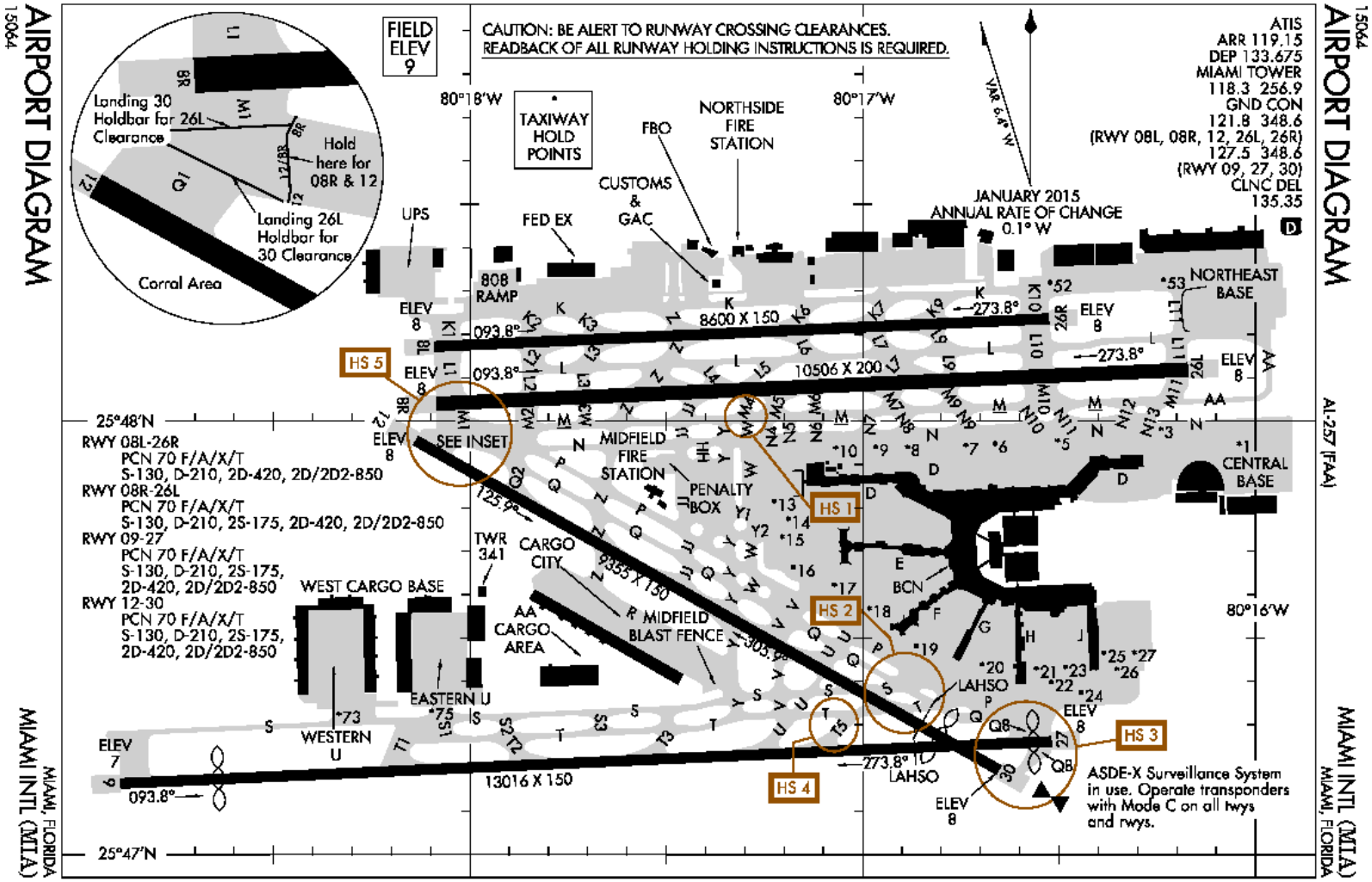
Session

Airport Challenges and Runway Incursions

Geometries!!!

HOT SPOTS and US Airport Diagrams



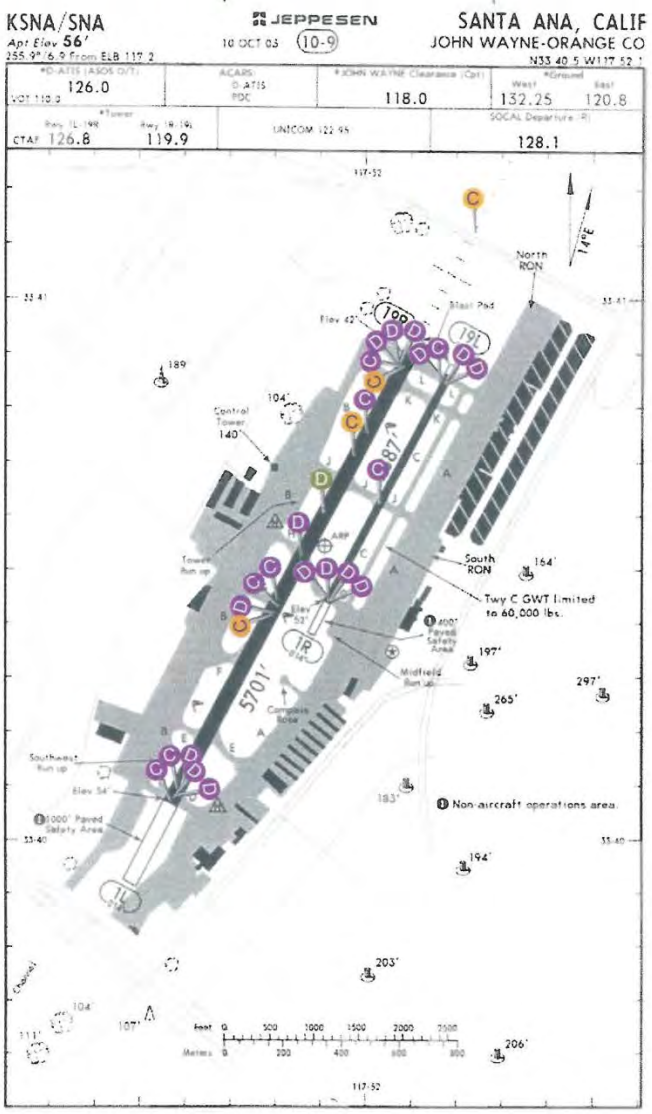
What ***"common"*** *taxiway geometries are prone to Runway Incursions?*

