

Rapid City Regional Airport

Runway & Terminal Concepts

April 27, 2021

This presentation includes planning level concepts and cost estimates. Further analysis and environmental clearance (including opportunities for public input) will occur prior to implementation.



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Key Master Plan Objectives

Re-evaluate facility needs considering significant growth

Maximize/increase developable space

Maintain continuity of operations



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Future Runway Options



- Runway 14-32 pavement will likely require reconstruction in the next 10 years
- Runway options available
 - Reconstruct existing runway
 - Expand crosswind runway
 - Construct “new” Runway 14-32 east of the existing



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“Reconstruct” Option



➤ Challenges & Impacts

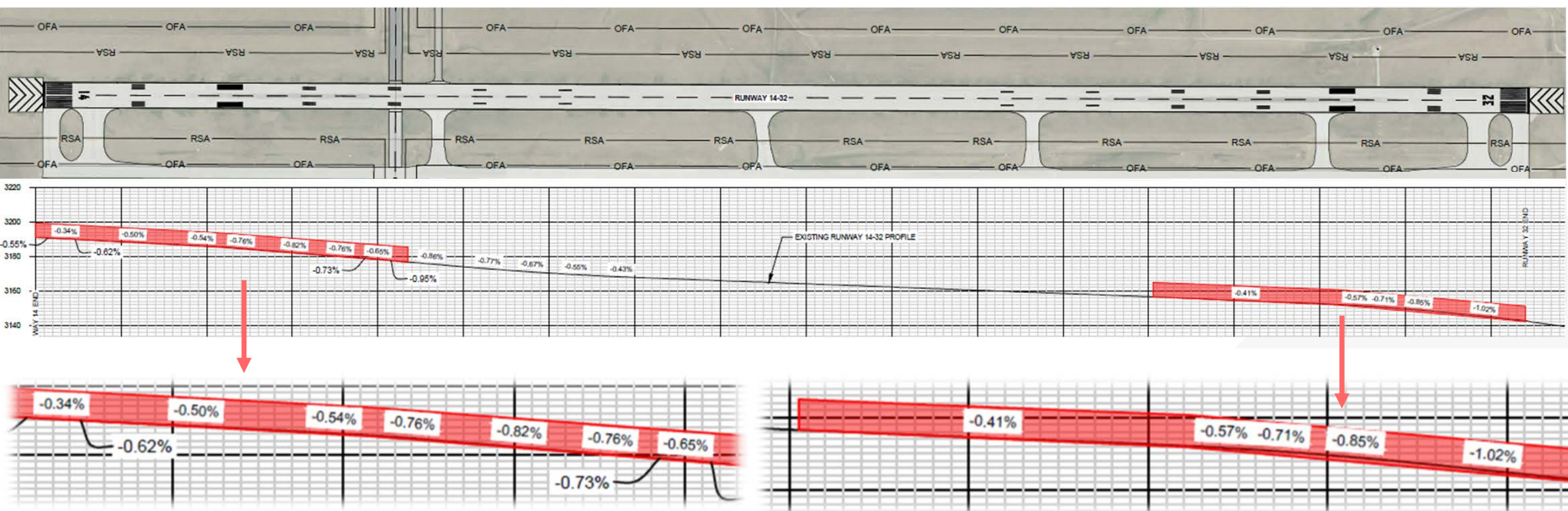
- Meeting FAA Runway Gradient Standards
- Limited Phasing Options
- Requires Runway/Airport Closure
 - Impacts to the flying public
 - Economic impacts
 - Impacts to RAP



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Runway Gradient Requirements

➤ No gradient changes allowed in the last ¼ of RAP's Runway 14-32



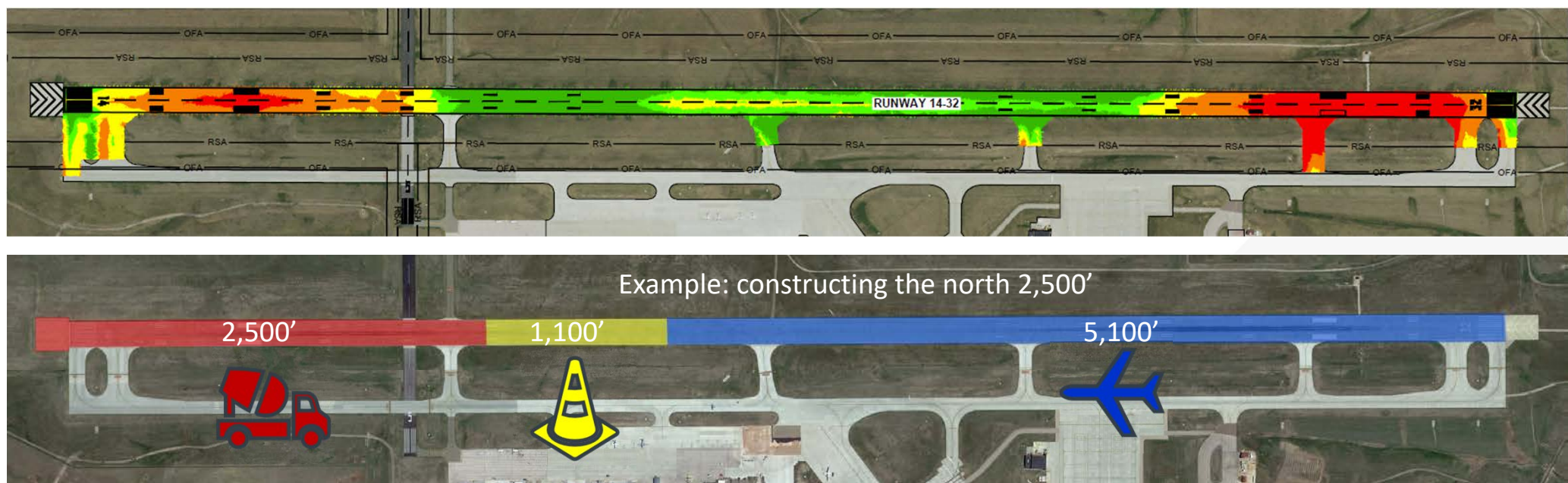
Meeting Gradient Requirements

➤ Correcting requires raising/lowering segments of the runway



Project Phasing / Constructability

- Need to be able to tie into existing runway grade
- Smallest construction phase would likely be 2,500'
 - Approximately 5,100' is available for takeoff and landing in that scenario
 - Insufficient length to accommodate scheduled airline service and larger business jets



Reconstruct Runway 14-32 Overview

- Project duration dependent on funding/phasing (2 to 3 construction seasons)
- Planning Level Cost Estimate – \$55M
- Challenges/Considerations
 - Limited Runway Length During Const.
 - Loss of Air Service
 - Operational Impacts (GA / Cargo / USFS)
 - Economic Impacts to the Greater Black Hills Area

Year 1
Design

Year 2
Construction

Year 3
Complete
Construction



Airport Economic Impact



<https://dot.sd.gov/transportation/aviation/aviation-systems-plan>

Airport Location		Airport Classification	
Associated City:	Rapid City	Federal:	Nonhub
County:	Pennington	State:	Commercial Service

Airport Activity 2018		
Commercial Operations	15,755 GA Operations	28,985
Commercial Enplanements	303,659 GA Visitors	22,931
Commercial Visitors	151,830 Military Operations	1,736

