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**Embrace What's Next**

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# **Master Plan 2050 Stakeholder Meeting**

November 14, 2018

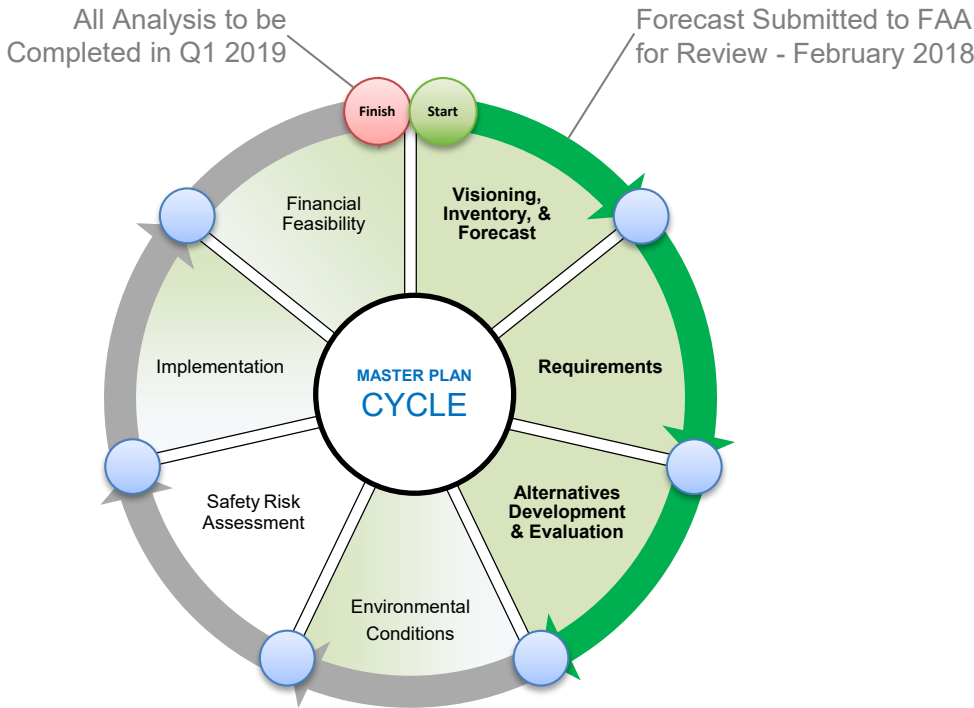
**Draft for Internal Discussion Only**



- Master Plan Progress To Date
- Passenger Concourse Concepts & Level 2 Evaluation
- Level 2 Evaluation Metrics
- On-Airport Land Use

# Master Plan Schedule

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# Progress To Date

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Completed	Underway	Upcoming
<ul style="list-style-type: none"><li>• Master Plan Website</li><li>• Master Plan Goals &amp; Objectives</li><li>• Draft Inventory of Existing Conditions</li><li>• Draft Aviation Forecast</li><li>• Draft Demand/Capacity Facility Requirements</li><li>• Level 1 Airline Engagement</li><li>• Public Meeting #1</li></ul>	<ul style="list-style-type: none"><li>• FAA Review of Forecast</li><li>• Alternatives Analysis &amp; Level 2 Evaluation</li><li>• Environmental Overview</li><li>• Sustainability Plan</li></ul>	<ul style="list-style-type: none"><li>• Level 2 Airline Engagement</li><li>• Public Meeting #2</li><li>• Alternatives Analysis &amp; Level 3 Refinement</li><li>• Implementation Plan</li><li>• Financial Feasibility</li><li>• Safety Risk Assessment Panel</li></ul>

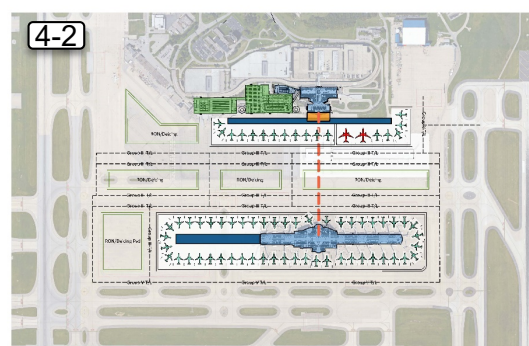
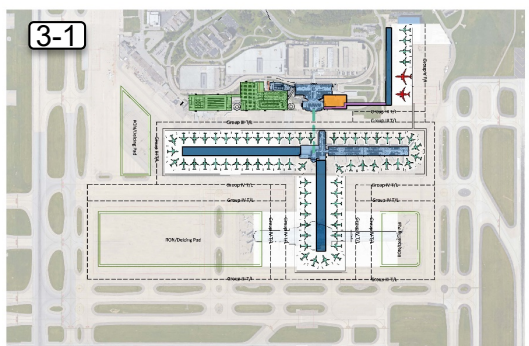
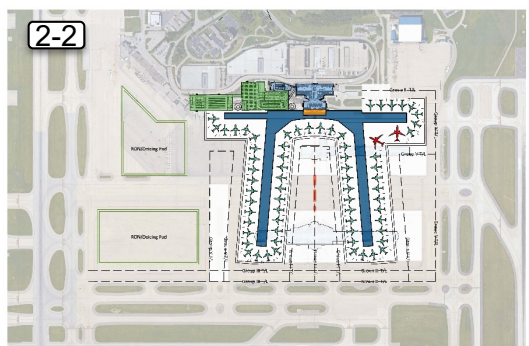
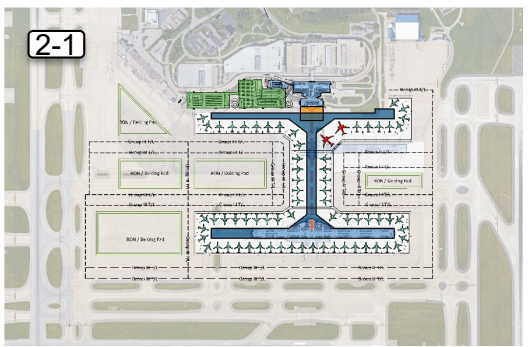
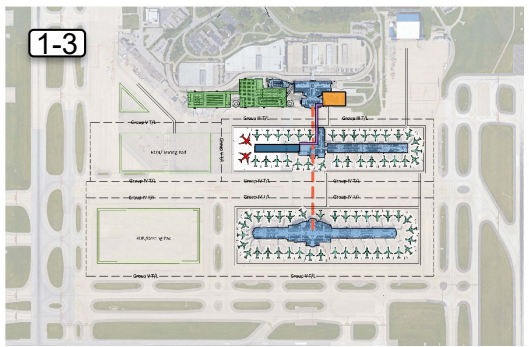
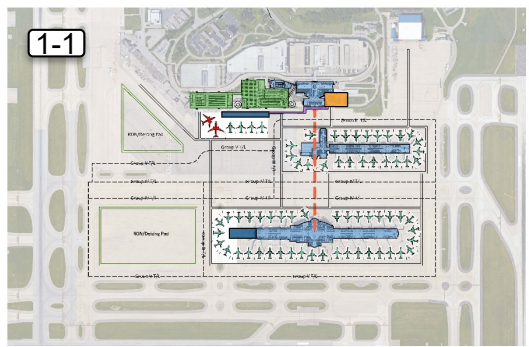


# Passenger Concourse Concepts & Level 2 Evaluation



# Concepts for Level 2 Evaluation

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Carried Forward Since 03/26 Charrette

- 14 evaluation metrics used
  - Refinement of Level 1 Criteria
  - All quantified
- Each concept scored on a scale of -2 to +2
  - -2, -1, 0, +1, +2 (not comparatively scored, scored by performance)
    - Zero centered on existing condition when able

# Level 2 Evaluation Metrics

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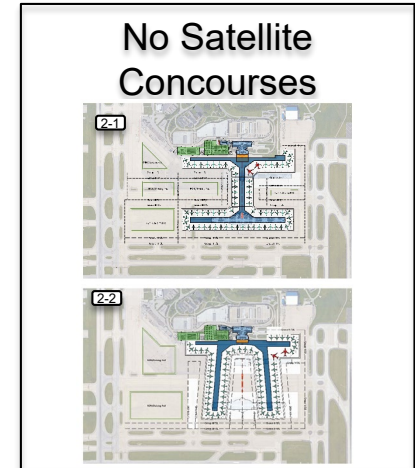
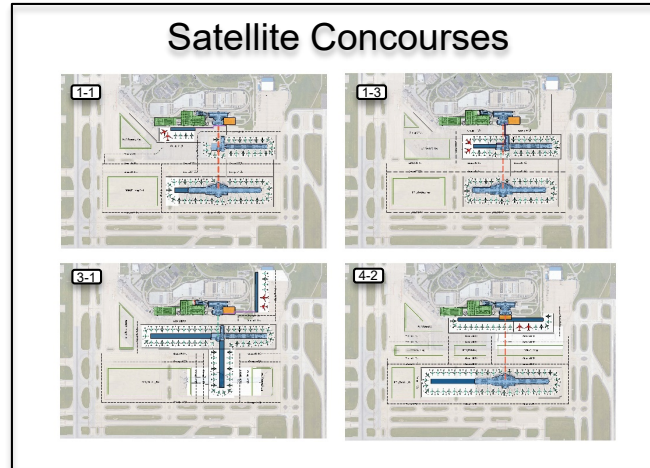
Airside		Assessment Metrics
Airside Operations	The percent of gates with dependent aircraft pushback operations	
Pushback Flexibility	The percent of gates supported by a single taxilane	
Airside Circulation	The number of east/west taxilanes usable for simultaneous Group III or greater taxi operations	
Taxi Distance	The average aircraft taxi distance from gate to departure runway ends	
RON / De-Icing Areas	The number of RON / De-Icing positions and distance of RON / De-Icing from the aircraft parking positions at the concourse	
Baggage Handling System		
BHS System Complexity	The count of separate baggage make-up location, bag conveyor length	
Terminal		
Passenger Journey	The average and maximum walking distances and the number of level changes required for domestic passengers	
International Passenger Flows	The maximum walking distance from the international capable gates to the CBP processor and if a bridge or tunnel connection is required to cross active taxilanes	
Future Flexibility	The largest percentage of the total gates that are directly adjacent to one another on a single concourse and the number of domestic gates that are directly adjacent to international gates for swing-gate usage	
Financial		
Capital Cost	The estimated cost based on the SF of building construction and SY of new pavement (not inclusive of future terminal expansion)	
O&M Cost	Assessment of the number of escalators, the SF of concourse re-use area and if the APM is operational	
Revenue Enhancement	The maximum number of aircraft gate positions adjacent to or beyond a single concession node such that passenger footfall is concentrated and the maximum number of gate positions within 1,500 ft of a concession node	
Implementation		
Phasing	The number of replacement gates built during construction and the number of construction phases	
Project "Off-Ramps"	The number of compatible ultimate concourse configuration concepts during the first phases of construction and assess the number of non-functional gates if the concept is only partially built	