FY 2000 through FY 2003 Runway Incursions
John Wayne - Orange County Airport

Operational Errors / Deviations

Pilot Deviations

Vehicle / Pedestrian Deviations



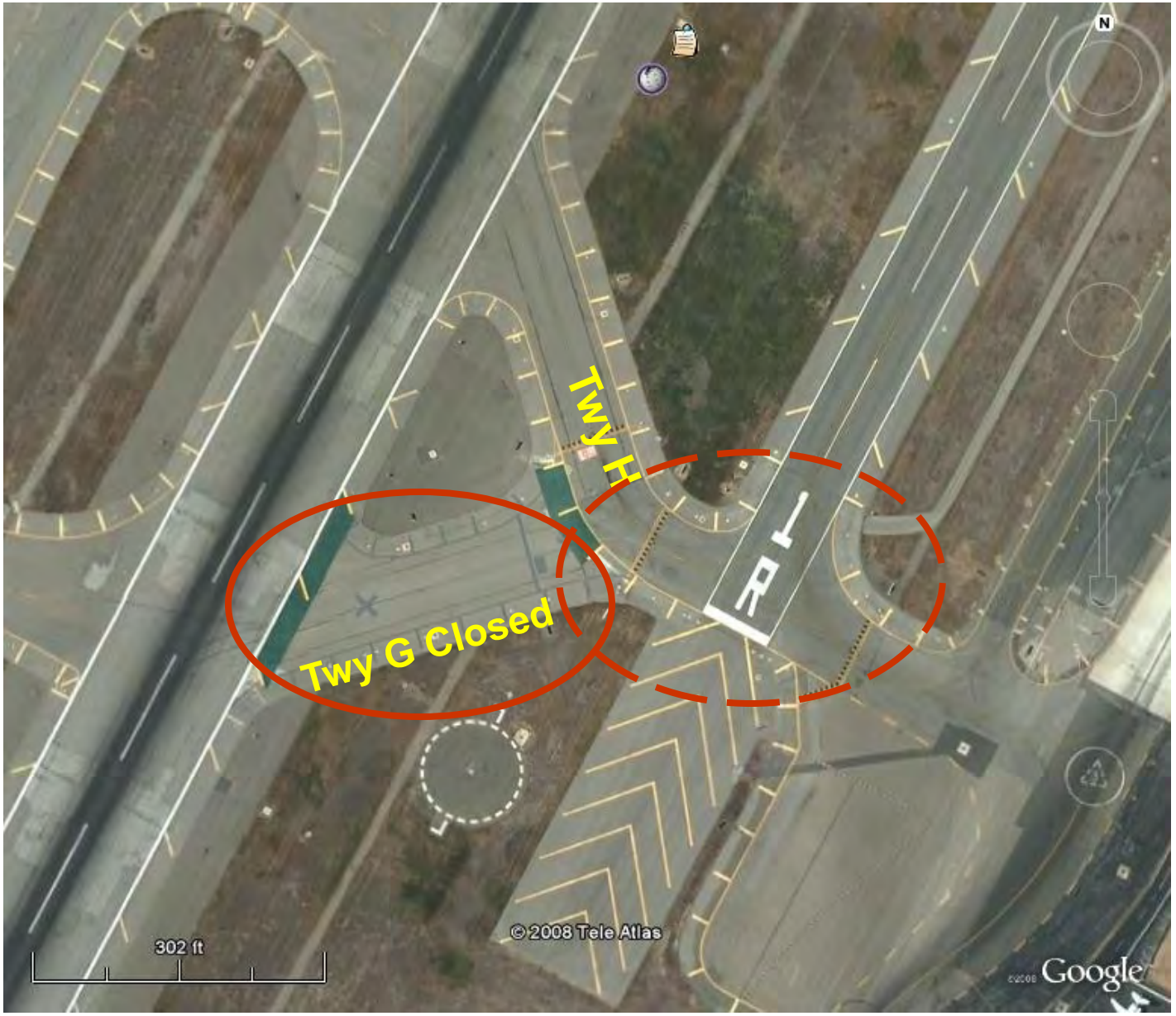
Avoid the following taxiway geometries

“Y-Shape”

Taxiway Connector to a Runway

SNA – Santa Ana/John Wayne Arpt

SNA: Total 15 Runway Incursions (Yrs. 1997-2000)



SLC - Salt Lake City Intl Arpt

SLC: 3-PDs (Yrs. 1997-2000)

Partial Listing: Airports with Y-Shape Taxiway Connectors

- STL [variant]: 1-PD, 1-OE; 1-V/PD, 2-OEs
- MEM: 1-PD
- LGB: Closed the Y-Taxiway/Rwy 6R/34L
- LGA: 1-PD, 1-V/PD; 1-PD; 2-OEs
- JFK: 1-PD
- FLL: 1PD; 1-PD, 1-OE, 1-V/PD
- DAB: 1-PD, 2-OEs
- CVG: 1-PD, 2-OEs - Now resigned
- BWI: 1-PD
- BOS: 4-PD, 2-OEs - redesigned
- SFO; HNL; DTW; DCA; CMH

*“**Crisscrossing**” Taxiways:*

High-Speed Runway Exits with Entrance Taxiways

Newark Intl Airport (ERW)

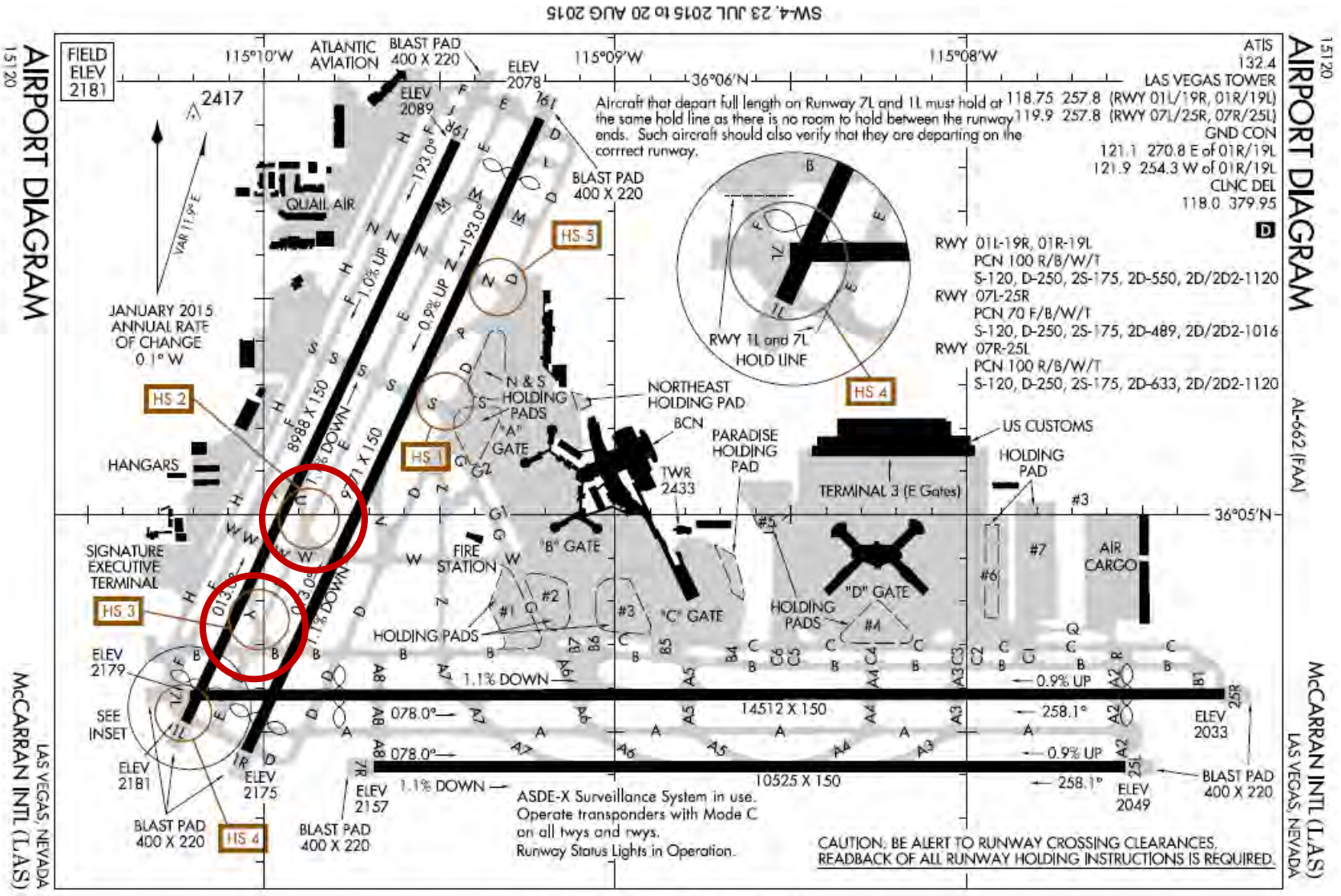
EWR: 2-PDs, 2-OEs (1997 – 2000)