Airport Economic Impacts					
Source of Impact	Category of Impact	Jobs	Earnings	GDP	Economic Activity
On-Airport	Direct	618	\$36,242,000	\$41,745,000	\$75,200,000
	Subtotal Direct	618	\$36,242,000	\$41,745,000	\$75,200,000
	Indirect	179	\$9,467,000	\$13,817,000	\$24,569,000
	Induced	248	\$11,051,000	\$18,517,000	\$33,077,000
	Subtotal Multiplier Effects	426	\$20,518,000	\$32,334,000	\$57,646,000
	Airport Operations Subtotal	1,044	\$56,760,000	\$74,079,000	\$132,846,000
On-Airport	Direct	25	\$1,346,000	\$1,510,000	\$3,135,000
	Subtotal Direct	25	\$1,346,000	\$1,510,000	\$3,135,000
	Indirect	6	\$295,000	\$480,000	\$900,000
	Induced	9	\$395,000	\$662,000	\$1,183,000
	Subtotal Multiplier Effects	14	\$690,000	\$1,142,000	\$2,083,000
	Capital Improvements Subtotal	39	\$2,036,000	\$2,652,000	\$5,218,000
Off-Airport	Direct	1,364	\$33,838,000	\$48,969,000	\$89,885,000
	Subtotal Direct	1,364	\$33,838,000	\$48,969,000	\$89,885,000
	Indirect	161	\$7,443,000	\$13,658,000	\$24,928,000
	Induced	182	\$8,057,000	\$13,505,000	\$24,114,000
	Subtotal Multiplier Effects	343	\$15,500,000	\$27,163,000	\$49,042,000
	Visitor Spending Subtotal	1,707	\$49,338,000	\$76,132,000	\$138,927,000
Off-Airport	Direct	63	\$1,559,000	\$2,257,000	\$4,142,000
	Subtotal Direct	63	\$1,559,000	\$2,257,000	\$4,142,000
	Indirect	7	\$343,000	\$629,000	\$1,149,000
	Induced	8	\$371,000	\$622,000	\$1,111,000
	Subtotal Multiplier Effects	16	\$714,000	\$1,251,000	\$2,260,000
	Special Event Subtotal	79	\$2,273,000	\$3,508,000	\$6,402,000
Total	Direct	2,069	\$72,985,000	\$94,481,000	\$172,362,000
	Subtotal Direct	2,069	\$72,985,000	\$94,481,000	\$172,362,000
	Indirect	353	\$17,548,000	\$28,584,000	\$51,546,000
	Induced	447	\$19,874,000	\$33,306,000	\$59,485,000
	Subtotal Multiplier Effects	800	\$37,422,000	\$61,890,000	\$111,031,000
	Grand Total	2,869	\$110,407,000	\$156,371,000	\$283,393,000

Notes: Readers are reminded that the figures shown are estimates generated by economic models and not an exact accounting. Totals may not sum due to rounding. Where the table indicates 0 jobs but also includes estimates for earnings, GDP, and economic output, individuals worked less than half-time on airport-related activities. A "-" indicates there was no measurable economic impact activity.

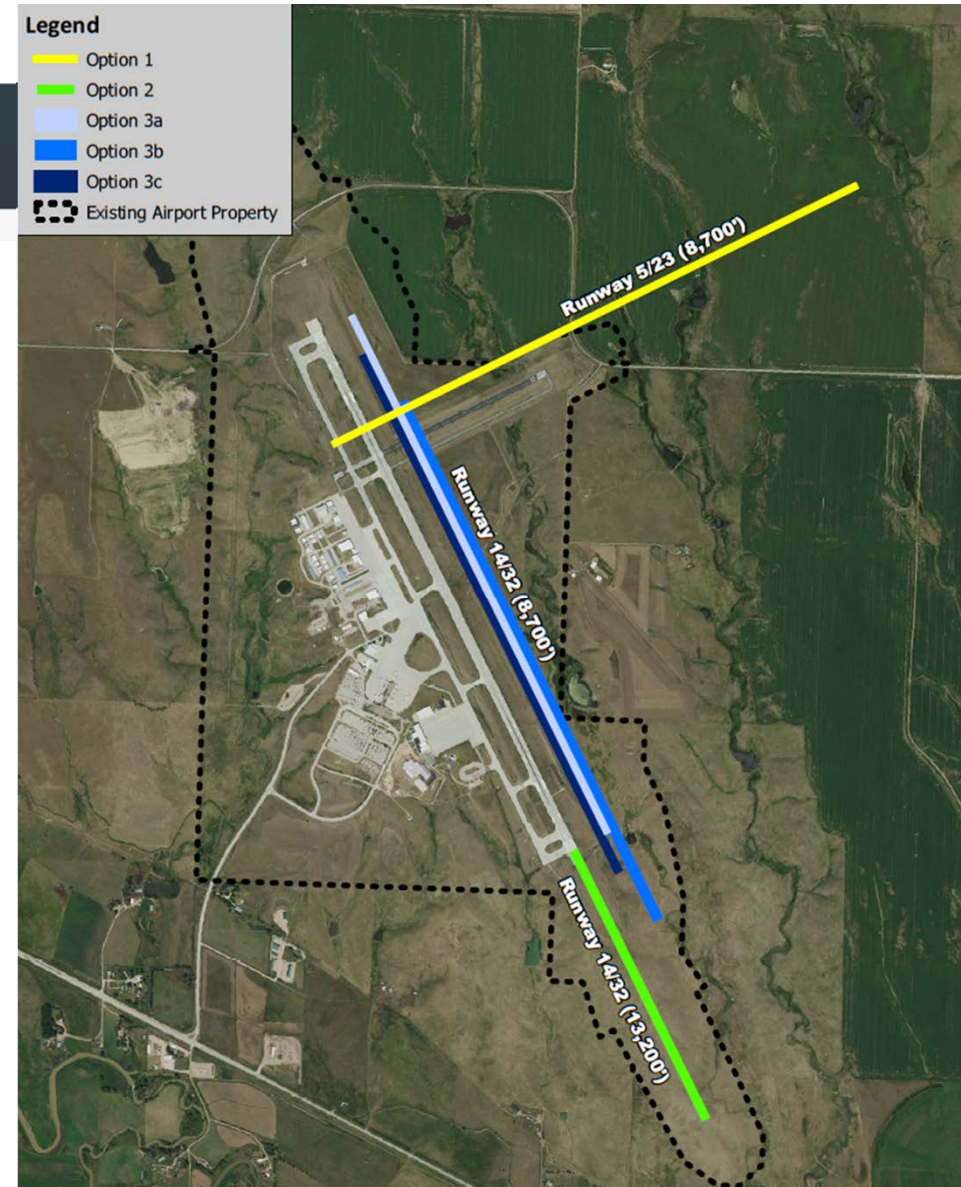
“New” Runway Options

> Options Considered But Discarded

- 1 Expand Crosswind Runway 5-23
- 2 Extend Existing Runway 14-32

> Options Carried Forward For Further Analysis

- 3a New Runway 14-32
Offset 550' from existing & no shift
- 3b New Runway 14-32
Offset 550' from existing & 1,500' shift
- 3c New Runway 14-32
Offset 550' from existing & 600' shift



Options Carried Forward

Options 3a, 3b and 3c

- Offset 550' from Existing Runway 14-32
- Convert existing runway to a taxiway
- Increase developable space



Increased Developable Space



Options Carried Forward

Options 3a, 3b and 3c

- Difference is the southerly shift
 - Degree a shift is necessary is primarily dependent on:
 - FAA Design Standard Policy
 - Desired Instrument Approach Capability
 - Greater shift results in more earthwork and higher costs



Design Standards & Instrument Approach Capability

➤ Runway Protection Zones

- “The RPZ function is to enhance the protection of people and property on the ground”.
- Focus is on the type of use/activity within the RPZs