# Evaluation Split

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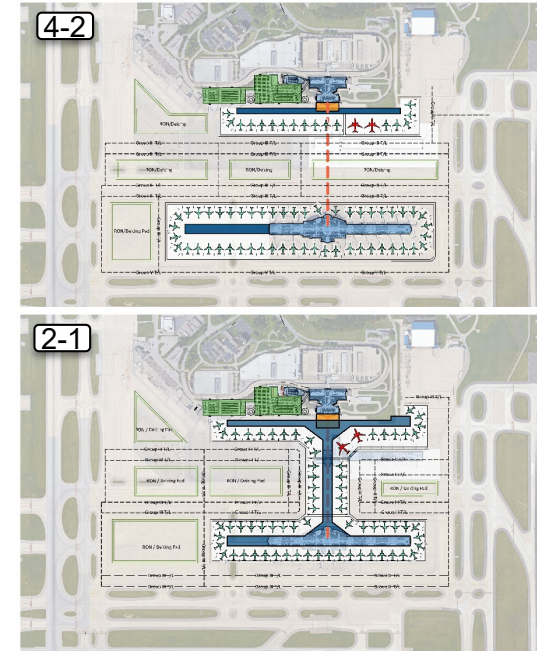
- Holistic evaluation
- 2 basic families exist
  - Satellite concourses
  - No satellite concourses
- Comparisons made within each family



# Evaluation Results

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- Three evaluation methods completed for the two families
  - Straight scoring (no weighting)
  - Weighted by major category (Airside, BHS, Terminal, Financial, Implementation)
  - Individually weighted criteria
- 4-2 is the highest scored satellite option
  - High performance on airside metrics
  - Two negative scores (Passenger Journey & O&M Costs)
- 2-1 is the highest scored non-satellite option
  - Performs better than 2-2 on costs
  - Performs better than 2-2 in terms of implementation and phasing

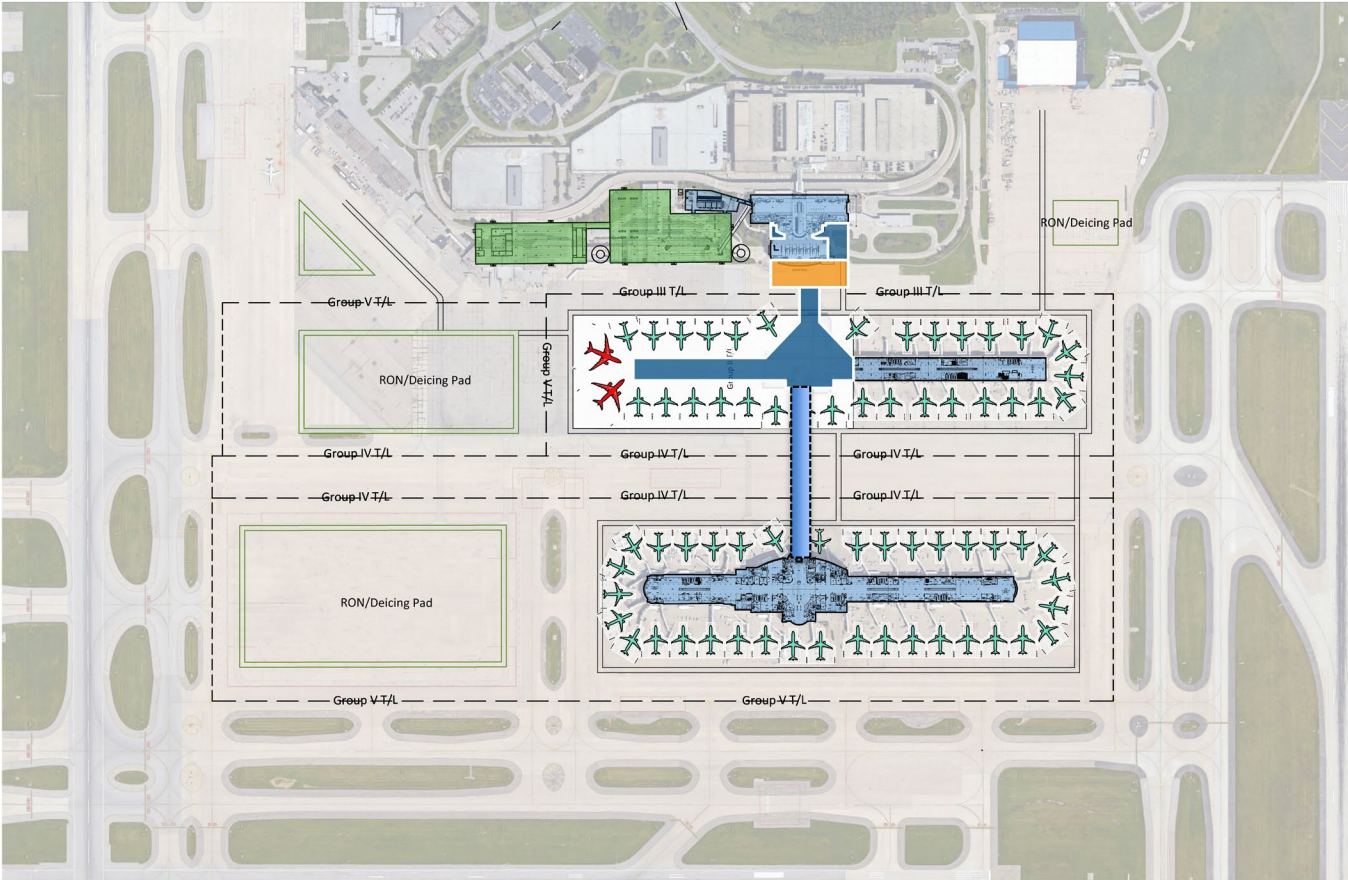


- Intent of Level 3 Evaluation is to refine concepts further, determine phasing, and financially model implementation
- Ultimate phase of Concepts 2-1 and 4-2 facilitate meeting primary objectives
  - Relocated FIS to eliminate passenger rescreening
  - Reconfigured baggage handling system
  - Expansion of Main Terminal Building
  - Centralized concession node (revenue enhancement)
- Phasing on gate demand alone may defer achieving objectives
- Question posed – How do we configure early phase to achieve primary objectives?

- Hybrid Concept developed to accelerate:
  - Relocating FIS to eliminate passenger rescreening
  - Reconfigured baggage handling system
  - Expansion of Main Terminal Building
  - Centralized concession node (revenue enhancement)
- Hybrid Concept minimizes new concourse footprint by:
  - Double-loading of terminal concourse
  - Re-use of Concourse B
- Hybrid Concept scores highest in evaluation matrix
- Recommend Hybrid Concept for Level 3 evaluation

# Hybrid Concept

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- Existing Building
- Future New FIS
- Tunnel with APM
- Future Service Road
- CONRAC Facility
- Physical Connection to FIS
- Future New Concourse
- Future Apron
- Tunnel with Moving Walkway Only
- Taxilane



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## **Level 2 Evaluation Metrics**

**Draft for Internal Discussion Only**

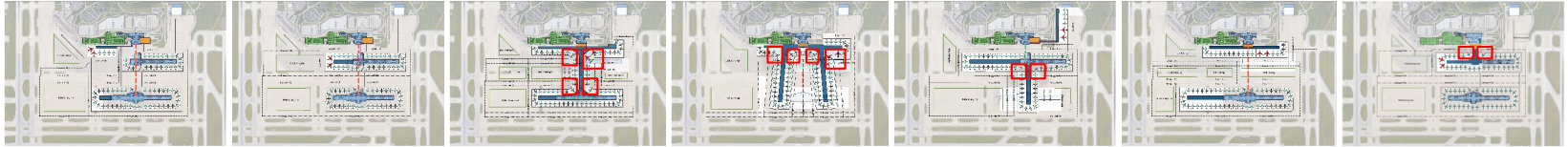


# Airside

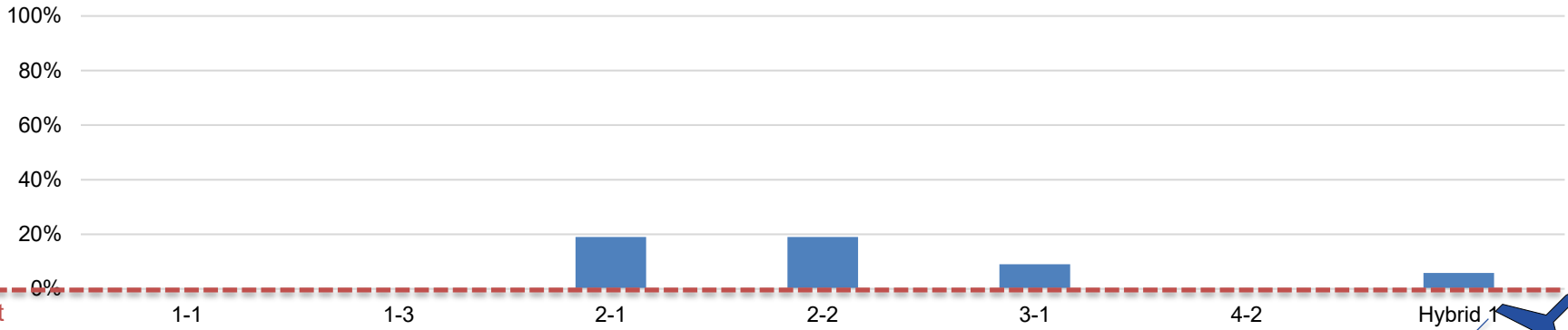


# Airside Operations

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Dependent Gate %	0%	0%	19%	19%	9%	0%	6%

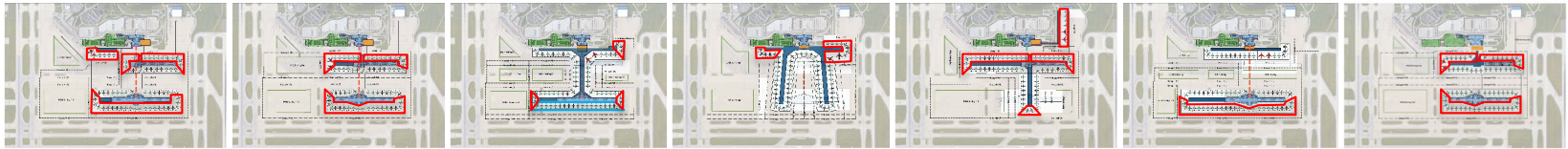




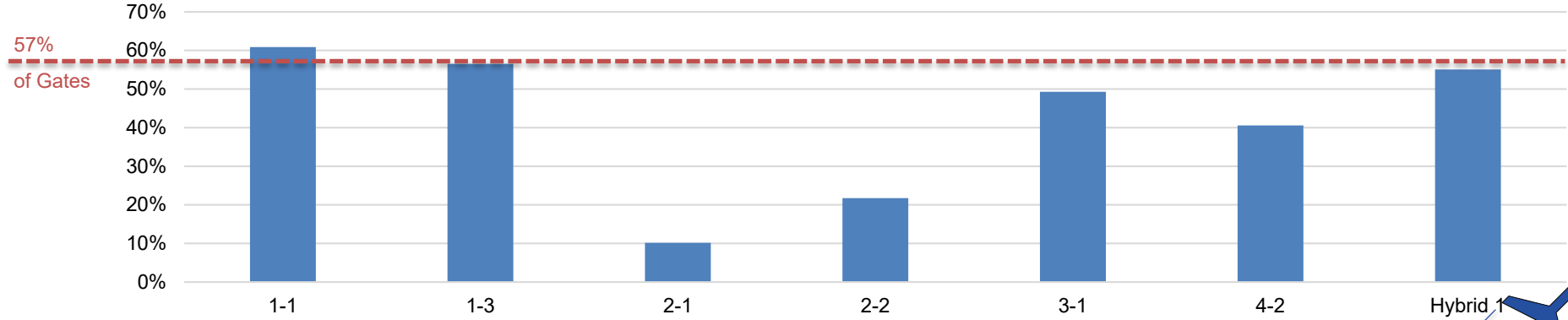
# Pushback Flexibility

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 1 taxi lane in push back area