Milwaukee-Mitchell Intl Airport (MKE)

MKE: 3-PDs

Extra long holdline marking @ 112 meters – HUMAN FACTORS

HOT SPOTS HS2 and HS3
High Speed Runway Exits and Taxiway Connectors



SW-4, 23 JUL 2015 to 20 AUG 2015

Entrance Taxiways

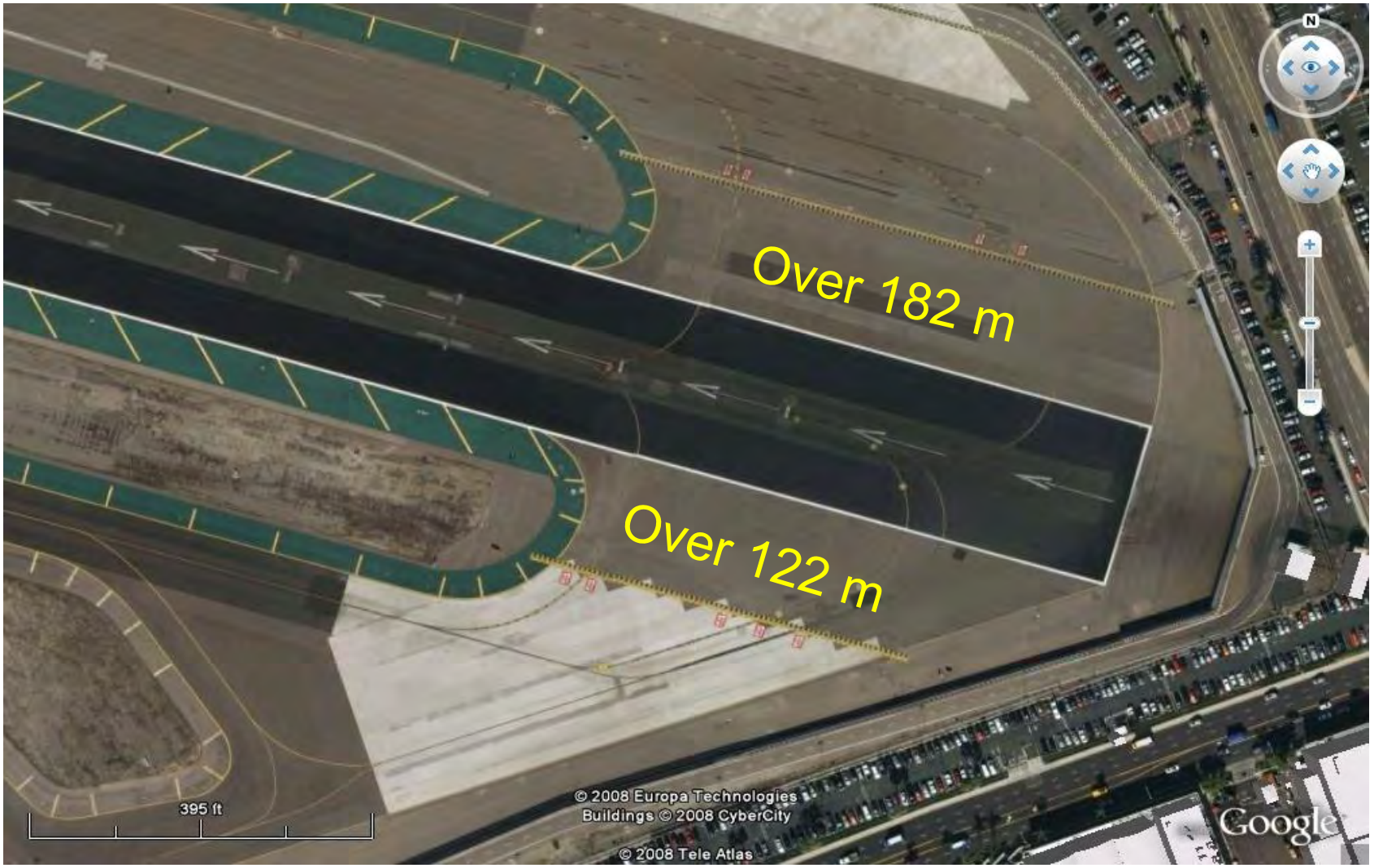
Taxiway with

extra-wide paved entrance

Also

Multi-Taxiways without "grass" island(s)