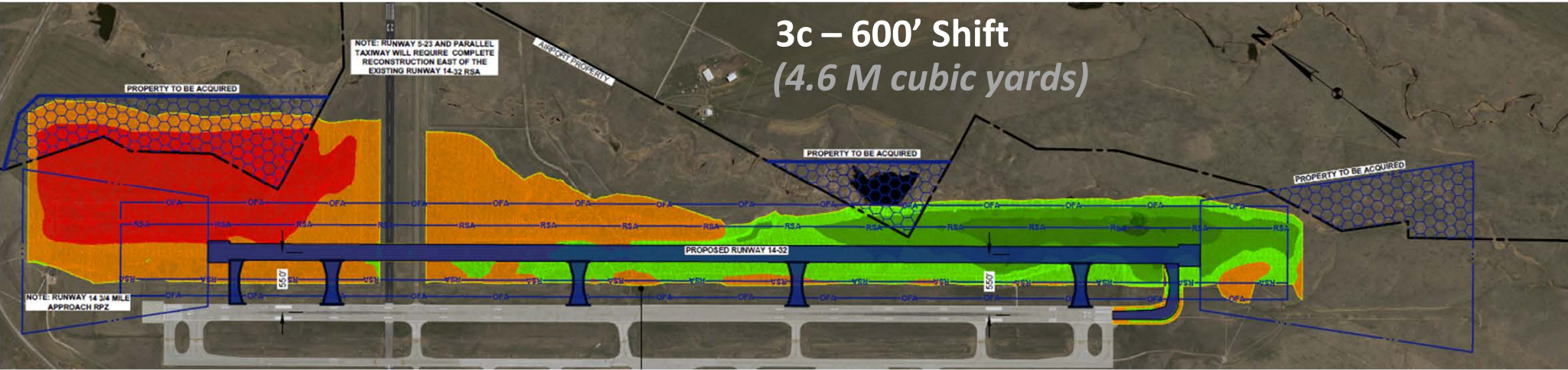
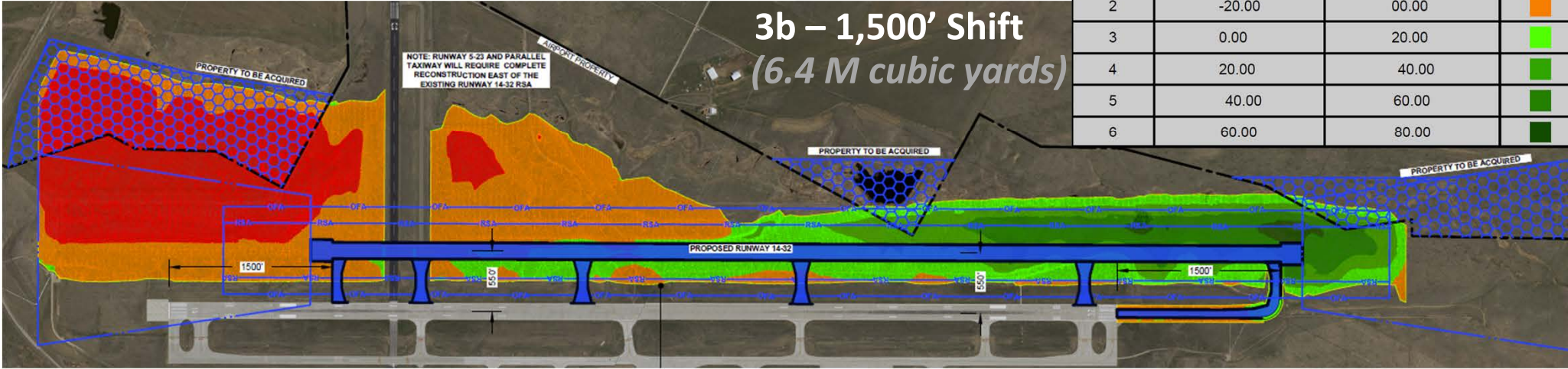
➤ Approach Surfaces

- “Approach surfaces are designed to protect the use of the runway in both visual and instrument meteorological conditions near the airport.
- Focus is on the height of objects within the approach surface



Example Earthwork (Cut/Fill)

CUT/FILL			
NUMBER	MINIMUM	MAXIMUM	COLOR
1	-40.00	-20.00	
2	-20.00	00.00	
3	0.00	20.00	
4	20.00	40.00	
5	40.00	60.00	
6	60.00	80.00	



“New” Runway 14-32 Timeline



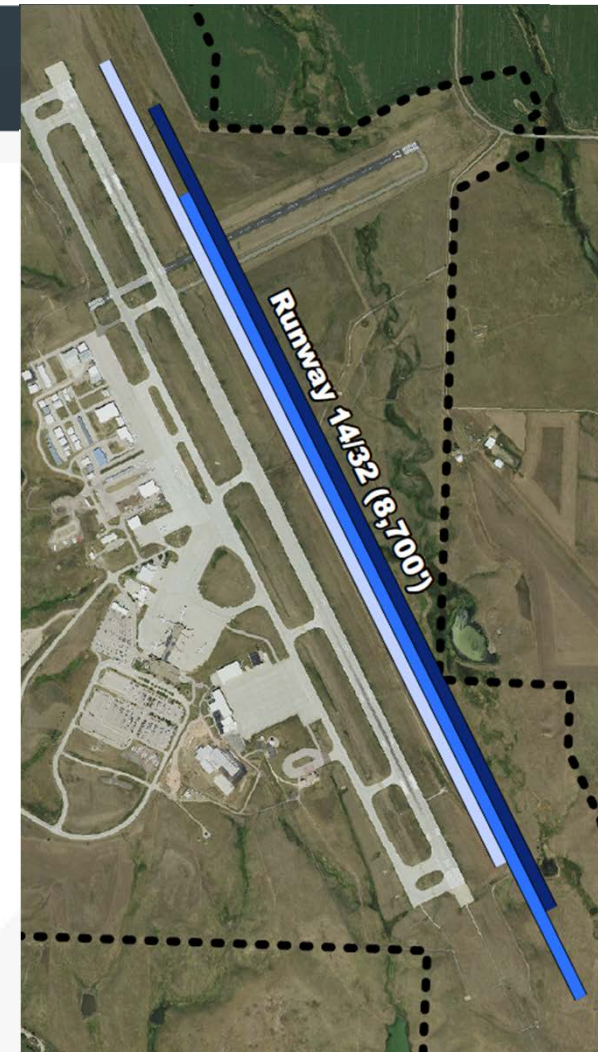
***Please note this is an aggressive schedule**



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Runway Option Summary

Category	Reconstruct	Option 3a	Option 3b	Option 3c
Operational Performance				
Alignment	14-32	14-32	14-32	14-32
Runway Length	8,700'	8,700'	8,700'	8,700'
Best Planning Tenets and Other Factors				
Impact to RAP Operations	Requires Runway Closure to Air Carrier	No Runway Closure Required Requires Displaced Threshold When Constructing Connecting Taxiways Runway Threshold Displacement Occurs for Part of Construction		
Timeframe Estimates	2-3 Construction Seasons	3 Construction Seasons		
North RPZ (14 end) South RPZ (32 end)	Road in RPZ Clear	Road in RPZ Clear	Clear Clear	Clear for ¼-Mile Approach Clear
Adds Developable Space	No	Yes	Yes	Yes
Environmental				
Wetland Impacts	No	3a, 3b and 3c are similar		
Env. Sensitive Areas	None	3a, 3b and 3c are similar		
Estimated Land Acquisition	None	55 Acres	100 Acres	70 Acres
Fiscal Factors				
Planning Level Estimate	\$55 Million	\$70 Million	\$85 Million	\$75 Million