	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
% of Gates with 1 Pushback Taxilane	61%	57%	10%	22%	49%	41%	55%

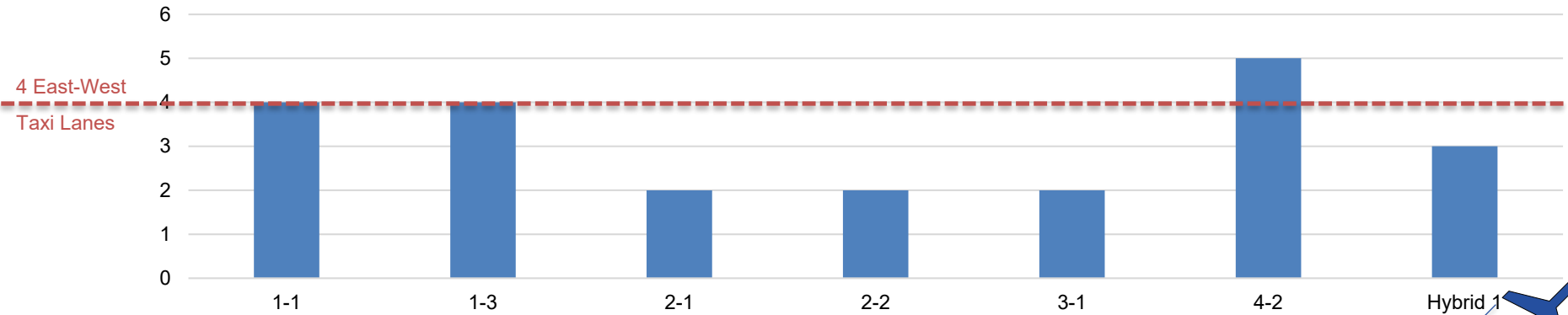


# Airside Circulation

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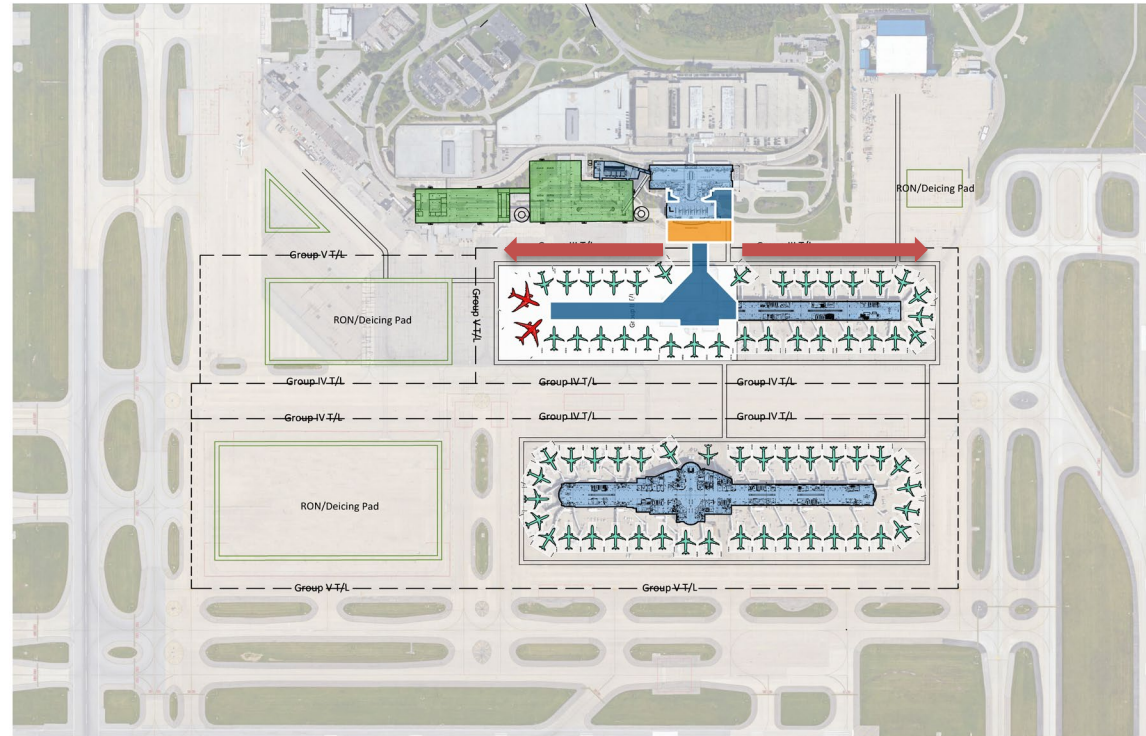


	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
# of East - West Taxi Lanes	4	4	2	2	2	5	3



# Airside Circulation – North of Concourse A

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- Removal of cross-apron flow provides some benefit
  - Limits users of north apron taxilane to only gate users
  - Reduces potential for conflict between aircraft pushback and transiting aircraft
  - Forces transiting aircraft to center taxilanes/taxiways
    - Possible to sidestep pushbacks

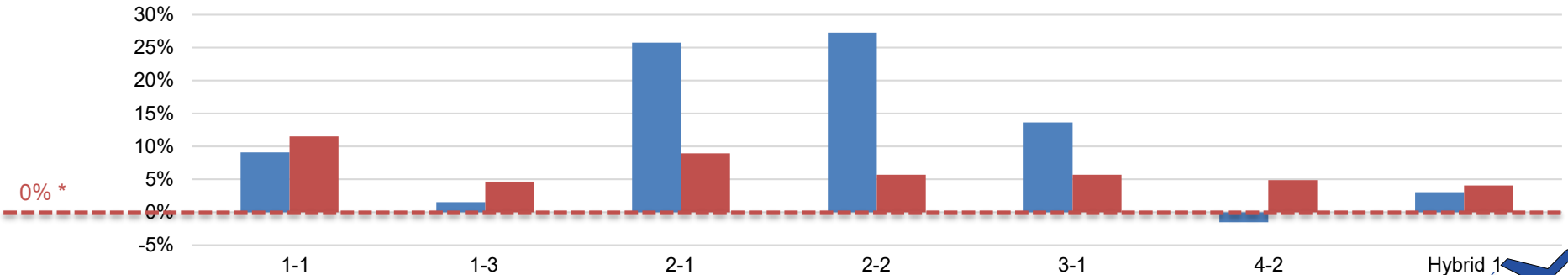
# Taxi Distance

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Average 18C/18L	9%	2%	26%	27%	14%	-2%	3%
Average 36C/36R	12%	5%	9%	6%	6%	5%	4%

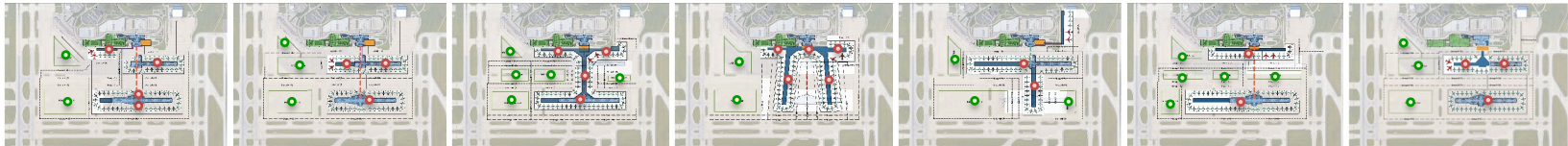
■ % Change Southbound ■ % Change Northbound



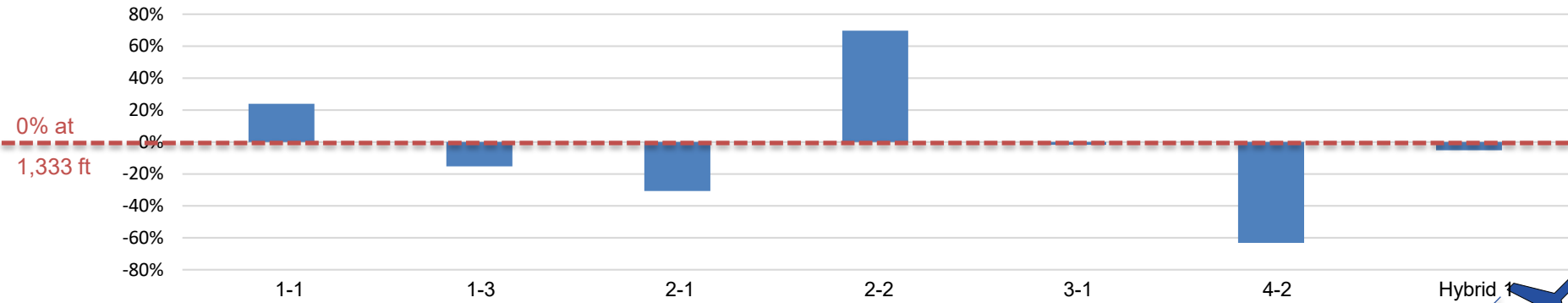
\* Note: Percentage Difference is based upon the Existing Taxi Average Distance at 6,600 ft Southbound and 12,300 ft Northbound.

# RON / Deicing Areas

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
% Change in Average RON Distance to Gate	24%	-24%	-31%	70%	-2%	-63%	1



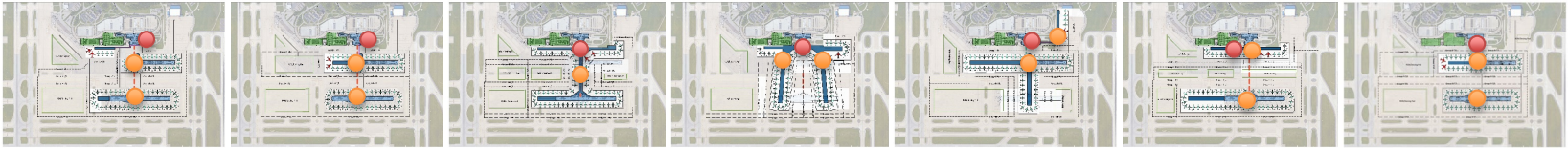
Note: Percentage Difference is based upon the Existing RON-to-Gate Average Distance at 1,333 ft.