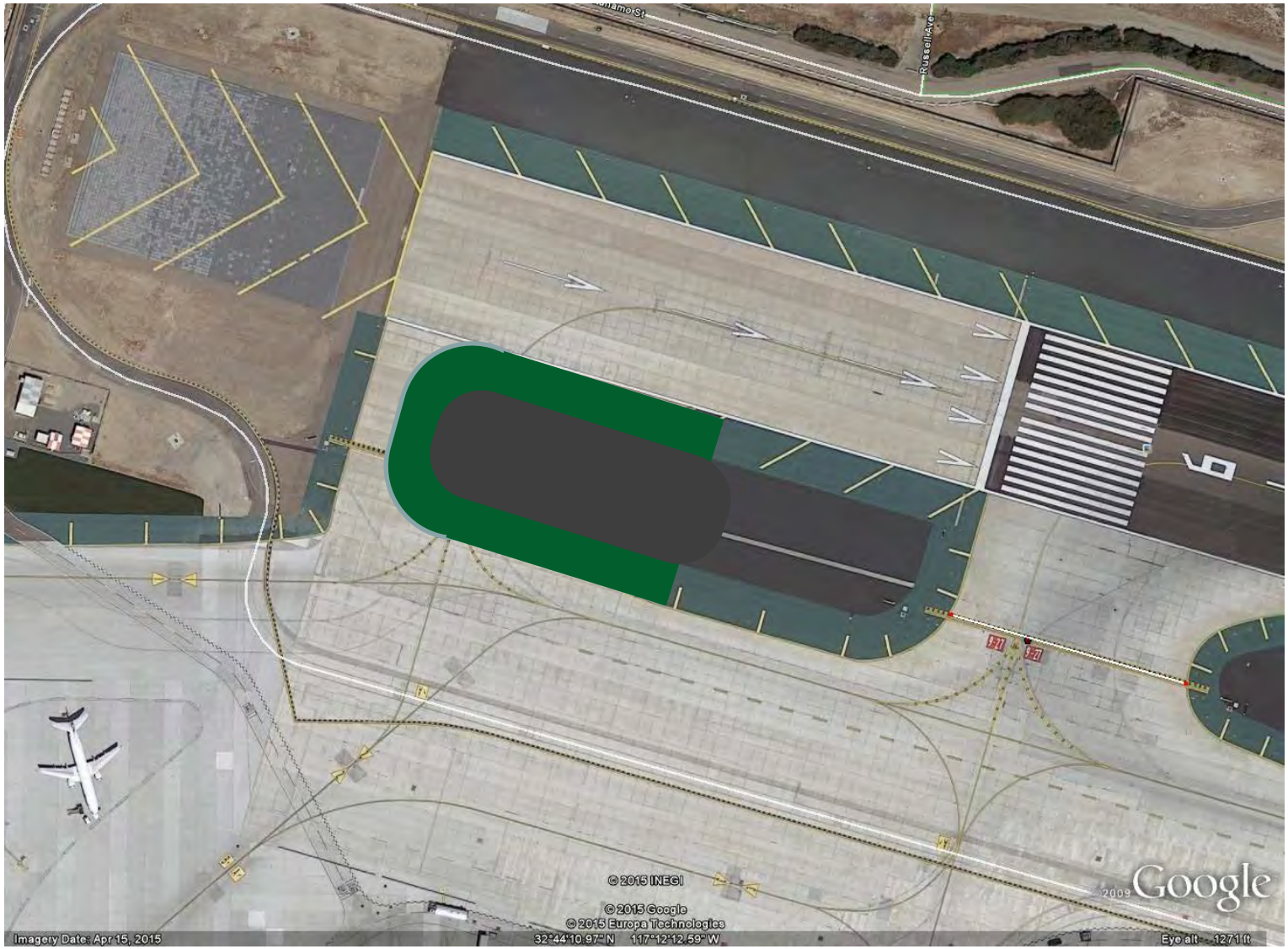
San Diego Intl Airport (SAN): 2-PDS, 1-OE



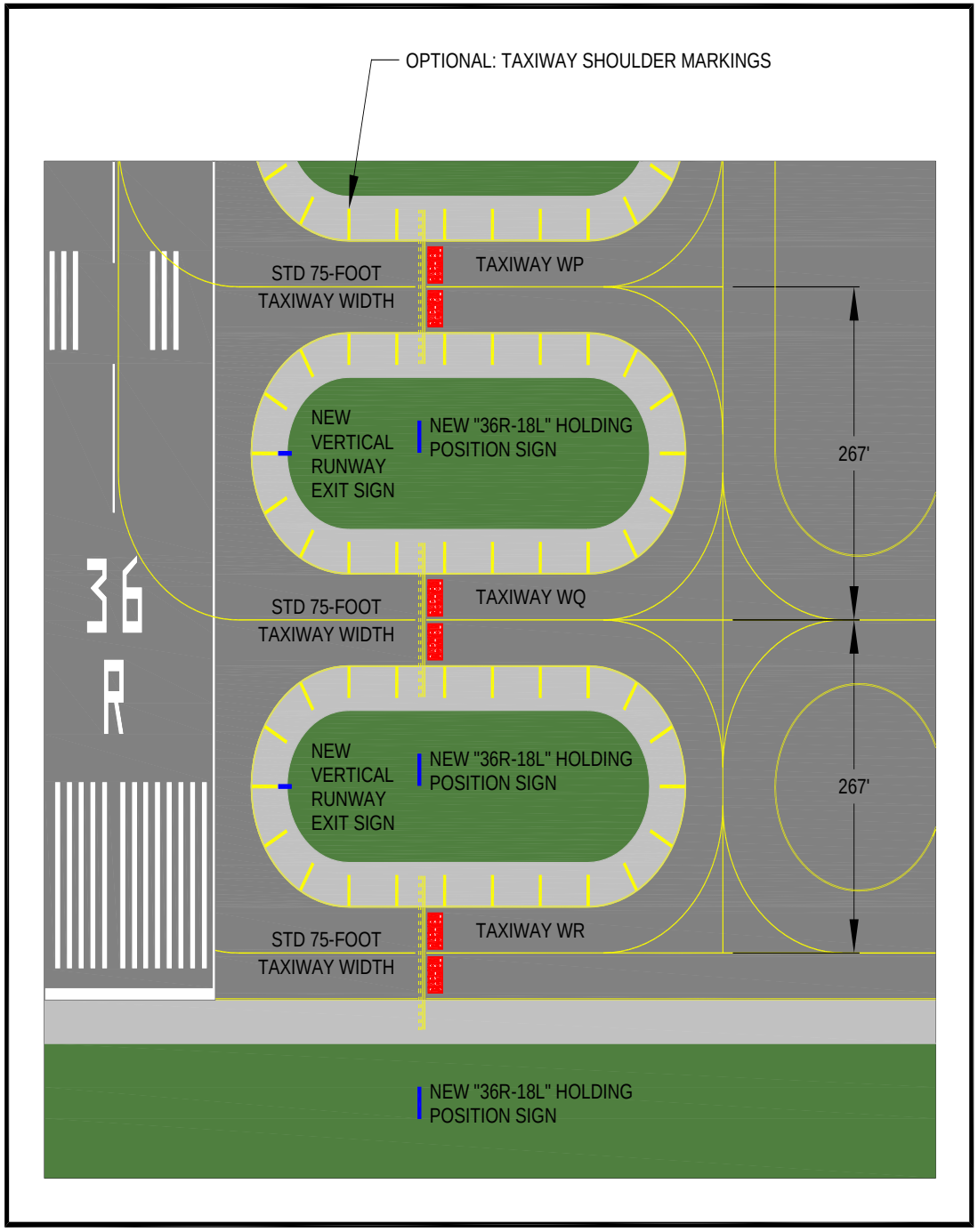
Lack of "GRASS ISLANDS" - Missing Vertical Sign

St. Louis Lambert Intl Airport (STL)