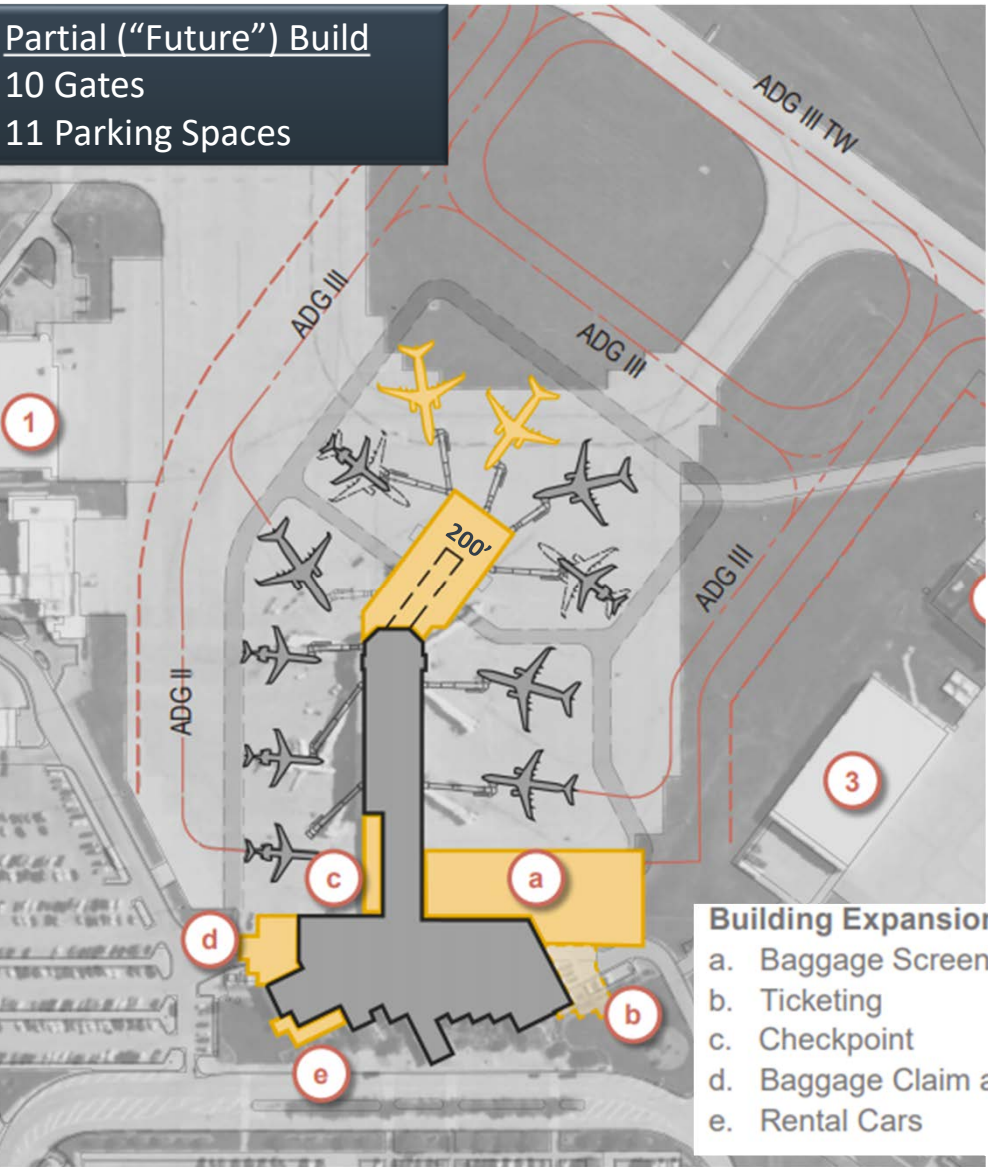
Terminal Study

- Increasing Activity
 - Annual
 - Peak Day / Design Day
 - Peak Hour / Design Hour
- Expansion Concepts
 - Concourse
 - Arrivals Area
 - Baggage Claim
 - Car Rental Offices
 - Departures Area
 - Ticketing
 - Baggage screening & makeup
 - Administration and Concessions

RAP Demand Comparison	2019			Forecast	
	Existing	Recommended	Capacity Threshold	2029	Capacity Threshold
General					
Annual Enplanements	343,926			514,497	
Aircraft Gates/PBB	7	8		10	
Aircraft Positions	9	8		10 +2	
Public Space					
Circulation (public seating, ticketing, concourse, bag claim, general circ)	26,090 s.f.	36,340 s.f.	✗	48,120 s.f.	✗
Ticket Lobby Queue	2,735 s.f.	3,370 s.f.	✗	4,530 s.f.	✗
Passenger Security Screening & TSA Offices	7,843 s.f.	6,380 s.f.	✓	8,780 s.f.	✗
Passenger Holdrooms	8,843 s.f.	13,770 s.f.	✗	22,490 s.f.	✗
Baggage Claim (retrieval/device/meeter&greeter)	5,359 s.f.	8,100 s.f.	✗	8,390 s.f.	✗
Restrooms (pre/post security)	3,229 s.f.	5,160 s.f.	✗	6,830 s.f.	✗
Other (Misc Tenant, information)	656 s.f.	650 s.f.	✓	650 s.f.	✓
Airline Space					
Ticketing (counter, ATO)	4,735 s.f.	4,550 s.f.	⚠	6,150 s.f.	✗
Outbound Baggage Screening	595 s.f.	18,000 s.f.	✗	18,000 s.f.	✗
Outbound Baggage Makeup	4,617 s.f.	6,960 s.f.	✗	12,320 s.f.	✗
Airside Ops/Storage	744 s.f.	760 s.f.	✗	990 s.f.	✗
Inbound Bag Claim Laydown	3,395 s.f.	3,900 s.f.	✗	3,900 s.f.	✗
Inbound/Outbound Baggage Circulation	3,325 s.f.	1,630 s.f.	✓	2,430 s.f.	✓
Baggage Service Offices (BSO)	0 s.f.	400 s.f.	⚠	400 s.f.	⚠
Concessions					
Landside/Storage (includes Rental Cars)	5,639 s.f.	4,270 s.f.	✓	5,370 s.f.	⚠
Airside/Storage	1,882 s.f.	3,330 s.f.	✗	4,980 s.f.	✗
Non-Public Space					
Airport Administration	2,474 s.f.	4,130 s.f.	✗	4,130 s.f.	✗
Restrooms/Circulation	1,423 s.f.	2,570 s.f.	✗	3,060 s.f.	✗
Airport Operations (Maintenance, Janitorial, Storage, Shops)	6,703 s.f.	2,490 s.f.	✓	3,230 s.f.	✓
Building Systems (MEP, Communications/IT, Loading Docks, Structure)	14,676 s.f.	13,290 s.f.	⚠	17,370 s.f.	✗
TOTAL GROSS (sq ft)	104,963 s.f.	140,050 s.f.	✗	182,120 s.f.	✗