# Baggage Handling System



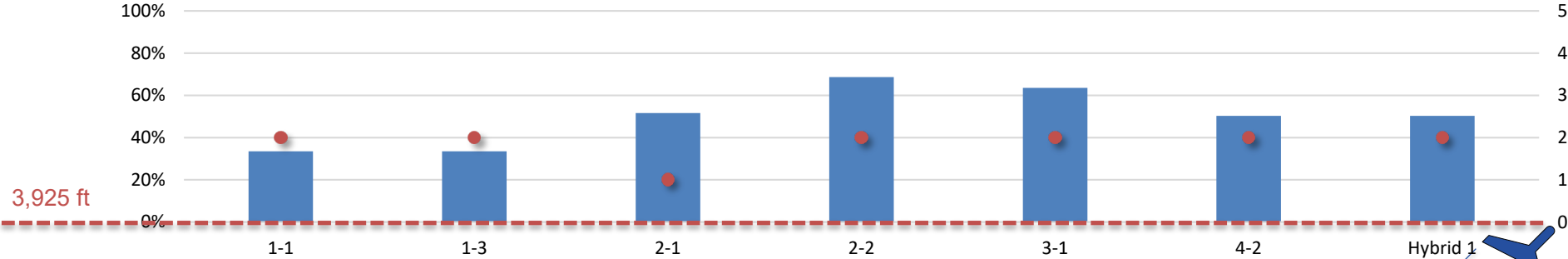
# Baggage Handling System

Draft for Internal Discussion Only



- Bag makeup
- CBIS

	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
# of Bag Makeup	2	2	1	2	2	2	2
MAX Belt Length	2,610 ft	2,610 ft	1,900 ft	1,230 ft	1,430 ft	1,950 ft	1,950 ft
% Improvement	34%	34%	52%	69%	64%	50%	50%



# Terminal





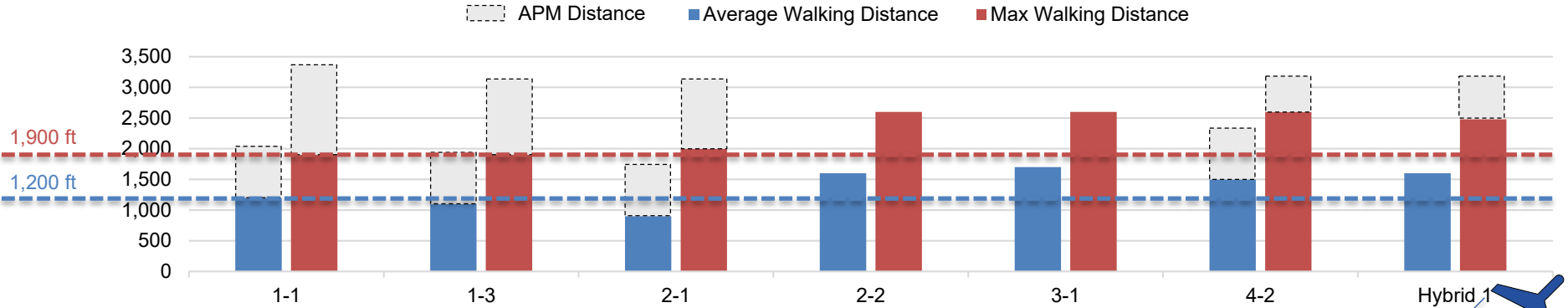
- Consists of four sub-criteria
  - Average walking distance
  - Max walking distance
  - Number of decision points **and** choices
  - Percent of gates requiring level changes

# Passenger Journey – Walking Distances

Draft for Internal Discussion Only



	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Average Walking Distance	1,200 ft	1,100 ft	900 ft	1,600 ft	1,700 ft	1,500 ft	1,600 ft
Max Walking Distance	1,900 ft	1,900 ft	2,000 ft	2,600 ft	2,600 ft	2,600 ft	2,500 ft



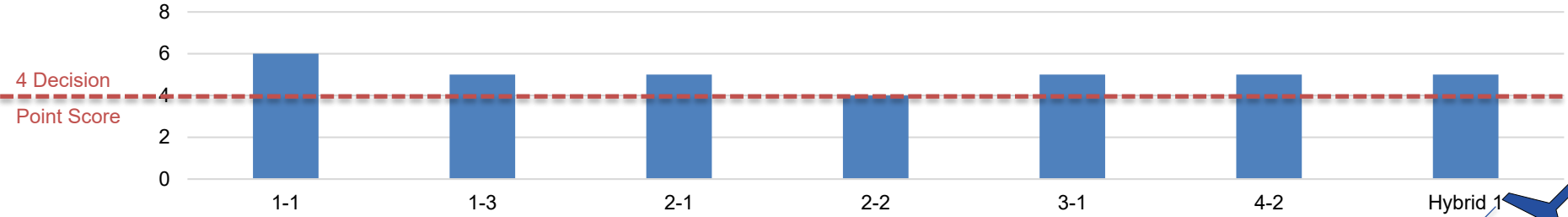
# Passenger Journey – Decision Points

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- 1<sup>st</sup> Decision Point
- 2<sup>nd</sup> Decision Point
- 3<sup>rd</sup> Decision Point




	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
# of choices at 1 <sup>st</sup> decision point	2	3	3	2	2	3	3
# of choices at 2 <sup>nd</sup> decision point	2	2	2	2	3	2	2
# of choices at 3 <sup>rd</sup> decision point	2	-	-	-	-	-	-
<b>Decision Point Score</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>5</b>



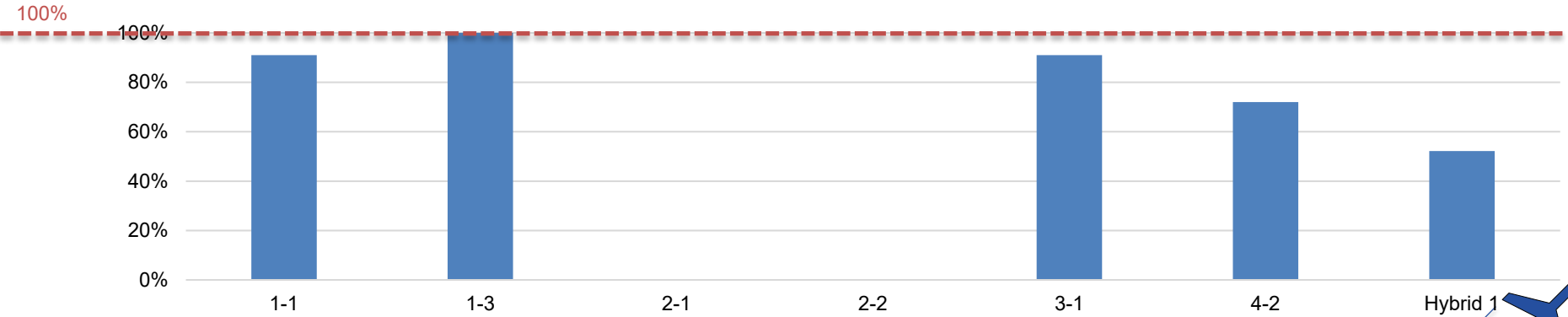
# Passenger Journey – Level Change

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 Gate with level change




	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
% of Gates with Level change	91%	100%	0%	0%	91%	72%	52%



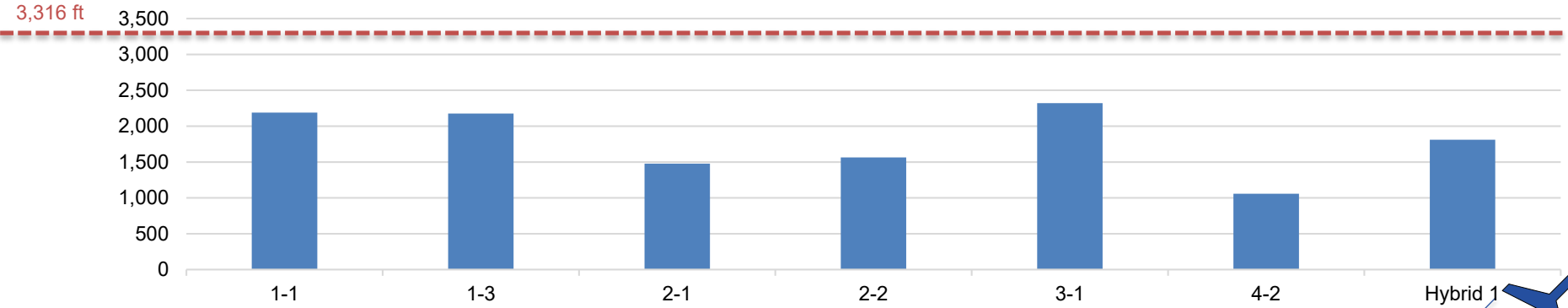
# International Passenger Flows

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 Maximum Int'l  
 Arrival Walking  
 Distance



	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Distance from furthest int'l gate to Curbfront	2,189 ft	2,175 ft	1,477 ft	1,565 ft	2,320 ft	1,058 ft	1,810 ft

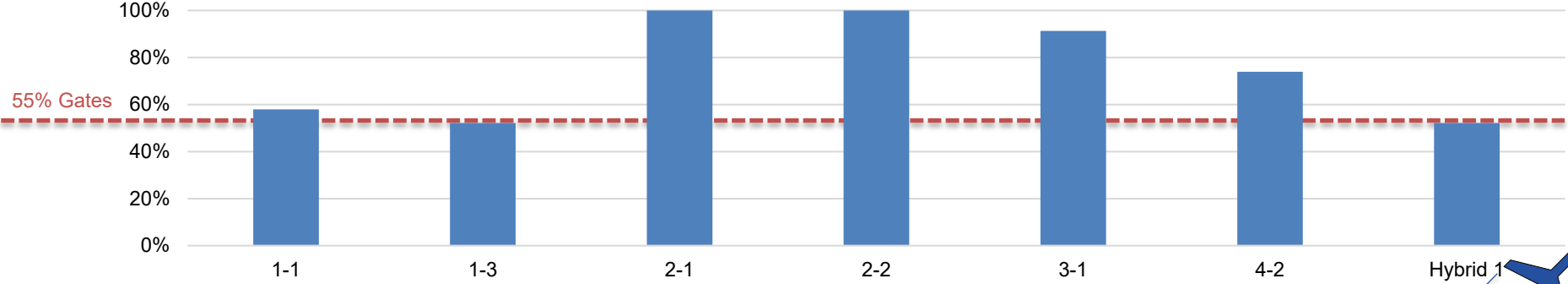


# Future Flexibility

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
% of contiguous gates	58%	52%	100%	100%	91%	74%	52%