Extra Width of Entrance Approx. 365 meters


Russell Ave
© 2015 INEGI
© 2015 Google
© 2015 Europa Technologies
Google
Imagery Date: Apr 15, 2015
32°44'10.97" N 117°12'12.59" W
Eye alt 1271 ft

Vertical Signs are 307 m apart



Now you have Signage at ALL Twy entrances

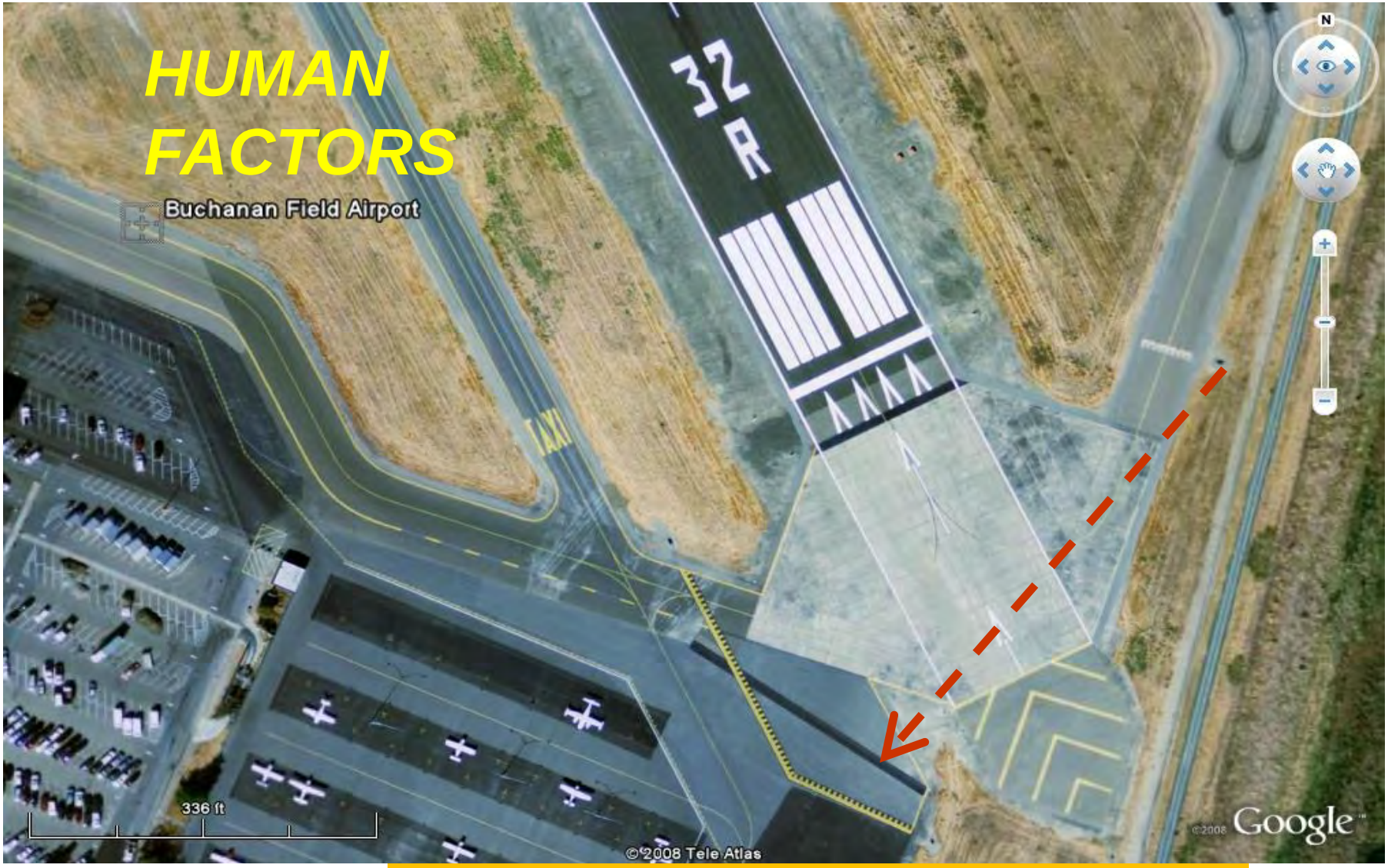
Now EACH TWY has a Name

Mixing Pavement Materials:

Visual Factors

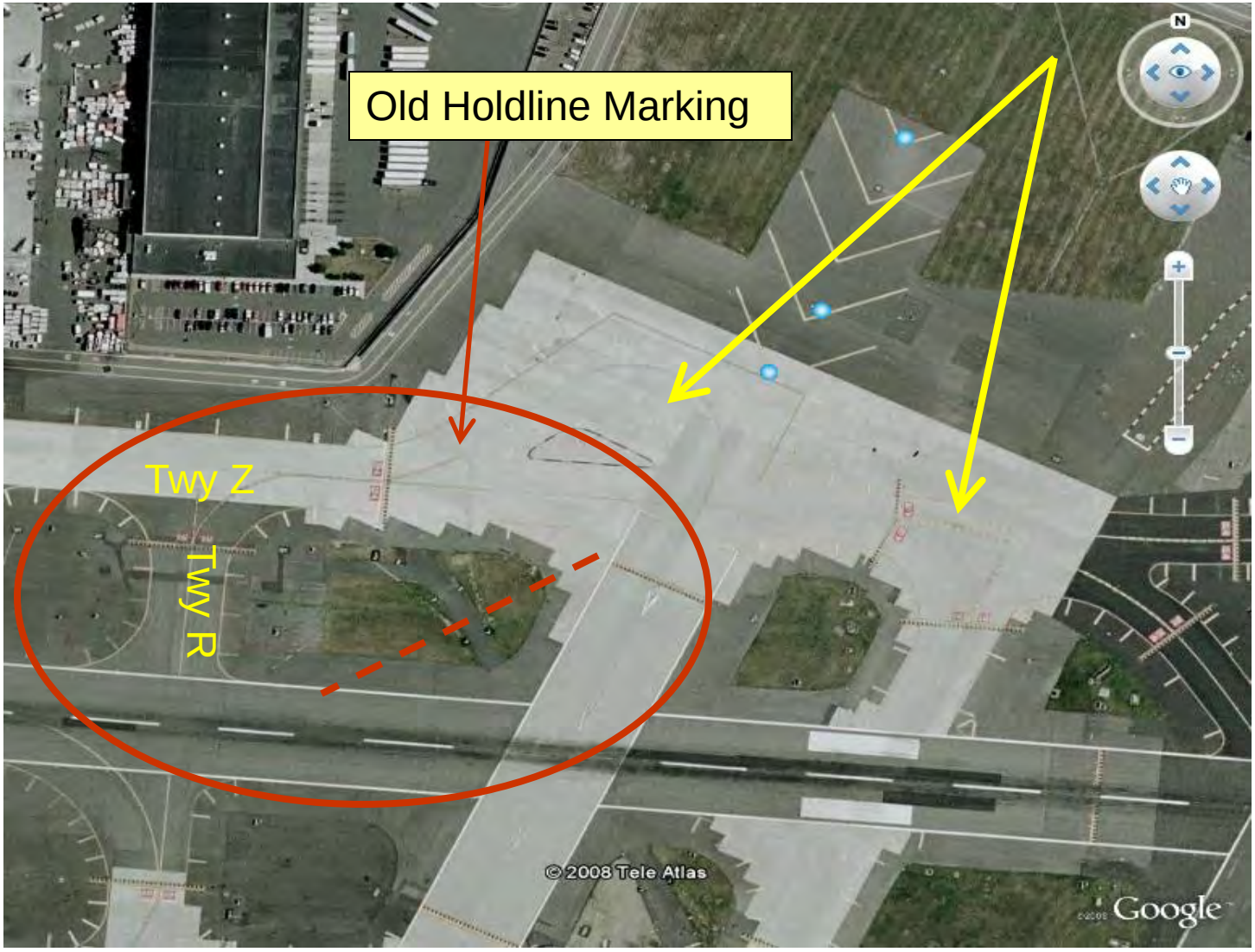
Asphalt with Portland Cement Concrete

Concord-Buchanan Field (CCR): 5-PDs, 2-Oes (1997 -2000)



Asphalt vs Concrete vs Asphalt

ERW During Old Configuration - 5 PD, 1 OE



Still Problems – Concrete/Asphalt Mixtures ?

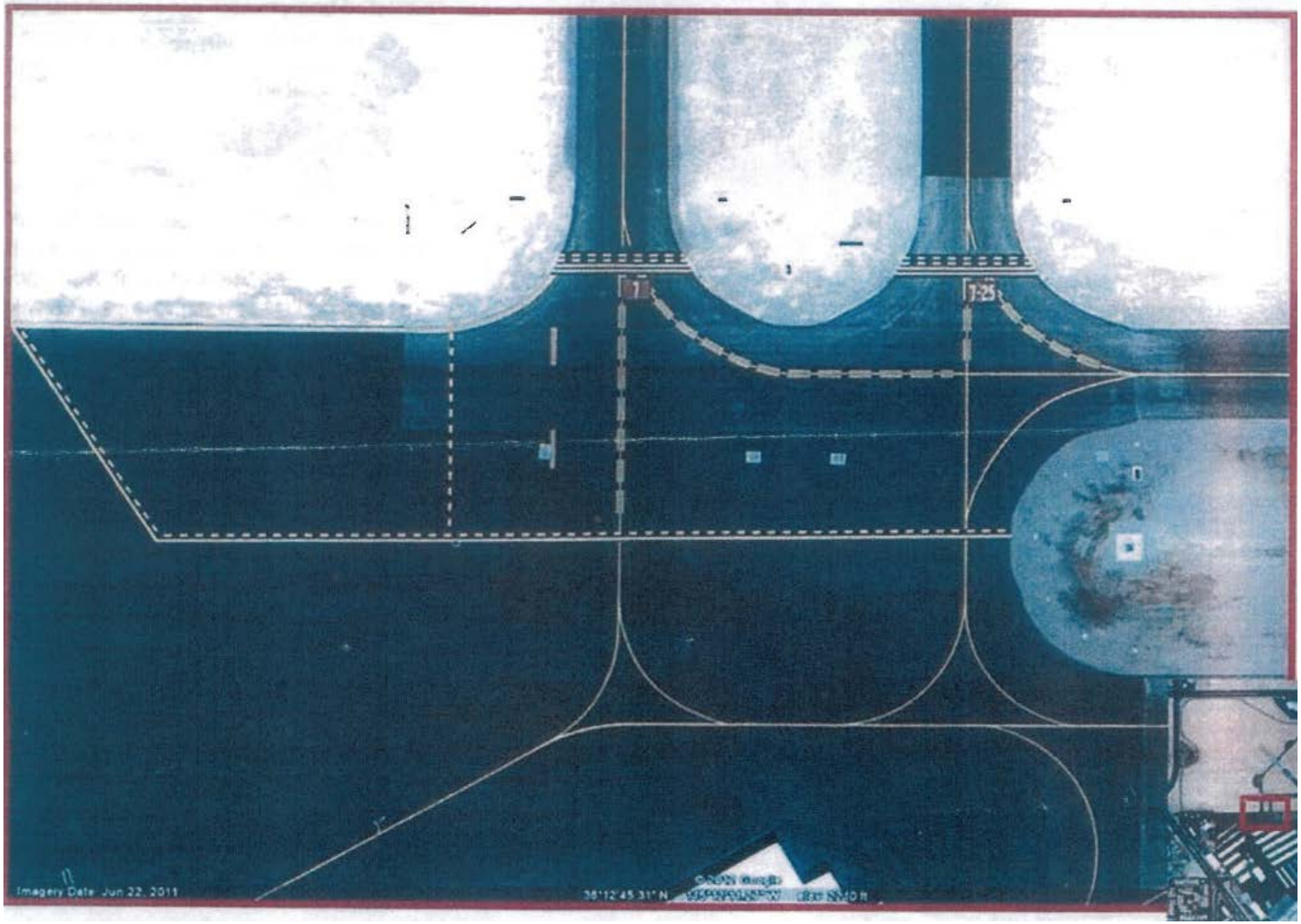
Let’s go back to

North Las Vegas

Solutions?

