



Memorandum

TO: COMMUNITY AND ECONOMIC
DEVELOPMENT COMMITTEE

FROM: John Aitken
Nanci Klein
Rosalynn Hughey

SUBJECT: SEE BELOW

DATE: February 12, 2021

Approved

Date 2/12/2021

COUNCIL DISTRICT: 3 & 6

**SUBJECT: CONSTRUCTION CRANE HEIGHT GUIDANCE STUDY FINDINGS AND
RECOMMENDATION**

RECOMMENDATION

1. Accept findings from a completed Construction Crane Height Guidance Study, which would affirm the City's development commitment for the Federal Aviation Administration (FAA) to protect the primary Terminal Instrument Procedures (TERPS) utilized by Mineta San José International Airport's Air Carriers to determine the maximum crane heights in the Downtown Core and Diridon Station Area.
2. Direct the Administration to:
 - a. Prepare a Construction Crane Guidance Document to be included in all development permits for projects in the Downtown Core and Diridon Station Area requiring temporary construction cranes.
 - b. Construction Crane Guidance Document to include the following three methods for developers to minimize impacts on air service:
 - (i) Utilize crane jumps to minimize duration cranes are at maximum height.
 - (ii) Limit maximum crane heights to a 6-month window.
 - (iii) Schedule maximum crane heights during non-South flow months of April through September (i.e., departures towards downtown).
 - c. Explore a construction crane permit fee to support a Landing Fee Reduction Program for air carriers that incur either cargo or passenger weight impacts on account of construction cranes in the Downtown Core and Diridon Station Area.
3. Cross-reference the proposed item to the full City Council on March 9, 2021.

OUTCOME

City Council approval of the above recommendations would allow domestic and international Air Carriers to continue to safely utilize the Mineta San José International Airport for both arrival and departures, during all weather conditions. In addition, approval of the above recommendations will minimize impacts to air service to the greatest extent possible, while maximizing temporary construction crane heights in the Downtown Core and Diridon Station Area.

BACKGROUND

On March 12, 2019, City Council approved recommendations from the City's Downtown Airspace and Development Capacity Study (DADCS), which established a new policy on airspace surface protection heights in the Downtown Core and Diridon Station Areas, allowing higher building heights with an acceptable level of Air Service impacts at the Mineta San Jose International Airport (Airport or SJC). Included in the City Council's direction was the development of a Construction Crane Policy in the Downtown Core and Diridon Station Area to minimize impacts to air service during construction.

The Federal Aviation Administration (FAA) protects airspace around airports through the application of Federal Aviation Regulations (FAR) Part 77 and Terminal Instrument Procedures (TERPS). These regulations define various airspace "surfaces" or slopes that radiate out from an airport's runway and mandate FAA review of any proposed temporary or permanent structure, including construction equipment (e.g. cranes). In San José, as in most local land use jurisdictions, generally all proposed temporary structures associated with high-rise building construction exceed these surfaces and are subject to FAA airspace safety review. A "determination of no hazard" clearance from the FAA is required prior to, or as a condition of, City development permit approval.

While the DADCS considered FAA Part 77 and TERPS surfaces in determining the maximum heights of permanent structures, the analysis of potential impacts of temporary structures, such as construction cranes, on Air Carrier procedures was not included in the study. These procedures include basic safe landing and departing procedures that Air Carriers utilize on a daily basis, regardless of the weather conditions. The loss of these procedures could result in Air Carriers diverting aircraft to alternate airports, resulting in inconvenience for passengers, schedule impacts to the Air Carriers, and lost revenue for the Airport. Protecting for critical Air Carrier procedures maximizes construction crane heights, but also allows Air Carriers access to critical procedures, which are necessary during inclement weather conditions. In the extreme cases of equipment failure on an aircraft or FAA navigational aid failure at the Airport, air carriers must still be able to land at the airport.