# Financial

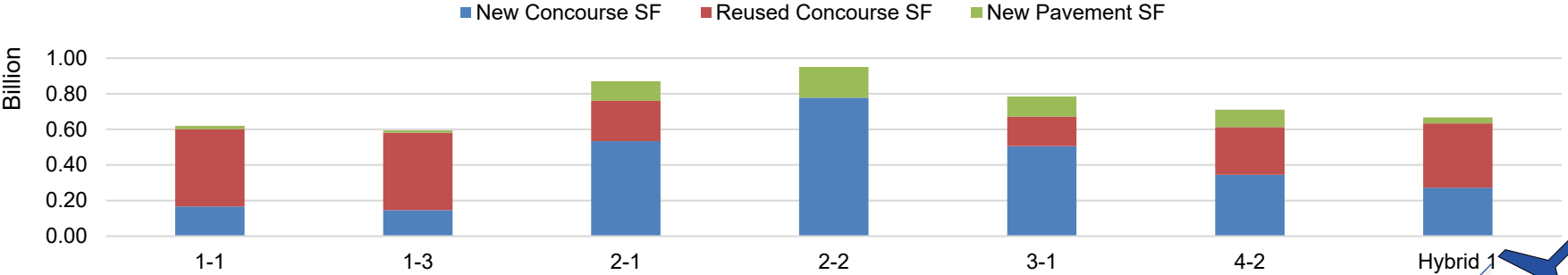


# Capital Costs

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
New Concourse	0.17	0.15	0.53	0.78	0.51	0.34	0.27
Reused Concourse	0.43	0.43	0.23	0.00	0.17	0.27	0.36
New Pavement	0.02	0.01	0.11	0.17	0.11	0.10	0.03
<b>Total (Billion)</b>	<b>0.62</b>	<b>0.59</b>	<b>0.87</b>	<b>0.95</b>	<b>0.78</b>	<b>0.71</b>	<b>0.67</b>



Note: Terminal Expansion, Fuel Hydrants and Jetbridge Cost is Not Included





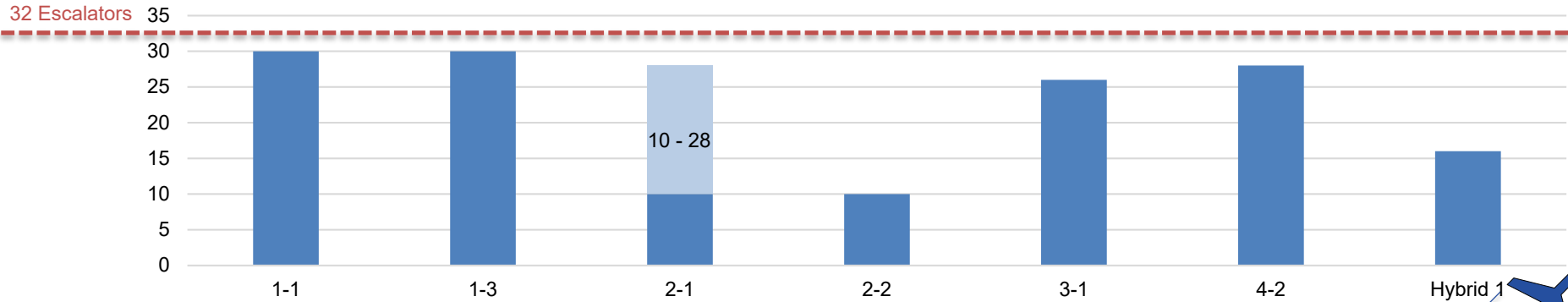
- Consists of three sub-criteria
  - Number of escalators required
  - Percent of concept that uses existing facility
  - APM/Number of APM stops

# O&M Costs - Escalators

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Escalator #	30	30	10 or 28	10	26	28	16



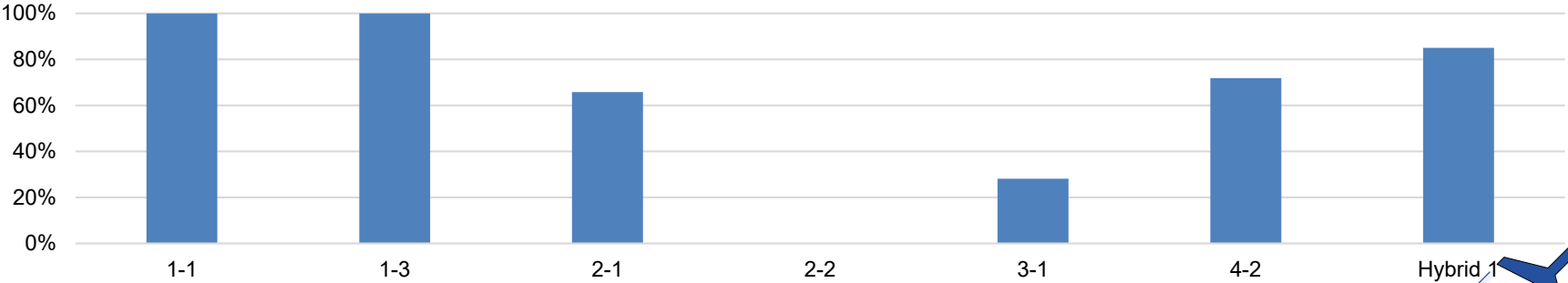
Note: Assumes existing Concourse A/B escalators are still in use (2-1 / 4-2 will see a reduction in escalators)

# Infrastructure Re-Use

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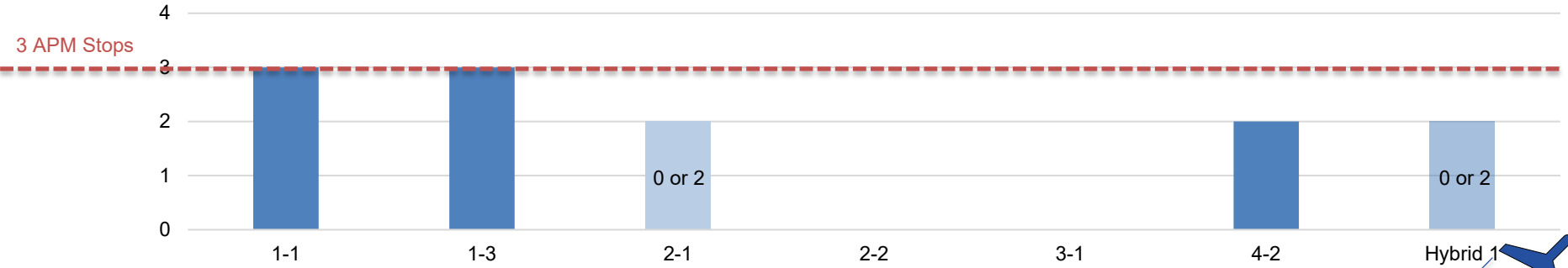


	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Concourse Re-Use Area (SF)	1,245,000	1,245,000	819,000	0	350,000	895,000	1,059,000
% Re-Use of Existing	100%	100%	66%	0%	28%	72%	85%





	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
# of APM Stops	3	3	0 or 2	0	0	2	0 or 2

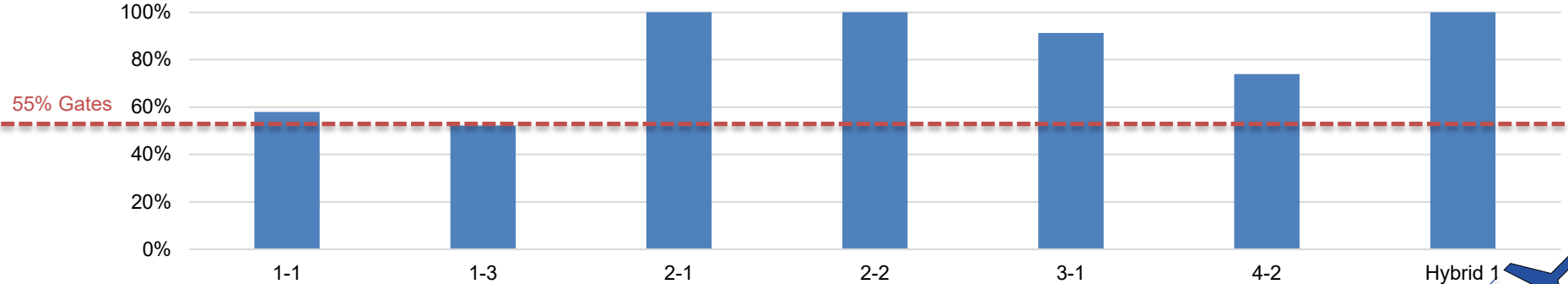


# Revenue Enhancement

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	1-1	1-3	2-1	2-2	3-1	4-2	Hybrid
Max gate % beyond a concession node	58%	52%	100%	100%	91%	74%	100%



# Implementation



# Off-Ramps

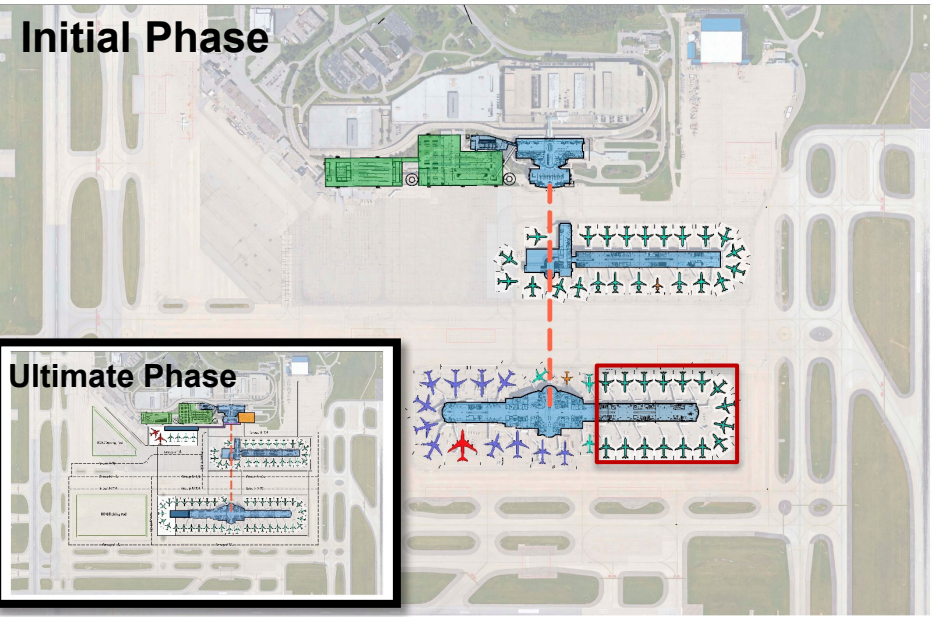
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- PAL 3 gate demand
- Assumes “least build”
- No “throw away” phases

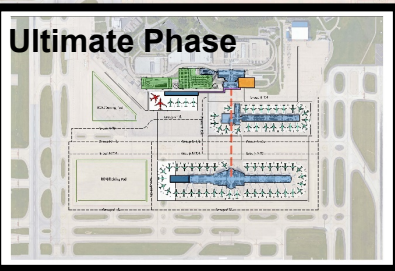
# Off Ramps | Family 1 – Concept 1

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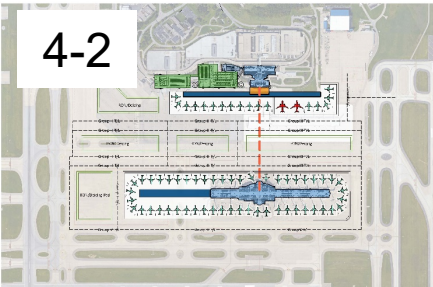
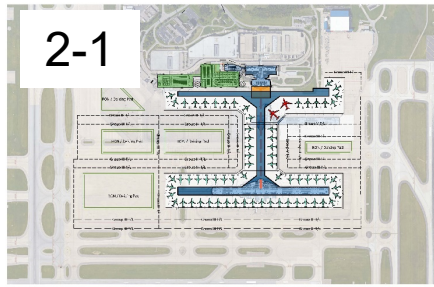
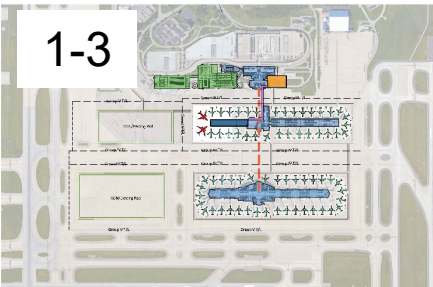
## Initial Phase




