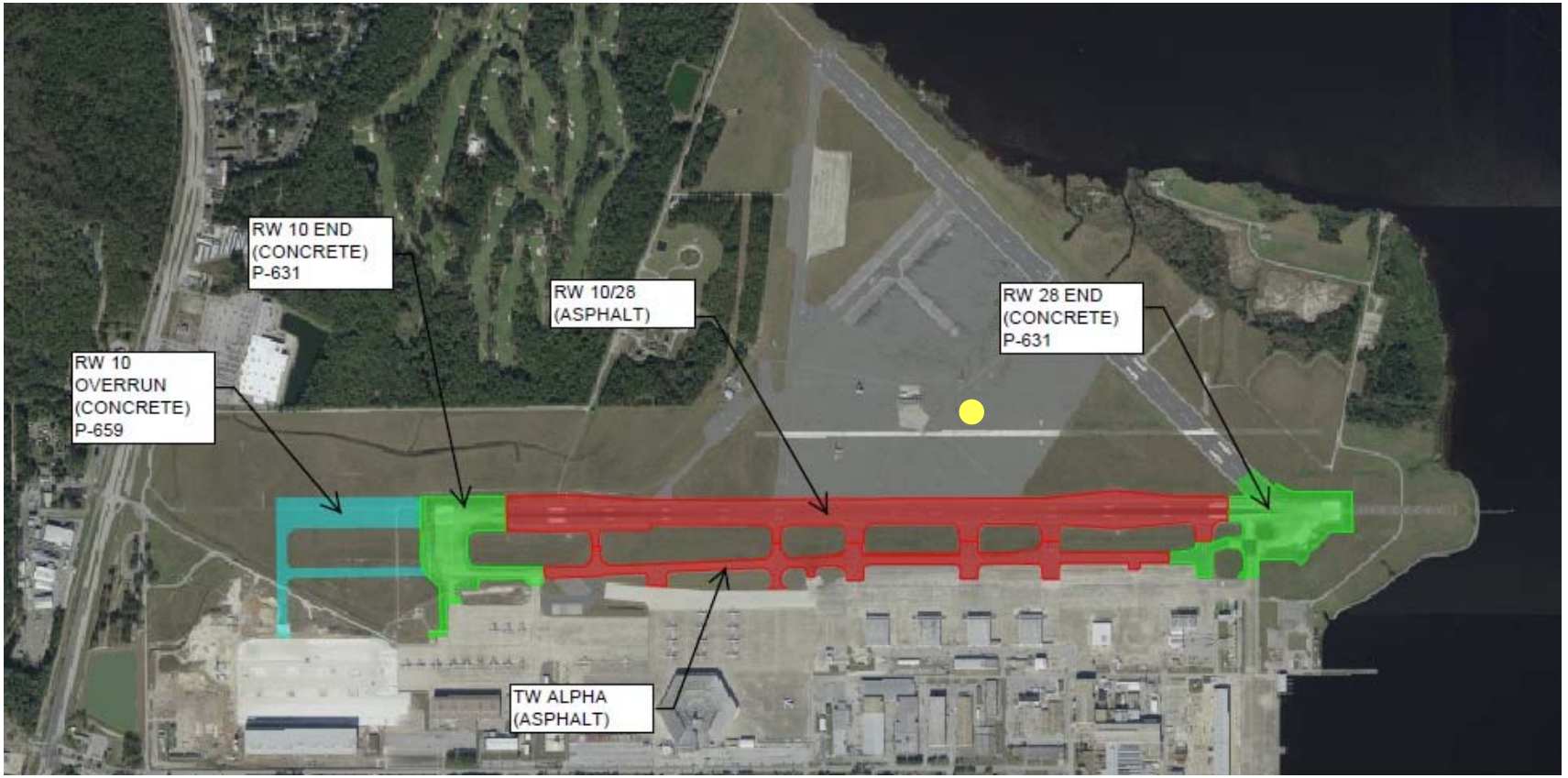
- ST 15-08 includes repairs to the asphalt portion of runway 10-28, taxiway Alpha and associated throats. ($24.2M)
  - ➢Entire length of the asphalt portions of runway 10-28, taxiway Alpha and throats will be milled and overlaid with new asphalt.
  - ➢Full depth repairs to include replacement of the base material will be required in various locations on the asphalt portions of the runway.