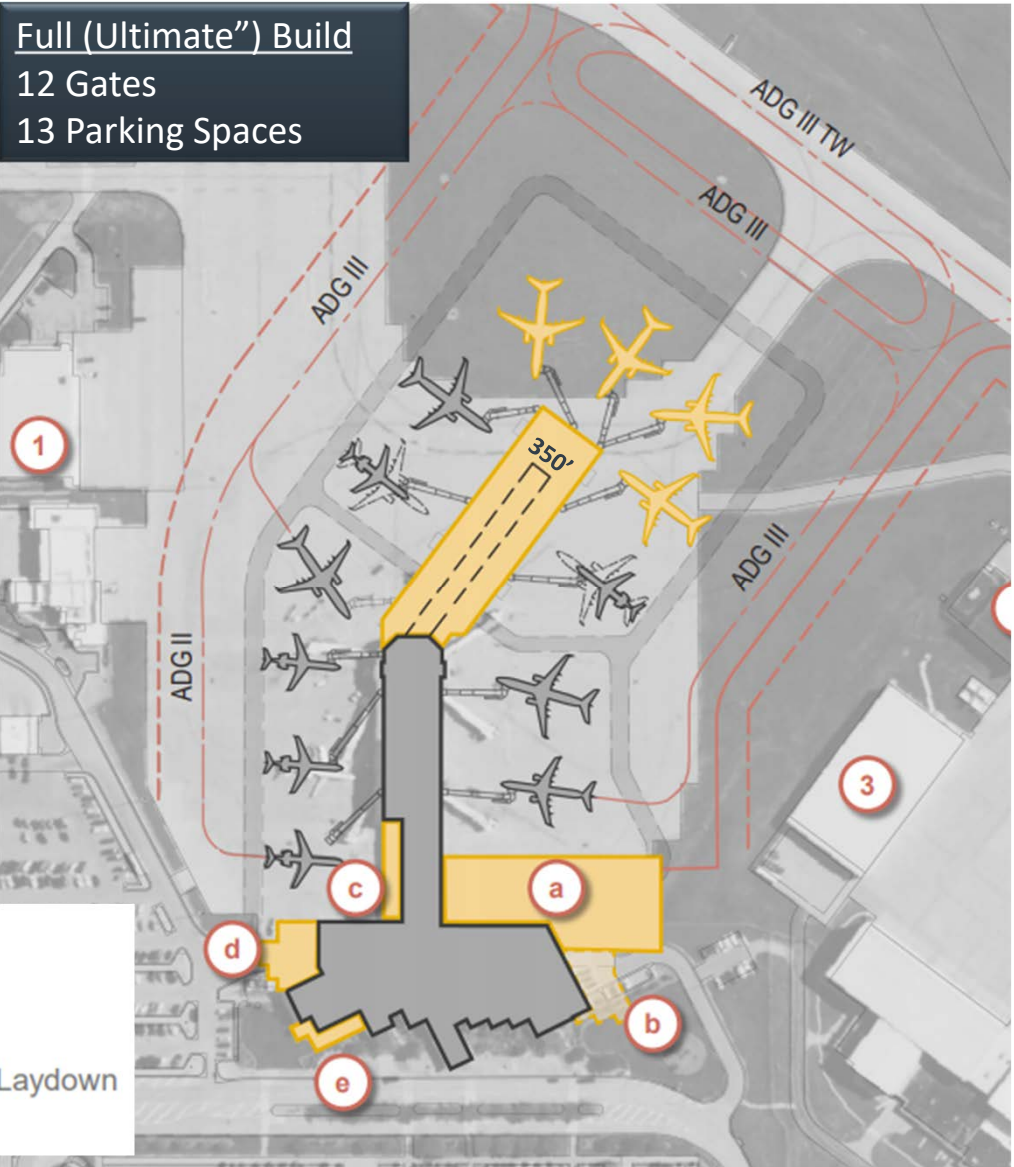
Partial ("Future") Build

10 Gates
11 Parking Spaces



Full (Ultimate") Build

12 Gates
13 Parking Spaces

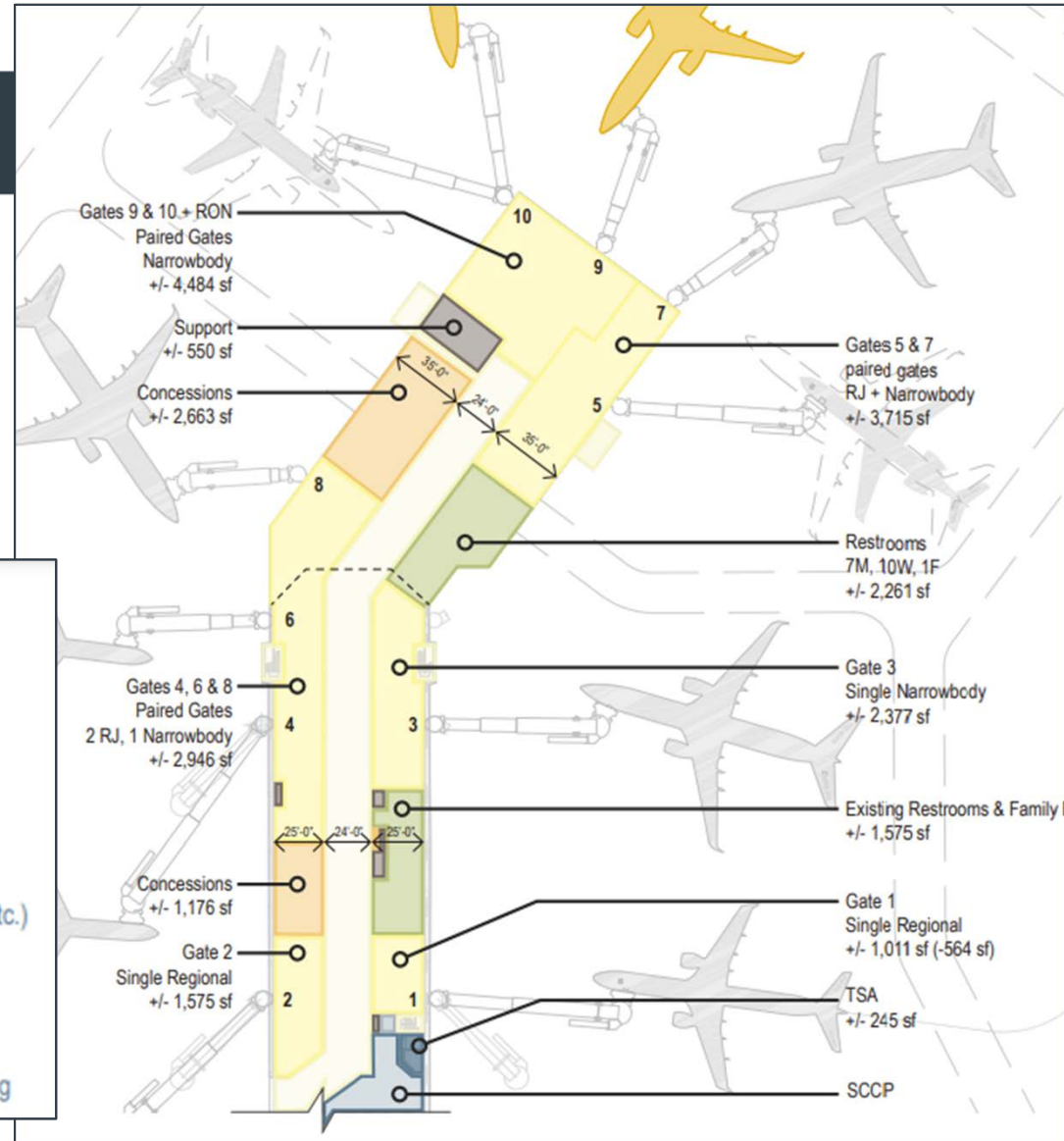
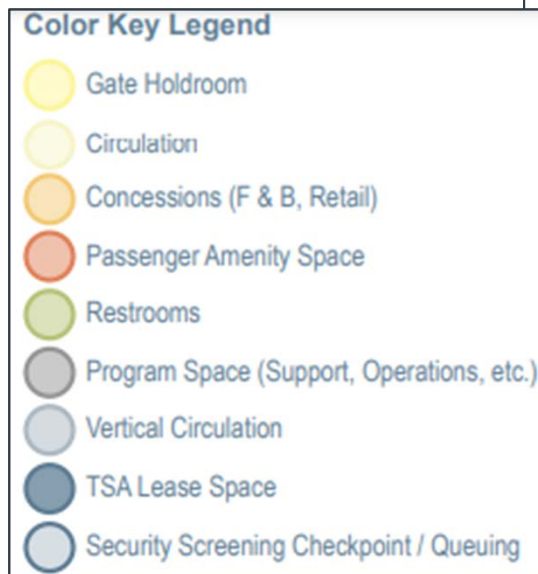