## Ultimate Phase



## Future Flexibility



Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	38	16	12

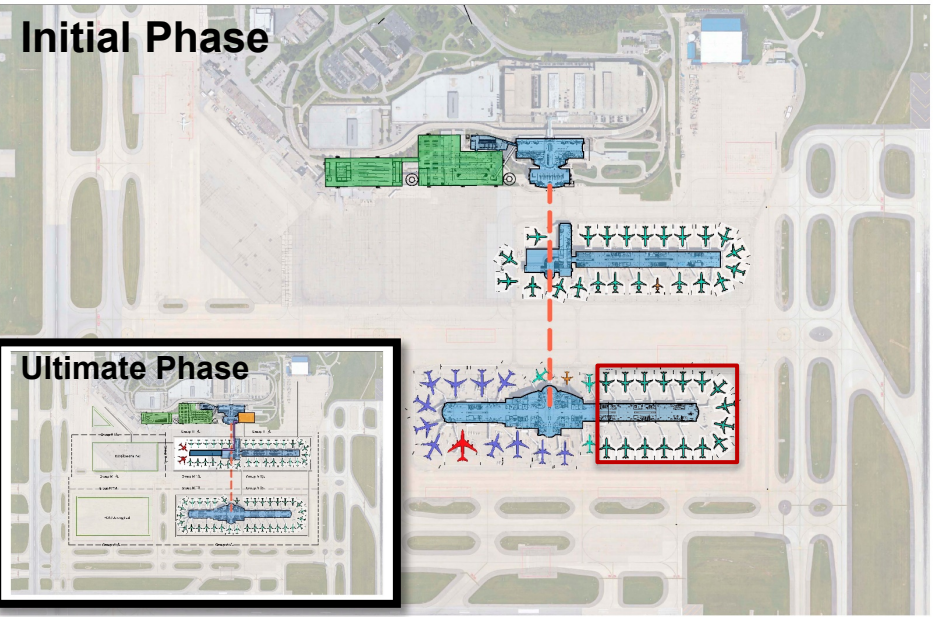
 Gates in Construction



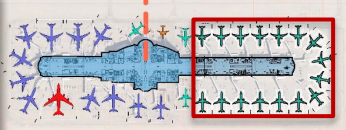
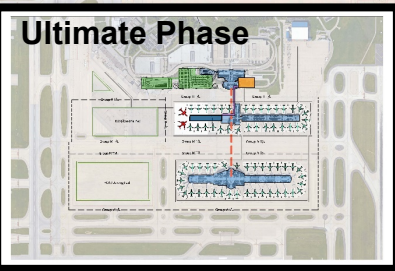
# Off Ramps | Family 1 – Concept 3

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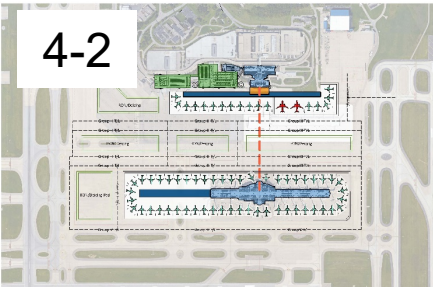
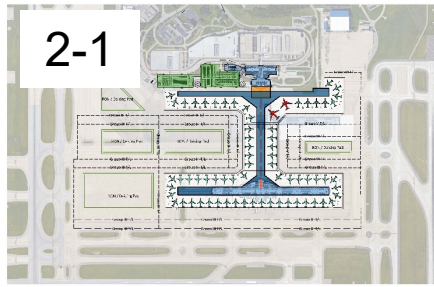
## Initial Phase



## Ultimate Phase



## Future Flexibility

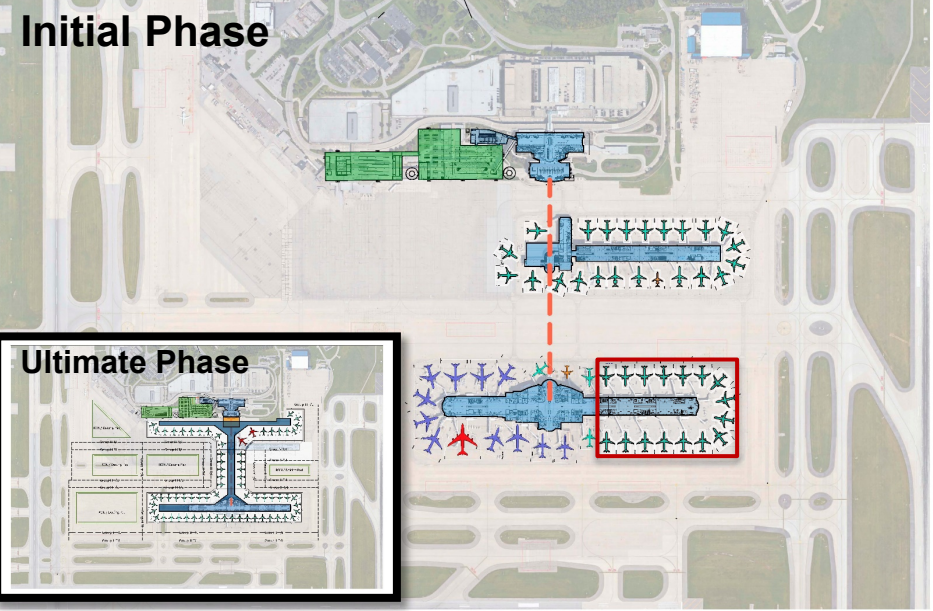


Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	38	16	12

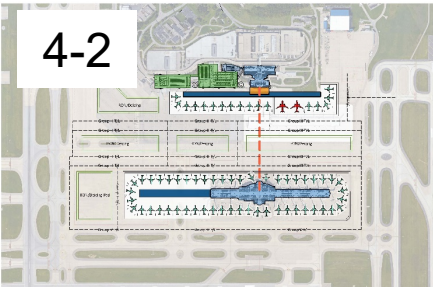
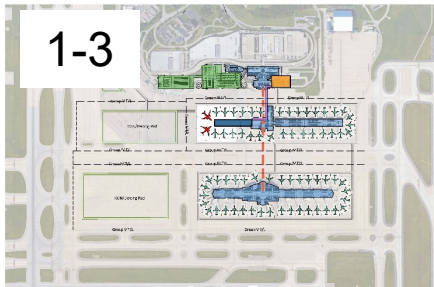
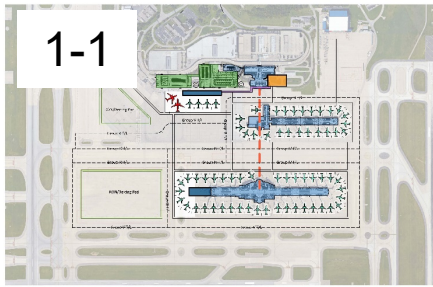
Gates in Construction

# Off Ramps | Family 2 – Concept 1


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## Future Flexibility



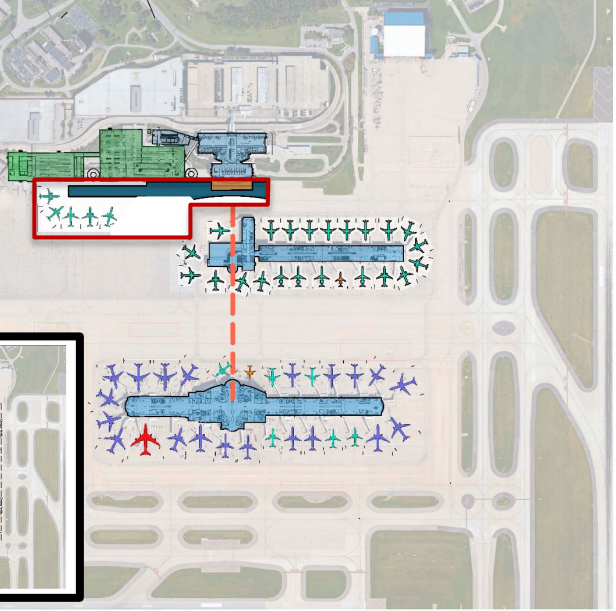
Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	38	16	12

 Gates in Construction

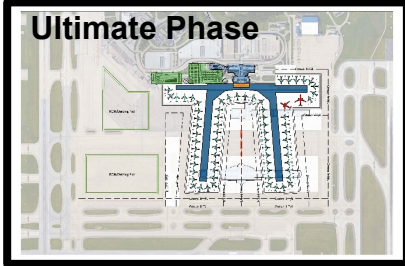
# Off Ramps | Family 2 – Concept 2

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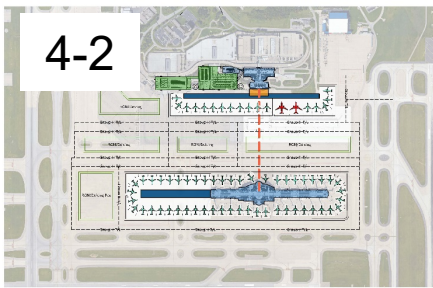
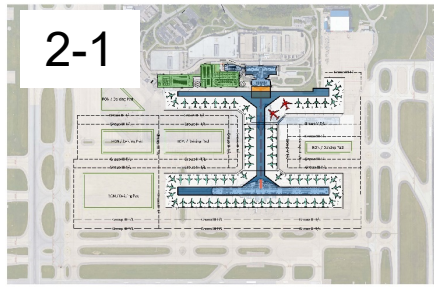
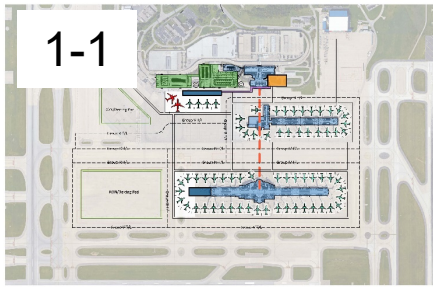
## Initial Phase