SCOPE OF PROJECT



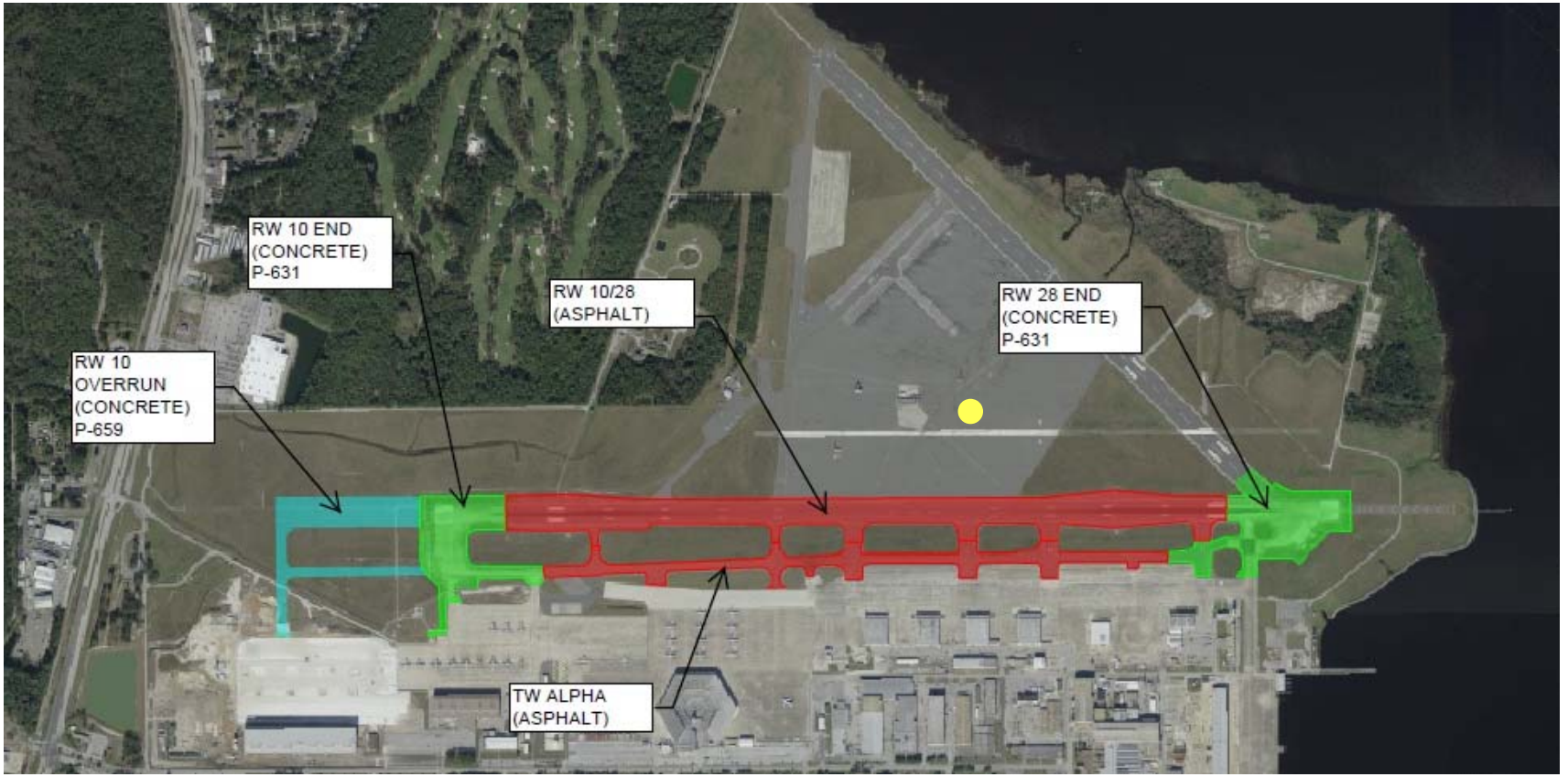
- P-631 includes the reconstruction of both the 10 and 28 ends of the primary runway 10/28. ($24.06M)
  - Over excavation of materials at the 28 end of the runway to address poor soil conditions.
  - Currently the ends consist of 10” concrete, these ends will be fully demolished to include the existing base material.
  - The new ends will consist of 12” stabilized subgrade, 12” crushed concrete base and 15” of plain concrete.