Concourse “Future” Build

Planning Level Estimate

\$20M - \$30M

*Does not include associated apron construction costs

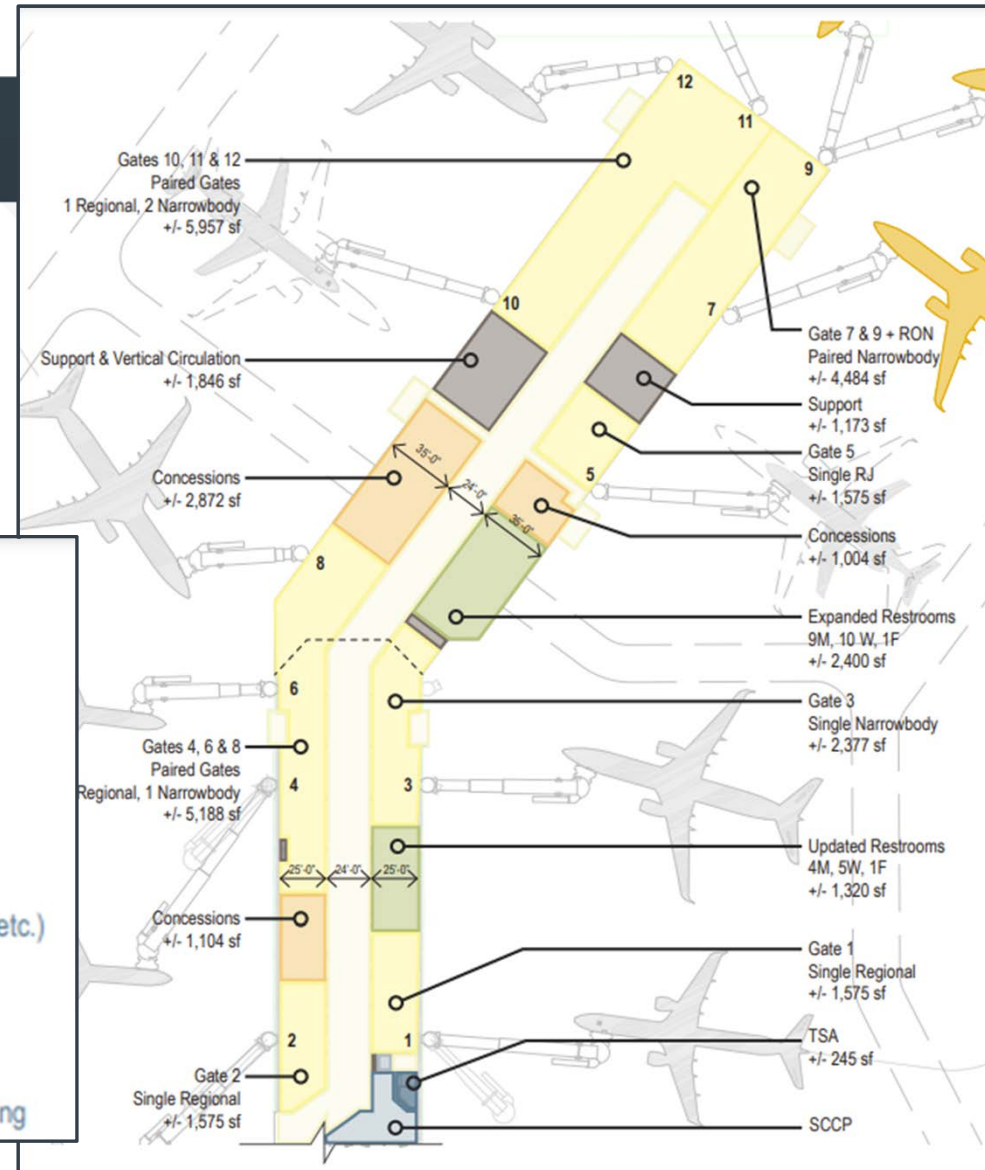
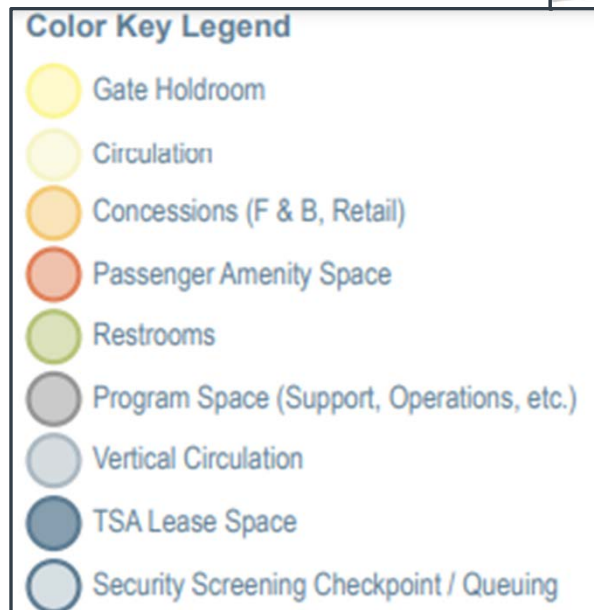


Concourse “Ultimate” Build

Planning Level Estimate

\$35M - \$50M

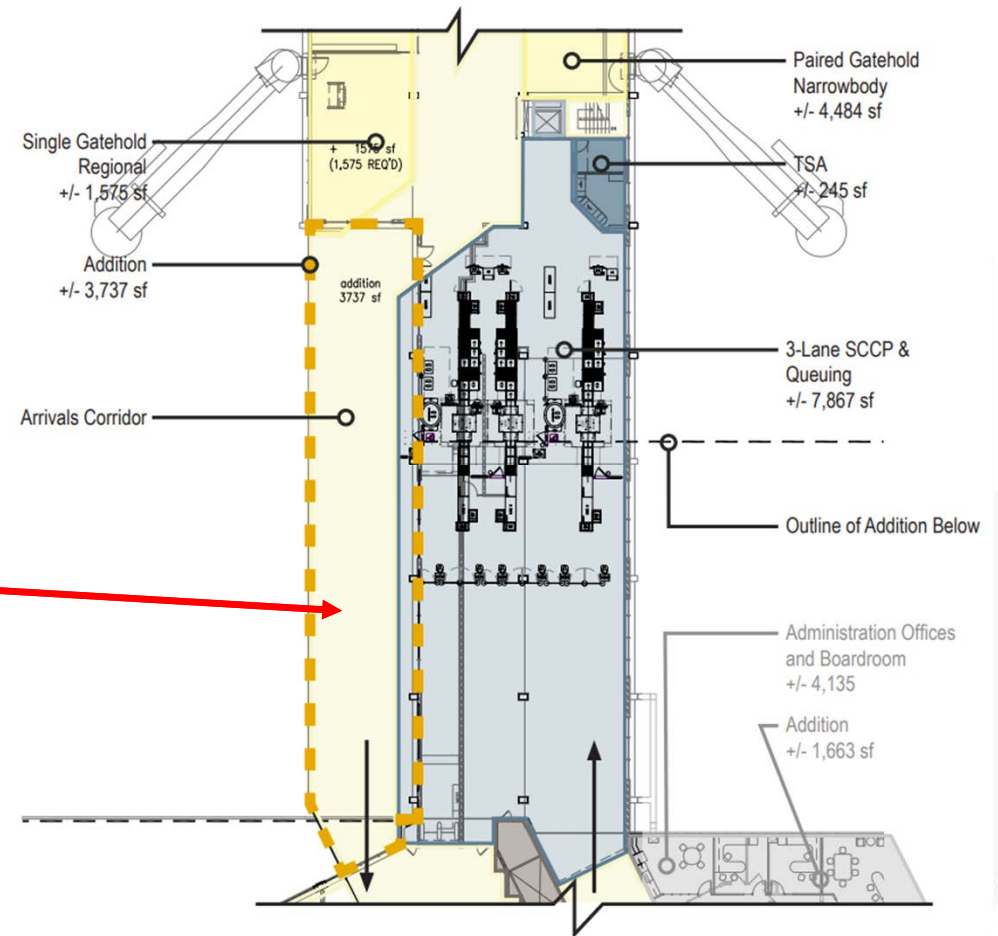
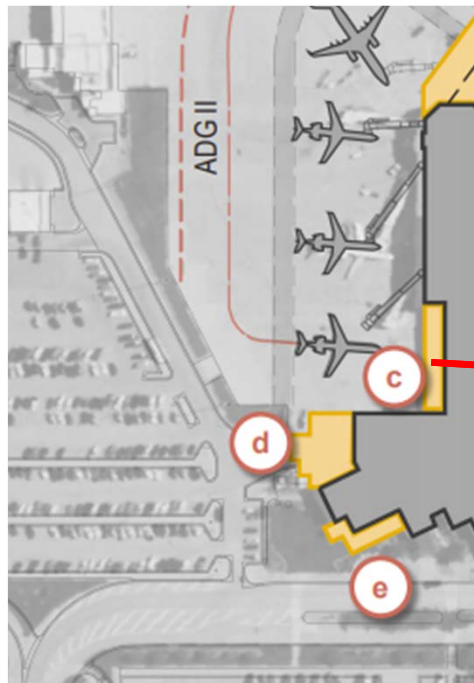
*Does not include associated apron construction costs