North Las Vegas Airport (VGT)
2002/2003

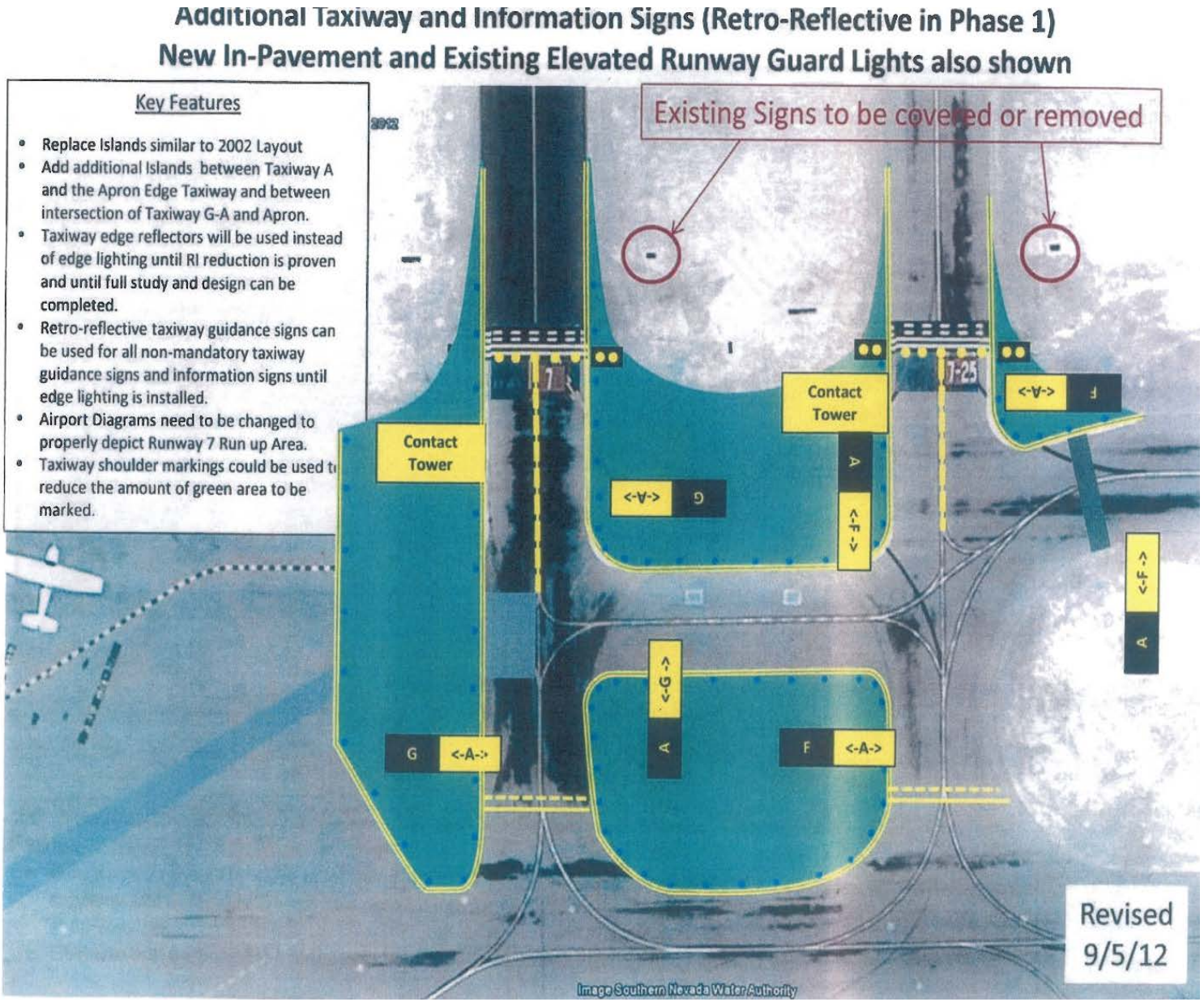
Nov 18, 2010
NO-TAXI Islands Removed



Result of Removal ?

- *2010*
  - *1 RI (Nov 26 – Dec 31, 2010)*
- *2011*
  - *12 RIs*
- *2012*
  - *10 RIs*
- *2013 (Thru October)*
  - *8 RIs*
- ***TOTAL***
  - ***31 IRs at Twy G/Twy F***