SCOPE OF PROJECT



- P-659 includes the construction of new additional 1000' of runway overrun, new parallel taxiway and construction of new associated ladder onto the 10 end of the runway. ($20.75M)

SCOPE OF PROJECT

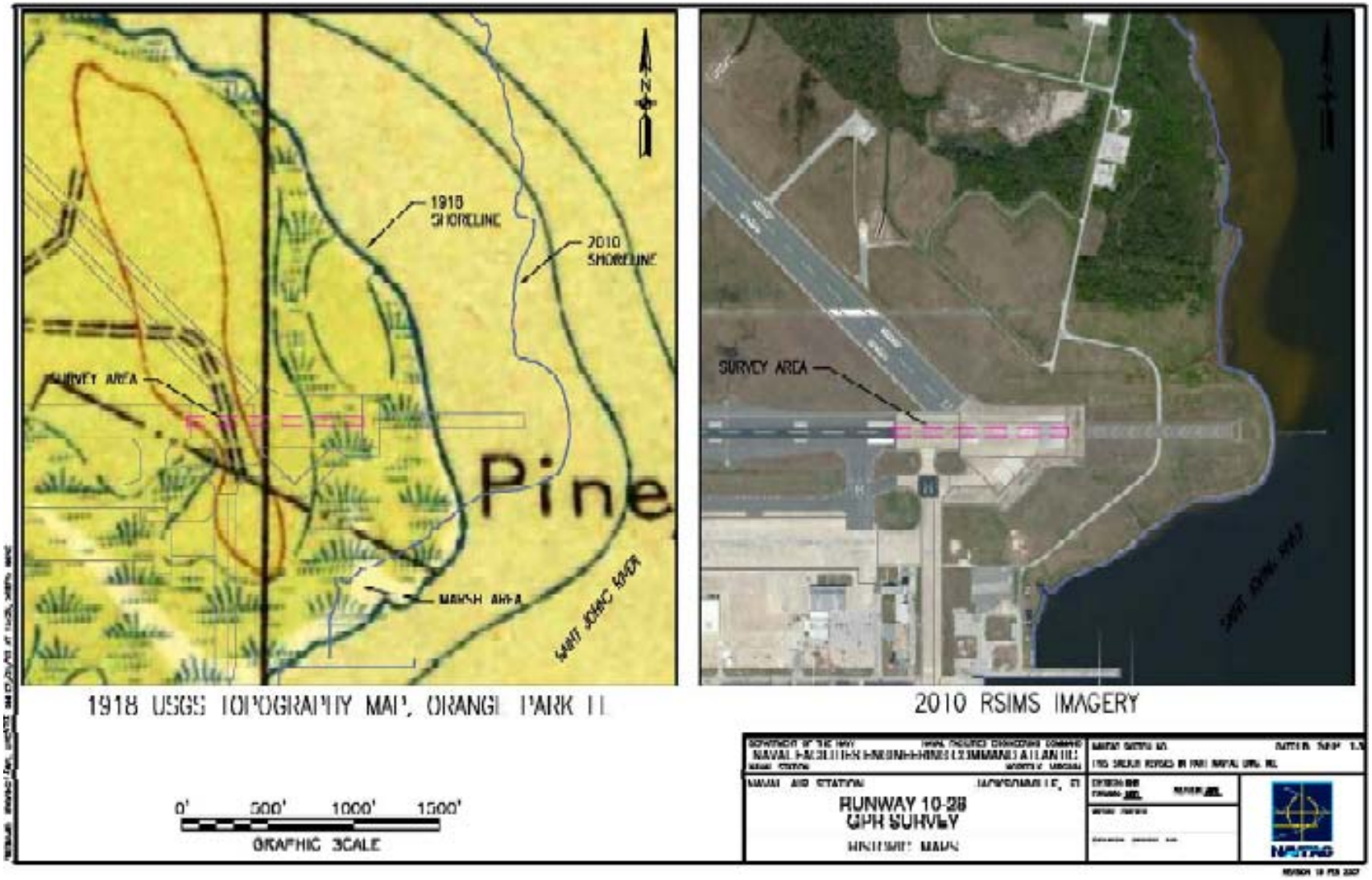


- RM 10-7582 Energy –Replace Airfield Lighting will fully replace all airfield lighting and signage with new energy efficient equipment. ($16.5M)
  - ➢3 of the 4 existing electrical vaults will be demolished and replaced with a new central 3000 SF electrical vault.

GEOTECHNICAL INVESTIGATION

- **Standard Penetration Tests (throughout all areas)**
- **Modulus of Subgrade Reaction (Plate load testing)**