Security Checkpoint - Expansion Concept

Planning Level Estimate

\$1.5M - \$2.5M



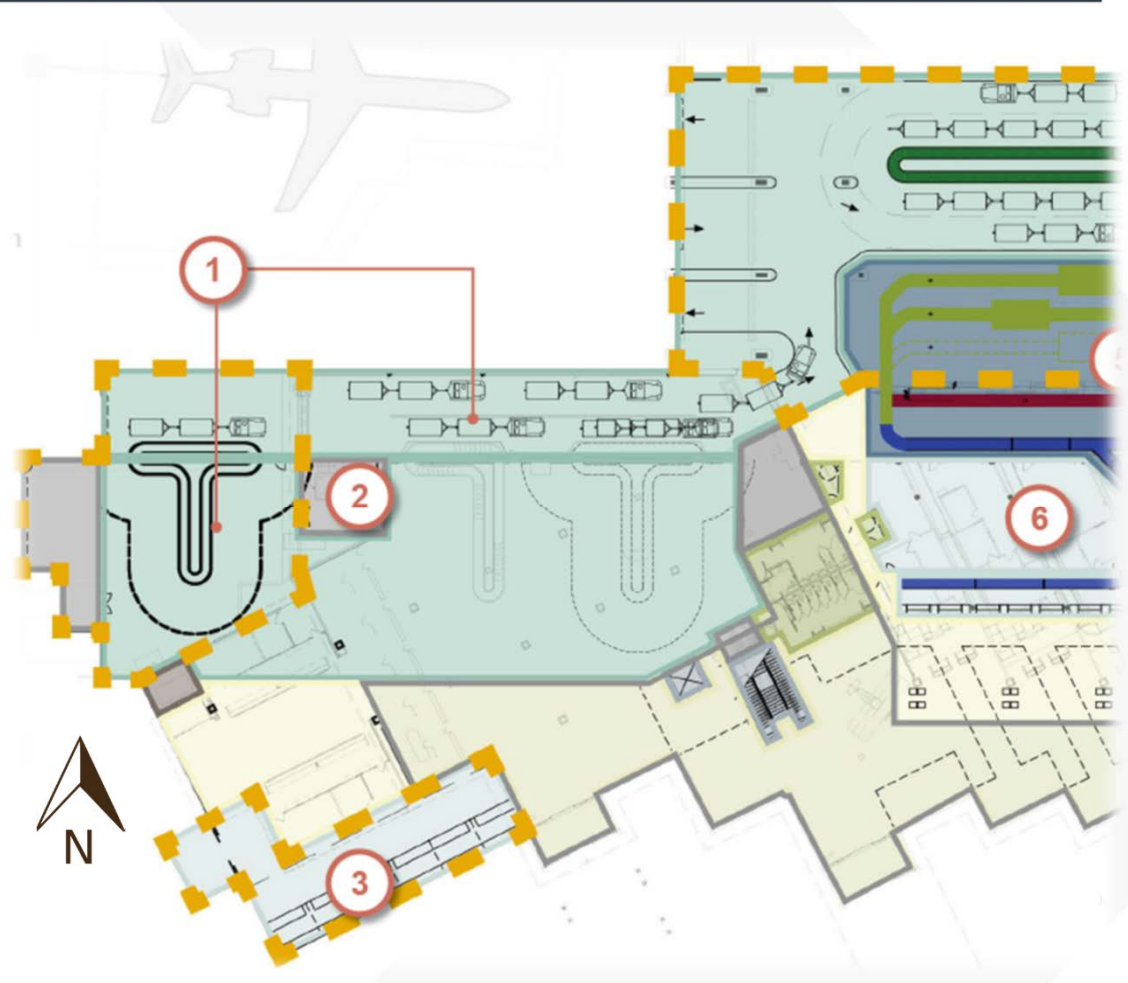
Terminal “Arrival Area” Expansion Concepts

- Baggage Claim
- Car Rental Offices

1. New Baggage Claim Device / Loading Dock expansion (+/- 6,000 sf)
2. New enclosure at existing vertical circulation
3. New addition for Car Rental (+/- 2,800 sf)