## Ultimate Phase



## Future Flexibility



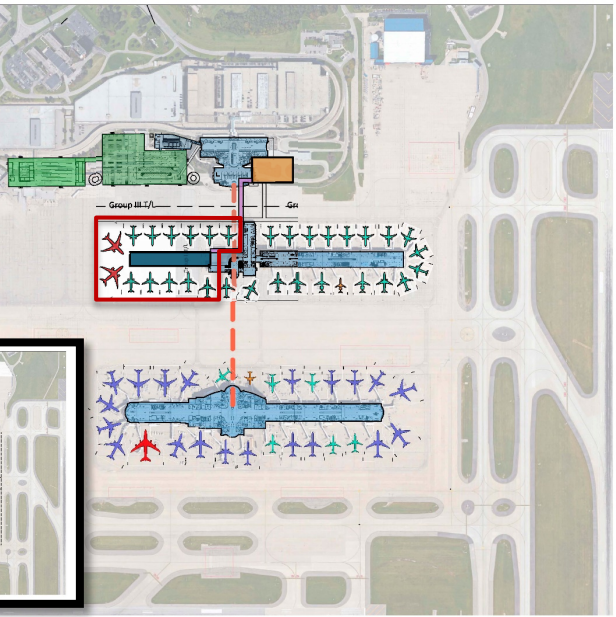
Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	51	5	0

 Gates in Construction

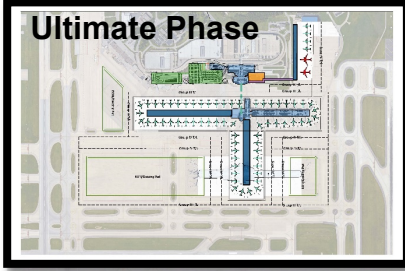
# Off Ramps | Family 3 – Concept 1

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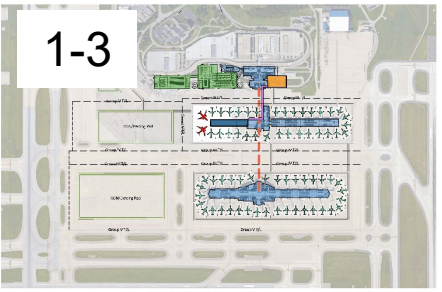
## Initial Phase




## Ultimate Phase



## Future Flexibility



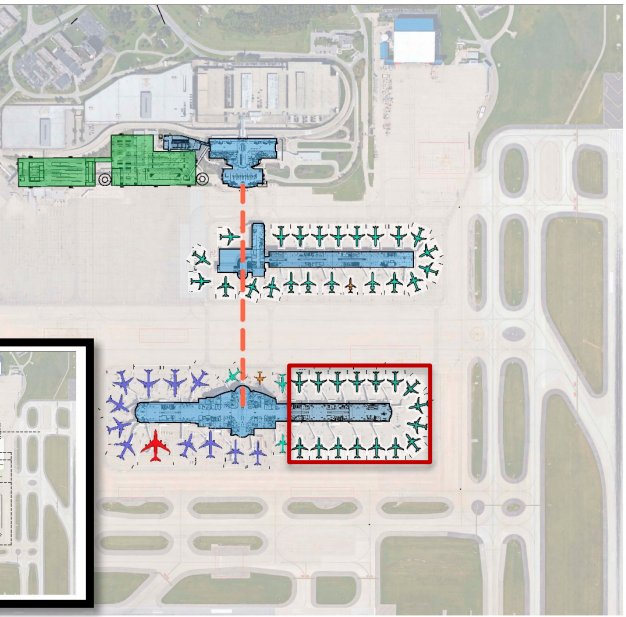
Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	48	13	4

 Gates in Construction

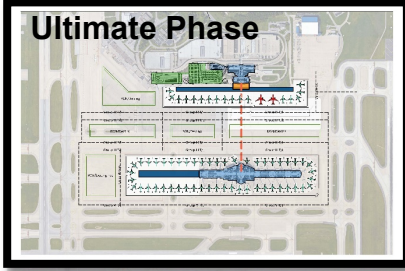
# Off Ramps | Family 4 – Concept 2

Draft for Internal Discussion Only

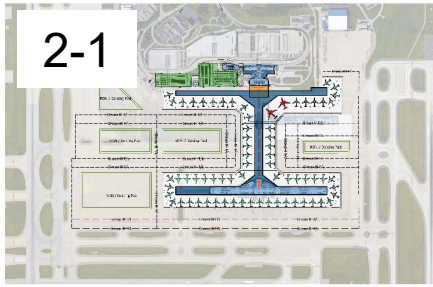
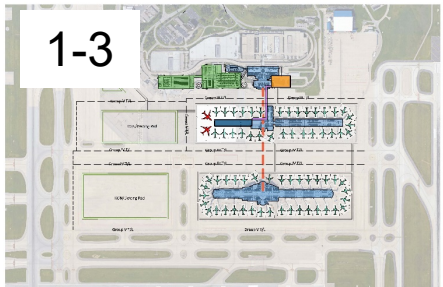
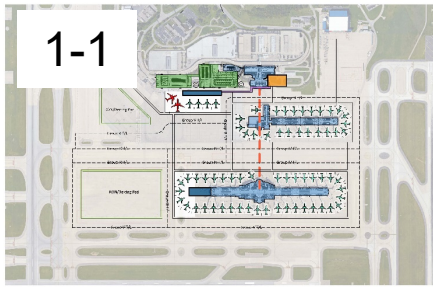
## Initial Phase




## Ultimate Phase



## Future Flexibility

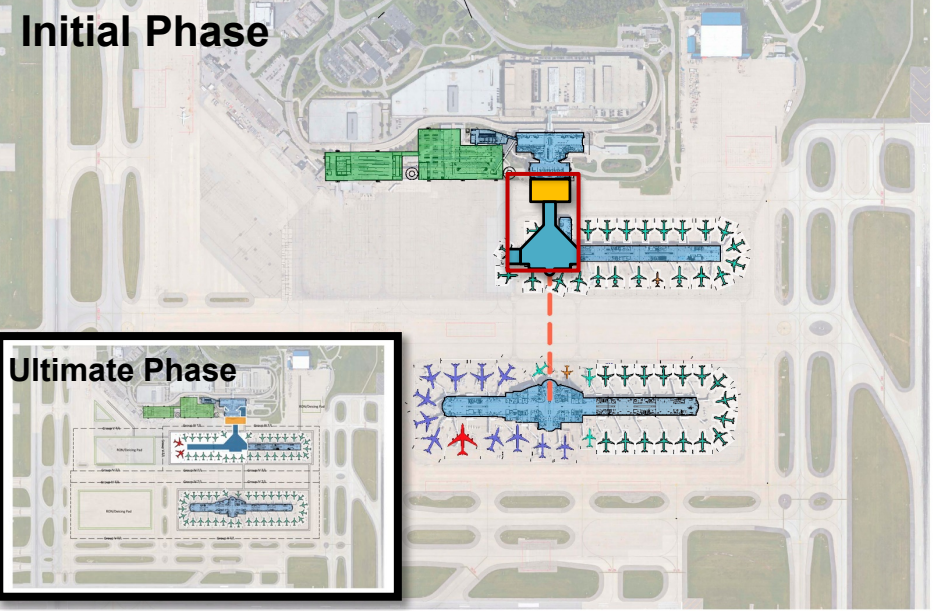


Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	38	16	12

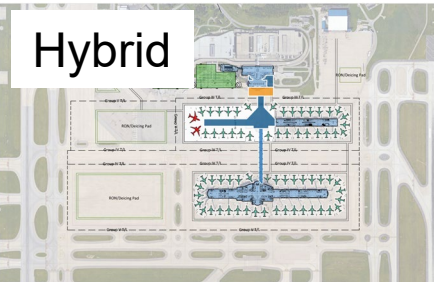
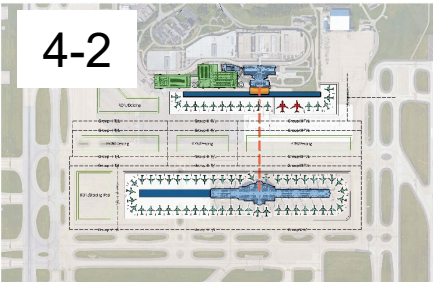
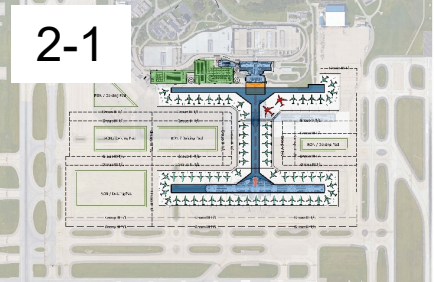
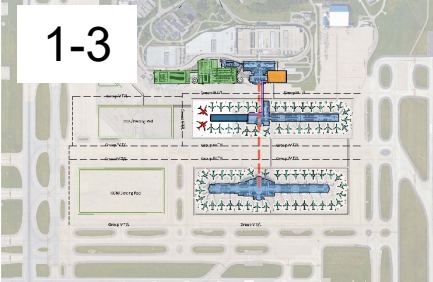
 Gates in Construction

# Off Ramps | Hybrid Concept

Draft for Internal Discussion Only



## Future Flexibility



Gates Required	Operating Gates	Gates in Construction	Replacement Gates
38	38	16	12