- **California Bearing Ratio (turfed areas)**
- **Limited Dynamic Cone Penetrometer (at void identified areas in PCC)**
- **Double Ring Infiltrometer (for stormwater infiltration rate estimation)**
- **Pavement cores (for thickness determination)**
- **Historical research from sources such as previous studies and Quad maps**

QUADRANGLE MAP 1918



VOID DETECTION VIA GPR

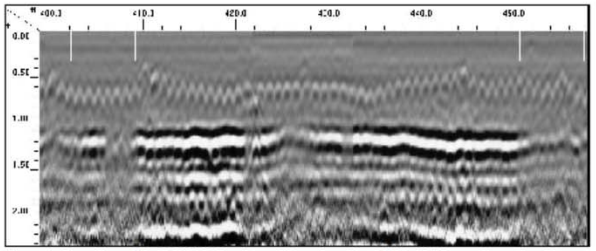


Figure 1: A portion of the 2-D GPR showing voids under slabs 28-30. Voids are shown in white.

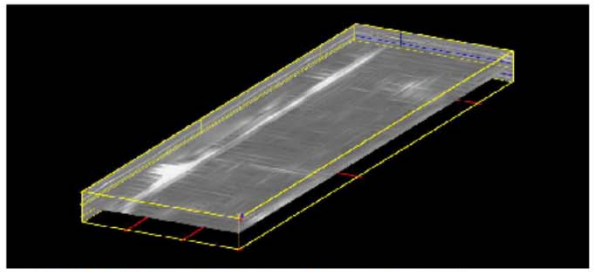


Figure 2: 3-D model of the voids under slabs 28-30. Voids are shown in white.