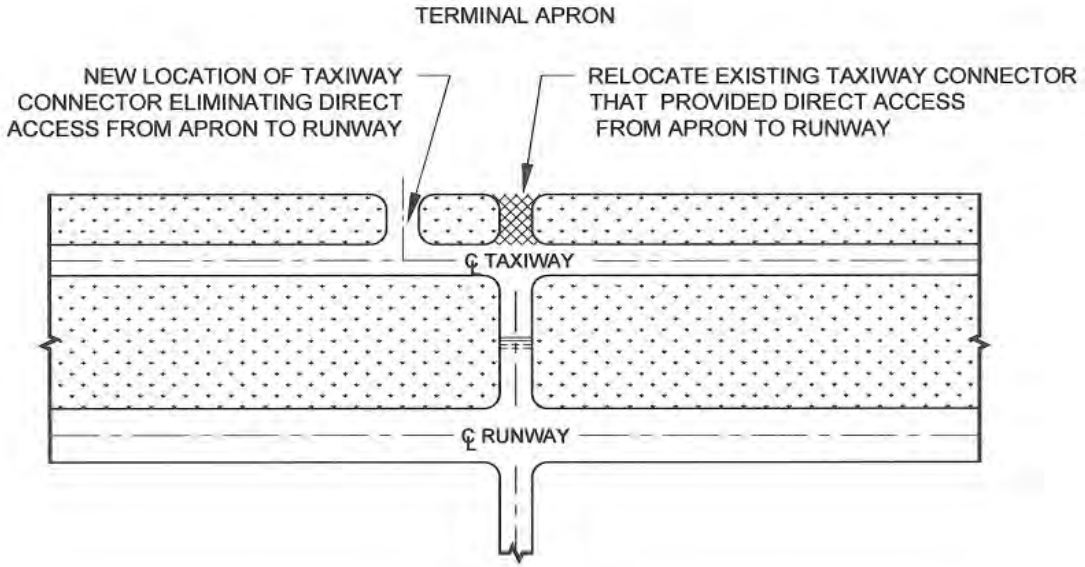
Proposed Corrective Actions



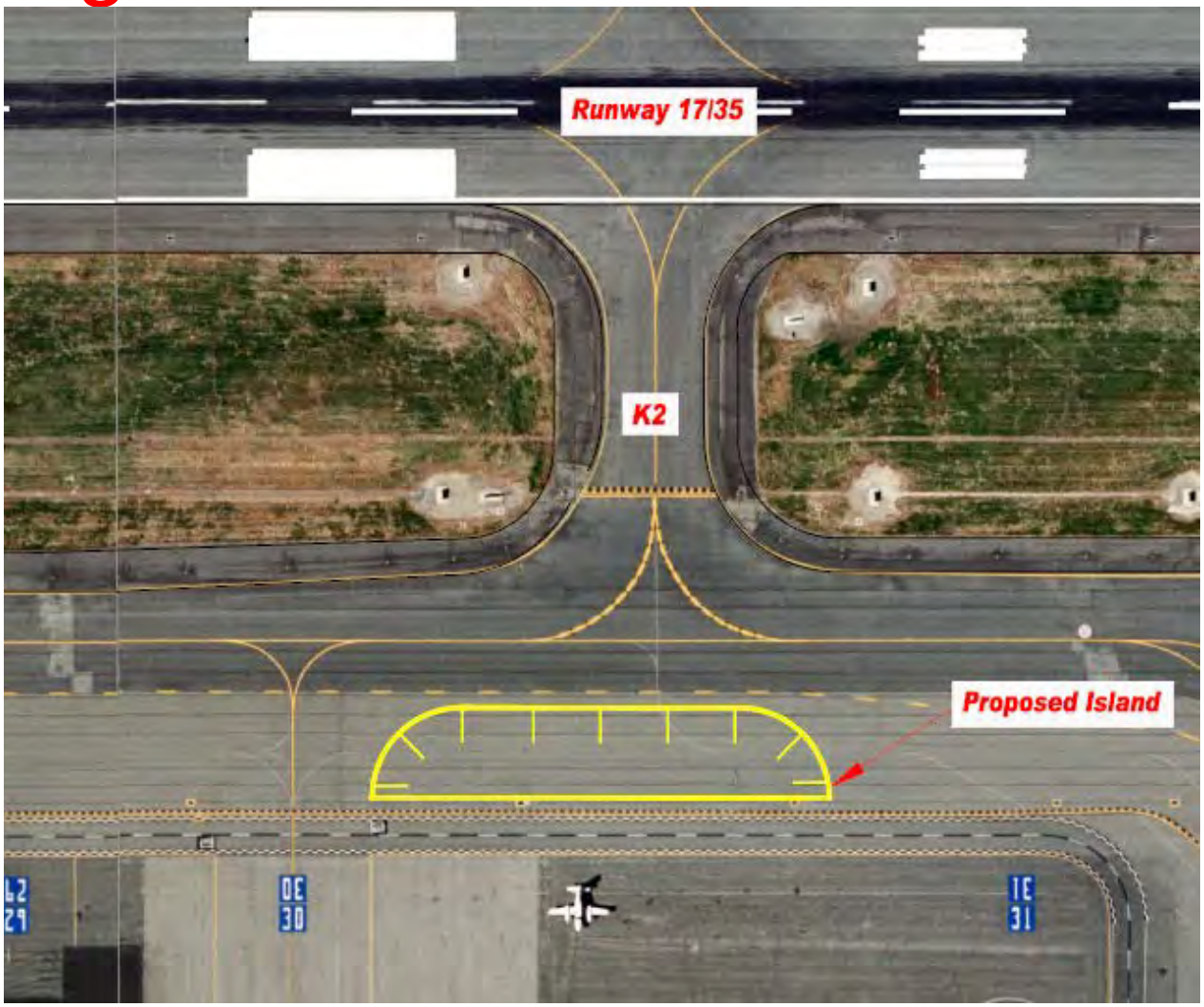
RIs Dropped 2014 – 2015
Two Events

*Design Standard – **Apron Access to Runways***

- *Do **not design** entrance taxiways that provide direct access from an apron to a runway, especially extra wide entrances*
- *Avoid wide expanses of pavement*
- *Configure taxiways as shown*



Mitigation – Paint No-Taxi Island



Annex 14 Volume I
Green Pages

- New Paragraph 22 in Attachment A

  – Specific precautions and recommendations for Taxiway Geometries that help to avoid the potential for Runway Incursions.

Amendments to Annex 14, Volume I

- ***Hot spot.*** A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

- *Paragraph 3.9 - Taxiways*
  - ***NEW Note 2****. — See Attachment A, Section 21 for specific taxiway design guidance which may assist in the prevention of runway incursions when developing a new taxiway or improving existing ones with a known runway incursion safety risk.*

New Para 21. Taxiway design guidance for minimizing the potential for runway incursions

- 21.1 Good aerodrome design practices can reduce the potential for runway incursions while maintaining operating efficiency and capacity. The following taxiway design guidance may be considered to be ***part of a runway incursion prevention programme*** as a means to ensure that runway incursion aspects are addressed during the design phase for new runways and taxiways. Within this focused guidance, the prime considerations are to limit the number of aircraft or vehicles entering or crossing a runway, provide pilots with enhanced unobstructed views of the entire runway, and correct taxiways identified as hot spots as far as possible.

- 21.2 The centre line of an entrance taxiway should be perpendicular to the runway centre line, where possible. This design principle provides pilots with an unobstructed view of the entire runway, in both directions, to confirm that the runway and approach are clear of conflicting traffic before proceeding towards the runway. Where the taxiway angle is such that a clear unobstructed view, in both directions, is not possible, consideration should be given to providing a perpendicular portion of the taxiway immediately adjacent to the runway to allow for a full visual scan by the pilots prior to entering or crossing a runway.

- 21.3 For taxiways intersecting with runways, avoid designing taxiways wider than recommended in Annex 14. This design principle offers *improved recognition* of the location of the runway holding position and the accompanying *sign, marking, and lighting visual cues.*

- 21.4 Existing taxiways wider than recommended in Annex 14, can be rectified by painting taxi side stripe markings to the recommended width. As far as practicable, it is preferable to redesign such locations properly rather than to repaint such locations.

- 21.5 Multi-taxiway entrances to a runway should be parallel to each other and should be distinctly separated by an unpaved area ***(the GREEN ISLAND).*** This design principle allows each runway holding location an earthen area for the proper placement of accompanying sign, marking, and lighting visual cues at each runway holding position. Moreover, the design principle eliminates the needless costs of building unusable pavement and as well as the costs for painting taxiway edge markings to indicate such unusable pavement. In general, excess paved areas at runway holding positions reduce the effectiveness of sign, marking, and lighting visual cues.

- 21.6 Build taxiways that cross a runway as a single straight taxiway. Avoid dividing the taxiway into two after crossing the runway. This design principle avoids constructing ***"Y-shaped"*** taxiways known to present opportunities for runway incursions.
-
- 21.7 If possible, avoid building taxiways that enter at the mid-runway location. This design principle helps to reduce the collision risks at the most hazardous locations (high energy location) because normally departing aircraft have too much energy to stop, but not enough speed to take-off, before colliding with another errant aircraft.

- 21.8 Provide clear separation of pavement between a rapid exit taxiway and other non-rapid taxiways entering or crossing a runway. This design principle avoids two taxiways from overlapping each other to create an *excessive paved area that would confuse pilots entering a runway.*

- 21.9 Avoid the placement of different pavement materials (asphalt and cement concrete) at or near the vicinity of the runway holding position, as far as practicable. This design principle *avoids creating visual confusion* as to the actual location of the runway holding position.

- 21.10 Perimeter taxiways. Many aerodromes have more than one runway, notably paired parallel runways (two runways on one side of the terminal), which creates a difficult problem in that either on arrival or departure an aircraft is required to cross a runway. Under such a configuration, the safety objective here is to avoid or at least keep to a minimum the number of runway crossings. This safety objective may be achieved by constructing a “perimeter taxiway”. A perimeter taxiway is a taxi route that goes around the end of a runway, enabling arrival aircraft (when landings are on outer runway of a pair) to get to the terminal or departure aircraft (when departures are on outer runway of a pair) to get to the runway without either crossing a runway, or conflicting with a departing or approaching aircraft.

21.11 A perimeter taxiway would be designed according to the following criteria:

- a) Sufficient space is required between the landing threshold and the taxiway centre line where it crosses under the approach path, to enable the critical taxiing aircraft to pass under the approach without violating any approach surface.

- b) The jet blast impact of aircraft taking off should be considered in consultation with aircraft manufacturers; the extent of take-off thrust should be evaluated when determining the location of a perimeter taxiway.

- c) The requirement for a runway end safety area, as well as possible interference with landing systems and other navigation aids should also be taken into account. For example, in the case of an Instrument Landing System, the perimeter taxiway should be located behind the localiser antenna, not between the localiser antenna and the runway, due to the potential for severe Instrument Landing System disturbance, noting that this is harder to achieve as the distance between the localizer and the runway increases.

- d) Human factors issues should also be taken into account. Appropriate measures should be put in place to assist pilots to distinguish between aircraft that are crossing the runway and those that are safely on a perimeter taxiway.

End of Session