Gates in Construction



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**Embrace What's Next**

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## **On-Airport Land Use**

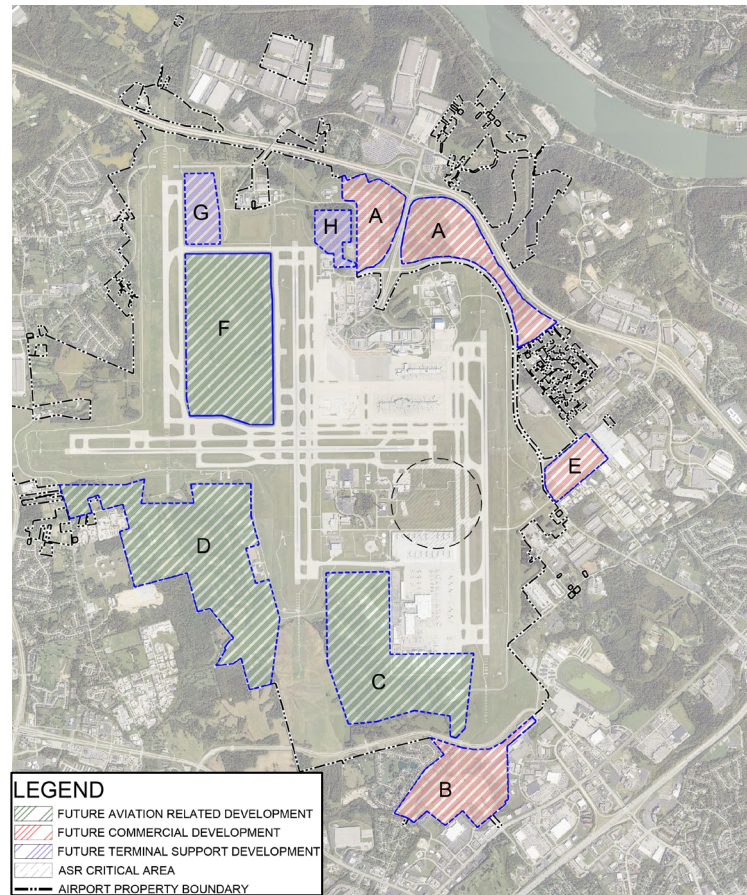
**Draft for Internal Discussion Only**



# 2013 Master Plan Land Use Recommendations

Draft for Internal Discussion Only

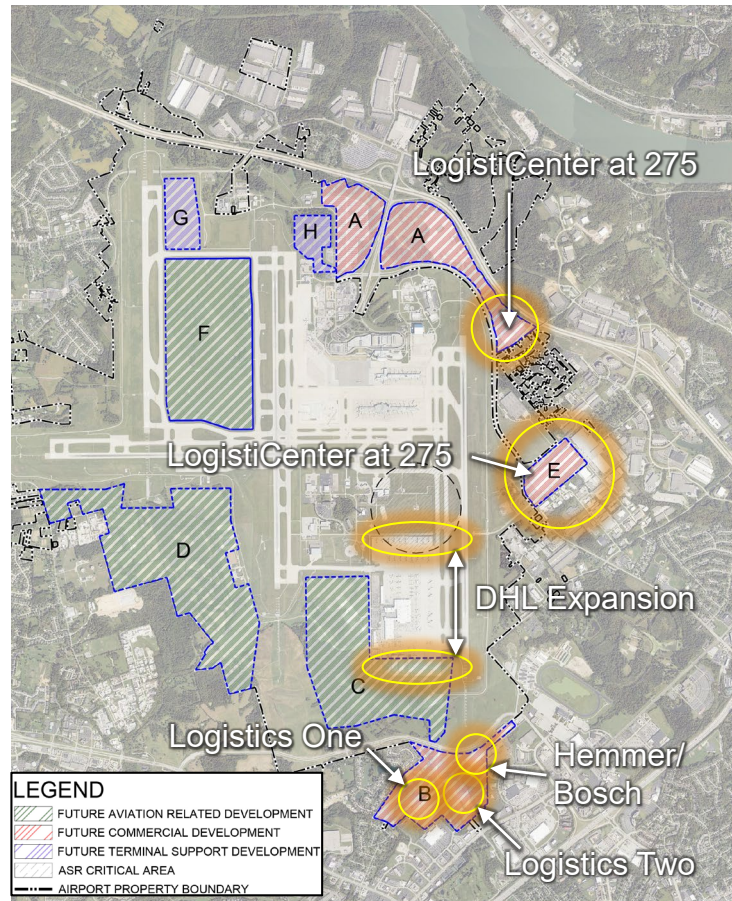
- Identified vacant airport property available for development
  - Split into major parcel segments
- Shaped Airport strategy for developing excess property





# Development Since 2013 Master Plan

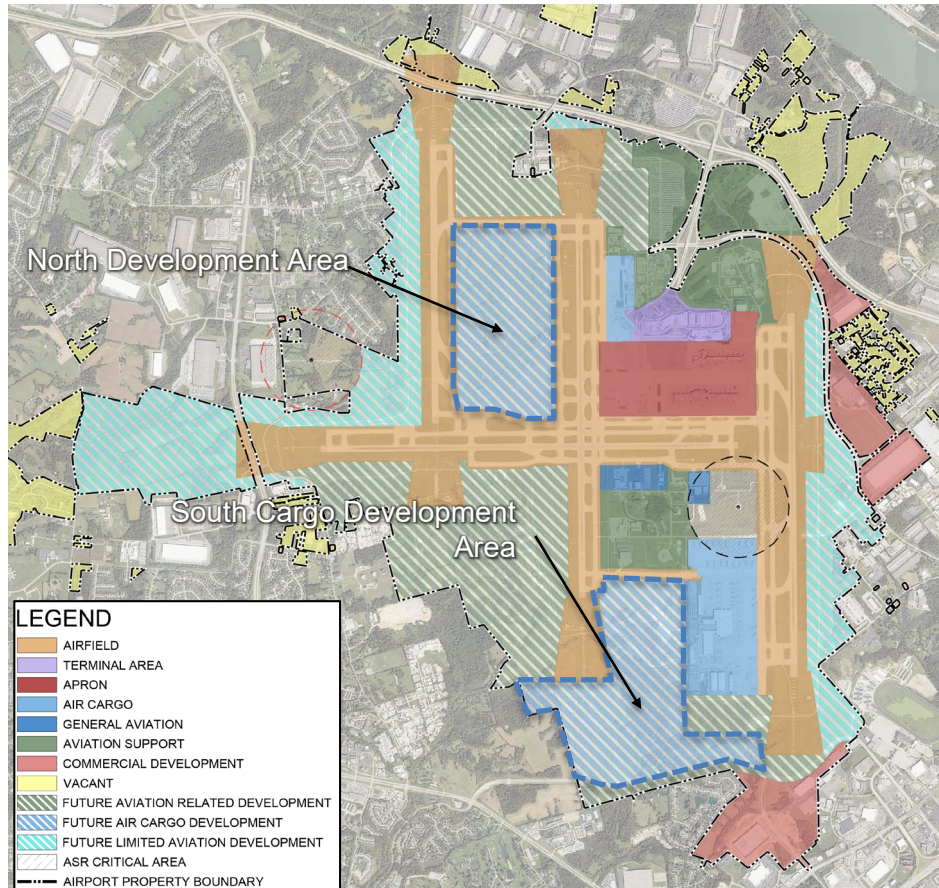
Draft for Internal Discussion Only



- Airport efforts to develop excess land since have been successful
  - LogistiCenter at 275
  - DHL Expansions
  - Logistics One
  - Logistics Two
  - Hemmer/Bosch
  - Imminent Amazon Cargo Hub
- All development thus far has been consistent with Master Plan

# Existing Land Use

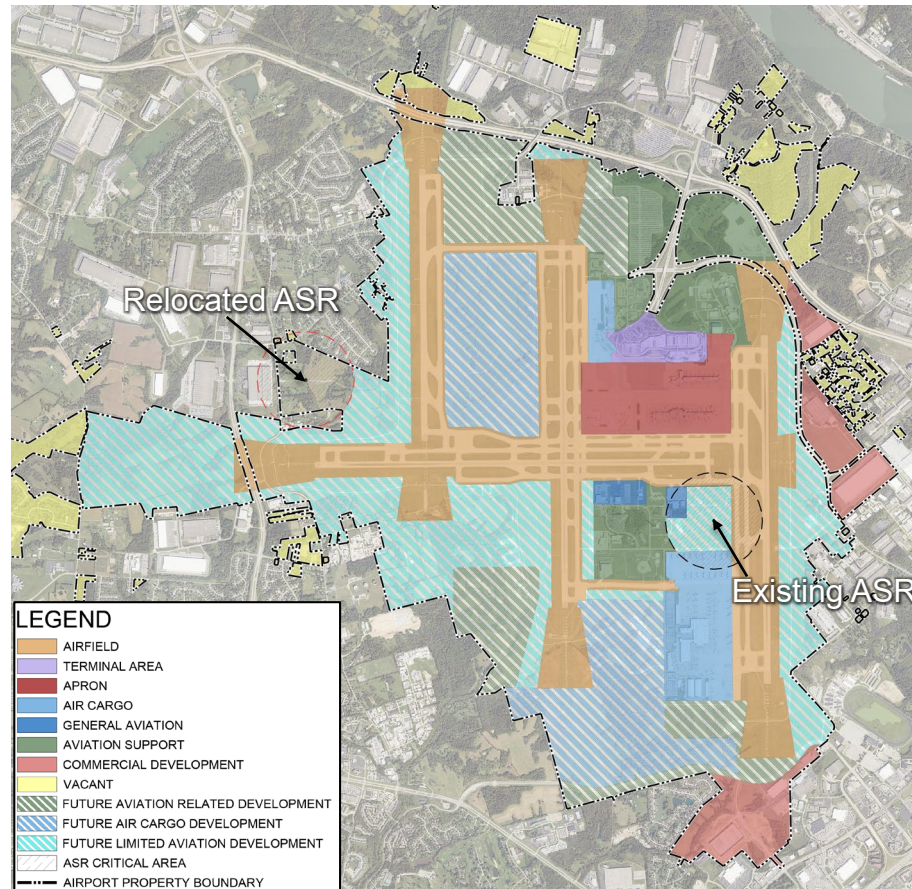
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- Represents:
  - Existing land uses
  - Current classification of unused land

# Master Plan 2050 Land Use Recommendations

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- Minor changes to Land Use plan includes:
  - Incorporate Amazon development
  - Further definition for uses requiring airfield access
  - Preserve for relocation of ASR-9
    - Existing site prime development for uses requiring airfield access



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**Embrace What's Next**

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## Appendix

**Draft for Internal Discussion Only**



# Evaluation Results

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Individual Weighting		Satellite Concepts				Non-Satellite Concepts	
Assessment Metric	Weighting	1-1	1-3	3-1	4-2	2-1	2-2
<b>Airside</b>							
Airside Operations	2%	0	0	-1	0	-2	-2
Pushback Flexibility	5%	-1	0	1	1	2	2
Airside Circulation	5%	0	0	-2	1	-2	-2
Taxi Distance	2%	-1	0	-1	0	-2	-2
RON/Deicing	2%	-1	1	0	2	1	-2
<b>Baggage Handling System</b>							
BHS Complexity	12%	0	0	1	1	2	2
<b>Terminal</b>							
Passenger Journey	10%	-1	0	-2	-1	1	0
International Passenger Flows	10%	1	1	1	2	2	2
Future Flexibility	3%	0	0	2	1	2	2
<b>Financial</b>							
Capital Costs	12%	2	2	0	1	-1	-2
O&M Costs	12%	-2	-2	1	-1	-1	2
Revenue Enhancement	2%	0	0	2	1	2	2
<b>Implementation</b>							
Difficulty of Phasing	8%	2	2	1	1	0	-2
Project Off Ramps	15%	1	1	-1	1	1	1
<b>Total Score</b>	100%	0.22	0.43	0.08	0.64	0.49	0.41
<b>Rank</b>		3	2	4	1	1	2



# Evaluation Results (with Hybrid)

Draft for Internal Discussion Only

Individual Weighting		Satellite Concepts				Non-Satellite Concepts		Hybrid Concept
Assessment Metric	Weighting	1-1	1-3	3-1	4-2	2-1	2-2	1
<b>Airside</b>								
Airside Operations	2%	0	0	-1	0	-2	-2	0
Pushback Flexibility	5%	-1	0	1	1	2	2	0
Airside Circulation	5%	0	0	-2	1	-2	-2	-1
Taxi Distance	2%	-1	0	-1	0	-2	-2	0
RON/Deicing	2%	-1	1	0	2	1	-2	0
<b>Baggage Handling System</b>								
BHS Complexity	12%	0	0	1	1	2	2	1
<b>Terminal</b>								
Passenger Journey	10%	-1	0	-2	-1	1	0	-1
International Passenger Flows	10%	1	1	1	2	2	2	2
Future Flexibility	3%	0	0	2	1	2	2	0
<b>Financial</b>								
Capital Costs	12%	2	2	0	1	-1	-2	1
O&M Costs	12%	-2	-2	1	-1	-1	2	0
Revenue Enhancement	2%	0	0	2	1	2	2	2
<b>Implementation</b>								
Difficulty of Phasing	8%	2	2	1	1	0	-2	2
Project Off Ramps	15%	1	1	-1	1	1	1	1
<b>Total Score</b>	100%	0.22	0.43	0.08	0.64	0.49	0.41	0.64
<b>Rank</b>		3	2	4	1	1	2	