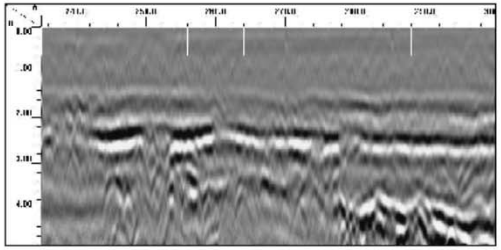
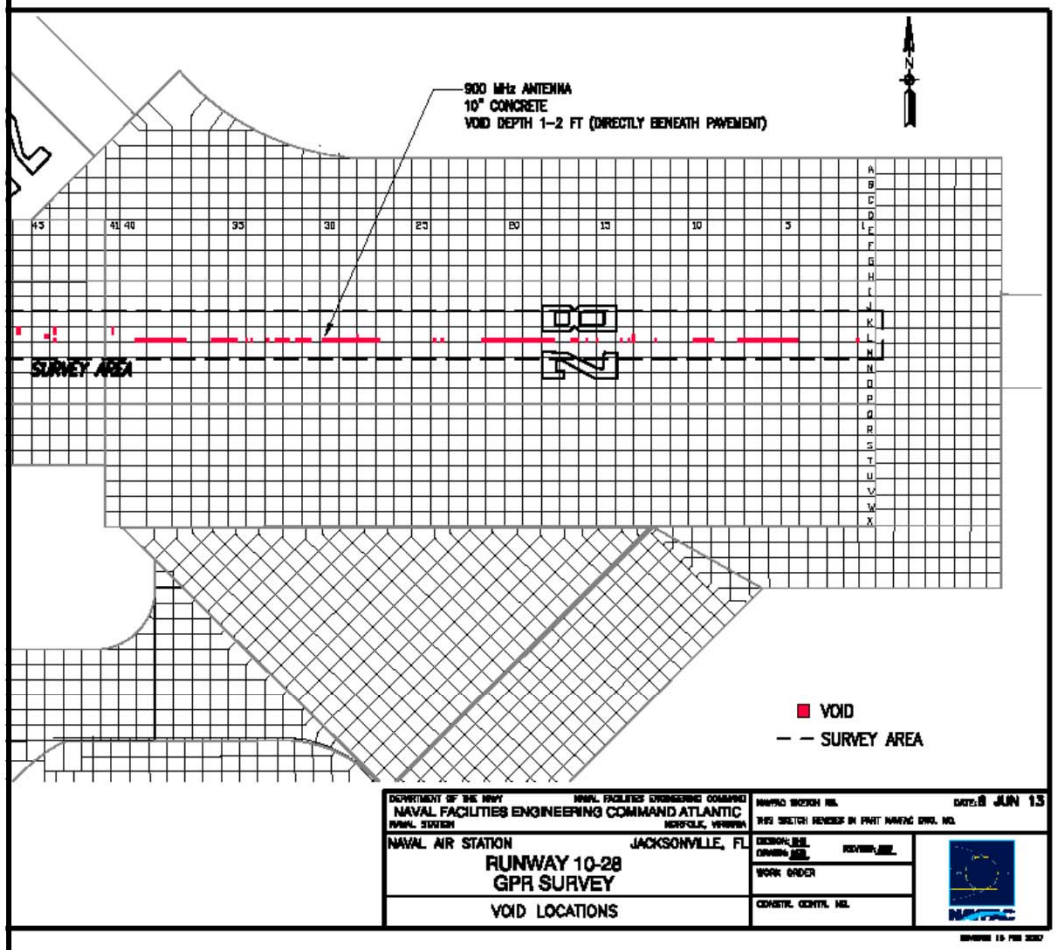
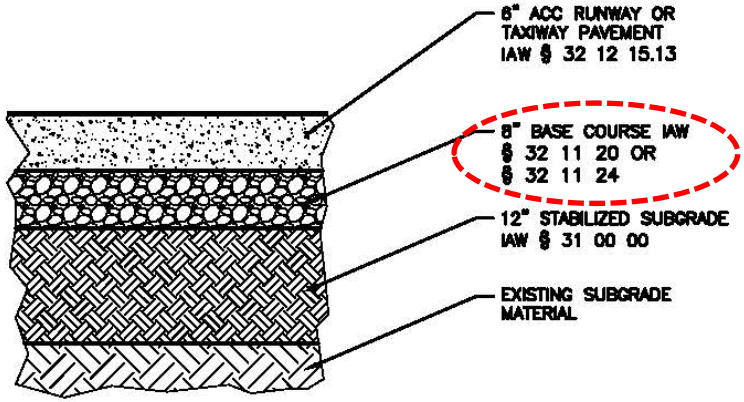


Figure 3: 2-D GPR data showing potential voids under slabs 57-59. Voids shown in white.