Planning Level Estimate

\$7M - \$11M



Terminal “Departure Area” Expansion Concepts

➤ Ticketing

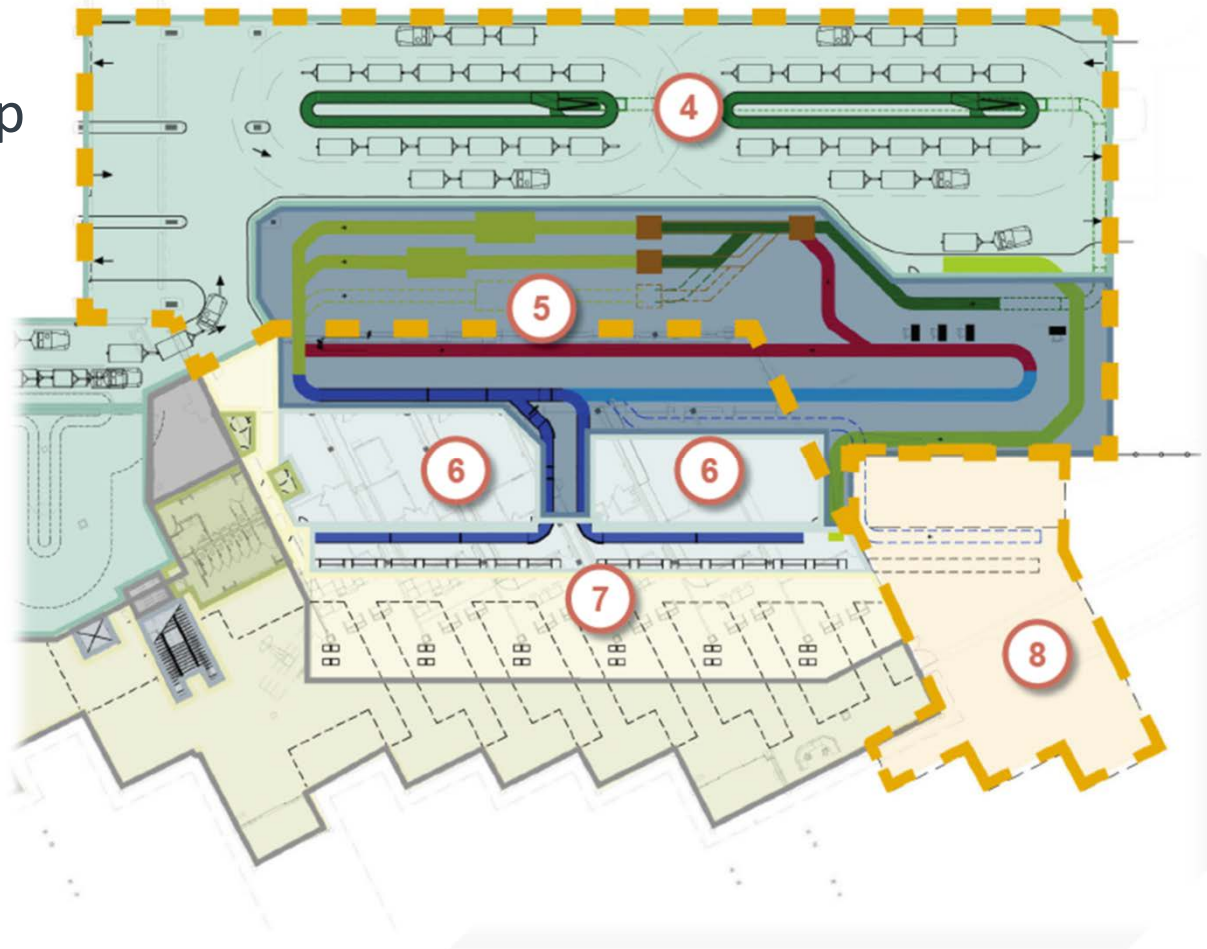
➤ Baggage screening & makeup

- 4. Baggage Makeup Addition (+/- 20,000 sf)
 - Two 160 LF Baggage Makeup carousels
 - 24-cart capacity
- 5. Baggage Screening area (+/- 15,000 sf)
- 6. Airport Ticket Offices (ATOs)
- 7. New Ticket Counters & Scales: 28 positions
- 8. Future Ticketing Hall expansion (+/- 6,000 sf)

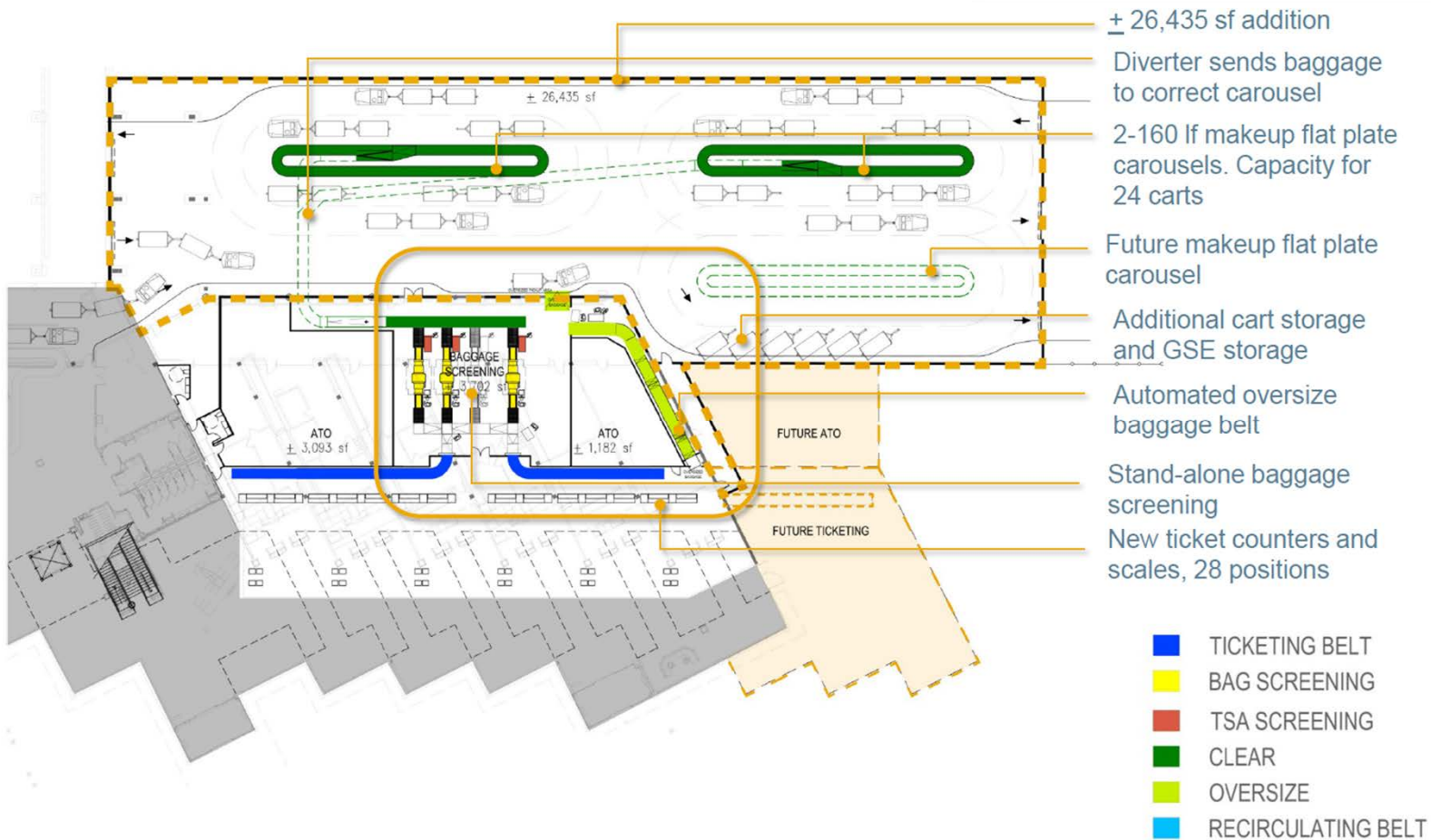
Planning Level Estimate

\$21M - \$28M

*Doesn't include est. \$13M baggage screening equipment costs (eligible for TSA Reimbursement)



“Stand-Alone” Baggage Screening Option



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Concessions & Administrative Offices Concept

Planning Level Estimate

\$6M - \$12M

Color Key Legend

- Gate Holdroom
- Circulation
- Concessions (F & B, Retail)
- Passenger Amenity Space
- Restrooms
- Program Space (Support, Operations, etc.)
- Vertical Circulation
- TSA Lease Space
- Security Screening Checkpoint / Queuing
- Baggage Handling
- Airlines / Car Rentals
- Building Support (Mech, Elec, etc.)



Key Big Picture Decisions

- Future Runway
 - Option 1 - Reconstruct the existing runway with two to three construction seasons of closures
 - Option 2 - Construct a “new” Runway 14-32 east of the existing runway
- Terminal Expansion Priorities & Preferred “Build-outs”



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Next Steps

- Focus Group & Advisory Committee Follow-Up Meetings
- Public Meeting
- Finalize Alternatives Chapter
- Implementation Chapter / Prioritize Projects



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Thank You!



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