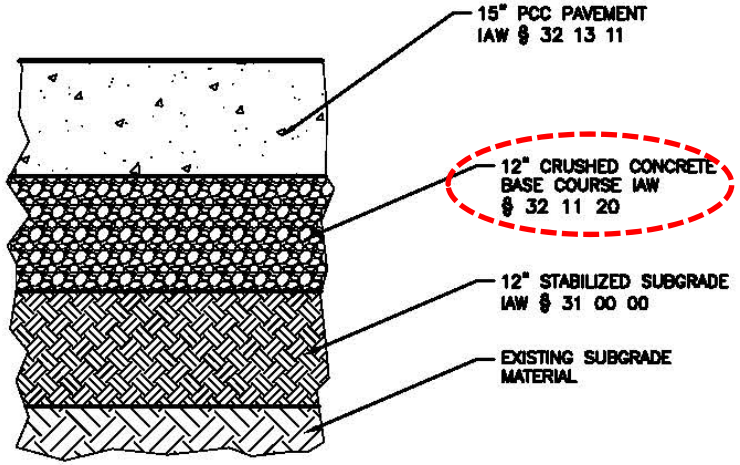


DESIGN PAVEMENT SECTION



FULL–DEPTH ACC RECONSTRUCTION DETAIL

NOT TO SCALE



FULL–DEPTH PCC RECONSTRUCTION DETAIL

NOT TO SCALE

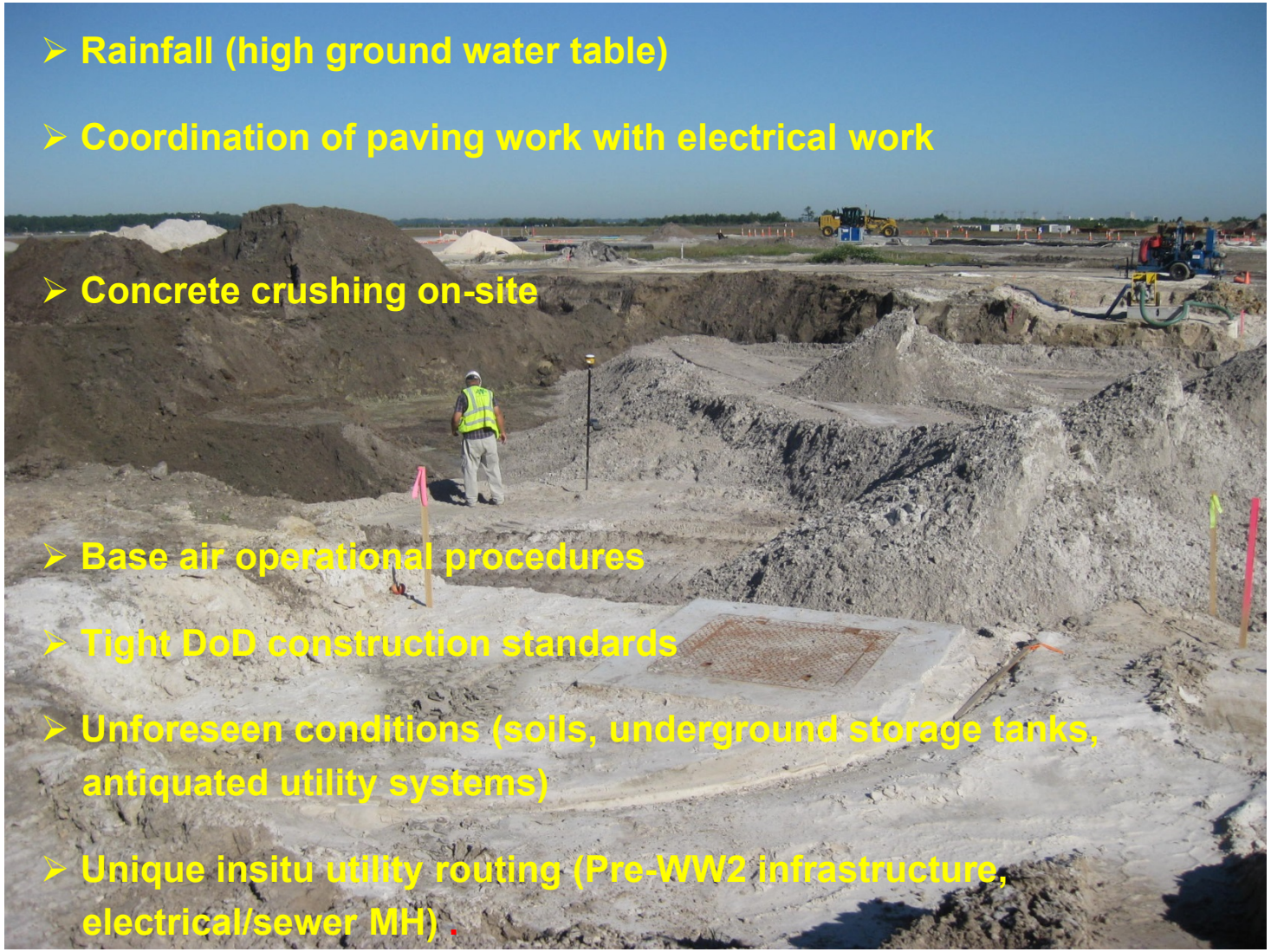
TECHNICAL APPROACH – PROJECT DURATION

- **All airfield paving and lighting work will be accomplished concurrently.**
- **Project durations are very aggressive and require the contractor to work multiple shifts per day.**
  - **Contract terms allow for 24 hours per day, 7 days per week work hours.**
  - **Contract allows for on site asphalt and concrete batch plants.**
  - **Contract requires all demolished concrete be crushed on-site and used as new base material.**
- **All of the work identified within these four (4) projects is very sensitive to weather conditions.**
  - **Much of this work cannot be accomplished in wet conditions as the soil moisture content is critical to the pavement portions of the project.**
  - **Contract duration includes the NOAA average rain days per month for this location.**
- **Project Quantities**
  - **Concrete crushing – 56,000 tons**
  - **New concrete - 1,163,217 SF (24.2 Football Fields)**
  - **New asphalt - 2,177,807 SF (45.4 Football Fields)**
  - **Power Cable installation - 117 miles**
  - **Duct Bank construction – 24 miles**
  - **Airfield Light Fixtures – 1,200**

DESIGN CHALLENGES

- Differing site conditions control (lump sum environment)
- Defining air operations for a 20-year period
- Correction of geometrical issues (horizontal & vertical)
- Phasing
- Grading and tie-in to existing features
- Limits of full-depth re-construction
- Multiple funding sources “color of money”
- Coordination with URS (electrical designer)
- Accommodation of asphalt and concrete batch plants, and crushing operations (environmental concerns)
- Communication across a multitude of personnel with differing skill sets (project analogous to taking an aircraft carrier offline unplanned)

CONSTRUCTION CHALLENGES



PROGRESS TO DATE

- Both concrete ends have been removed and crushed to gradation
- Over-excavation of soft and unsatisfactory materials has been achieved
- Much of the electrical infrastructure has been removed
- New electrical vault construction started
- New crushed concrete base constructed to grade at 10 and 28 ends
- New crushed concrete base construction to grade at 10 end overrun
- Approximately 70% of the concrete placed at 28 end
- New electrical/lighting approximately 60% complete at 28 end
- Asphalt reconstruction approximately 80% complete. Surface course in progress.

Construction Conceptual Plan



Runway 28 End – July 2015



Runway 28 End – August 2015



Runway 28 End – September 2015



Runway 28 End – October 2015



Runway 10 End – August 2015



Runway 10 End – September 2015



Runway 10 End – October 2015



QUESTIONS?

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