Additionally, while the City of San José's (City) downtown building height limits are based on TERPS surfaces rather than One Engine Inoperative (OEI) surfaces, Air Carriers are still required to comply with OEI emergency procedures per FAA Part 25. OEI emergency

procedures can impact maximum building heights around an airport more strictly than the FAA restrictions per FAR Part 77 and TERPS. The FAA has determined that airlines can mitigate OEI airspace obstructions by revising their emergency procedures or by reducing takeoff weight to improve climb performance to safely clear obstructions. However, implementing takeoff weight restrictions by reducing passengers, cargo, or fuel impacts the economic viability of airline service. Even small weight penalties can affect the feasibility of air service to a destination, most notably transcontinental and transoceanic destinations. These destinations require aircraft to carry larger fuel loads to reach the destination, which leads to larger passenger impacts when a weight reduction is required. Therefore, temporary or permanent obstructions within the surrounding airspace are a factor in SJC's ability to attract or retain desired air service. Additionally, City Staff gave close attention to the effect new local employees and additional downtown development can have on increasing the demand for air service.

In June 2020, Landrum & Brown, a national aviation planning/engineering consultant with extensive experience working for the City on airspace and other airport technical issues including the DADCS, was contracted to perform the technical work on the Construction Crane Height Guidance Study, which analyzed the potential impacts of temporary structures (e.g., construction cranes) on Air Carrier procedures.

The Airport Commission was briefed on the Crane Height Guidance Study on November 4, 2020 and given the opportunity to review the scope, initial technical analysis, and provide feedback. The Commission continued its discussion of this study at its meeting on February 8, 2021. City staff participation on the study included representatives from Planning, Building and Code Enforcement Department (PBCE), Office of Economic Development, City Attorney's Office, and the Airport Department. The development community was engaged through PBCE's Developers and Construction Roundtable over the course of six months including three meetings with short updates introducing the study, posing questions to the development community, and two meetings with longer presentations on preferred scenario alternatives and discussion. The meetings were well attended by the development community and served as opportunities to share their knowledge, provide input, and provide feedback to the study itself.

ANALYSIS

The Construction Crane Height Guidance Study, an extension of the DADCS, consisted of three tasks:

- Task 1: Airline Instrument Procedure Survey and Conceptual Airspace Protection Scenario Development
- Task 2: Stakeholder Outreach
- Task 3: Weight Penalty Analysis and Construction Crane Height Guidance

Task 1: Airline Instrument Procedure Survey and Conceptual Airspace Protection Scenario Development

The FAA has the regulatory responsibility on airspace determinations, including instrument approach and departure procedures to ensure the safe operation of all aircraft utilizing SJC. Staff worked with the FAA and the Airline partners to protect approach and departure procedures that were most commonly used to ensure safety can be maintained. As part of that process, Landrum & Brown surveyed all SJC Air Carriers and the Federal Aviation Administration Air Traffic Control Division to determine frequency and priority of air carrier instrument procedures. Of the 17 instrument approach procedures and 5 instrument departure procedures available for use, it was determined through the survey that Air Carriers primarily utilize five instrument approach procedures and five instrument departure procedures. Air Carriers that provided survey responses included Southwest Airlines, Alaska Airlines, Delta Airlines, Hawaiian Airlines, and UPS.

Based on the Air Carrier survey, five conceptual airspace protection scenarios were formulated and refined to test various alternative combinations of air service protection and FAA/TERPS instrument procedure protection, and their effect on maximum temporary construction equipment (e.g., crane) heights. Three conceptual airspace protection scenarios were selected for detailed analysis:

Scenario 3: Protect primary air carrier instrument procedures

Scenario 3A: Reduced air carrier instrument procedure protection

Scenario 3B: Protect critical air carrier instrument procedures

For each scenario, the following table displays the range of temporary cranes heights that would be allowed above the existing downtown buildings height limits:

Scenario	Additional Crane Height Downtown Area	Additional Crane Height Diridon Station Area
Scenario 3: Protect primary air carrier instrument procedures	10'-80'	10'-80'
Scenario 3A: Reduced air carrier instrument procedure protection	10-80'*	10-80'*
Scenario 3B: Protect critical air carrier instrument procedures	40-80'	60-80'

' - feet

* - Depending on location in the Downtown and Diridon Station Areas, crane heights above particular parcels are higher in Scenario 3A than in Scenario 3.

Task 2: Stakeholder Outreach

Stakeholder outreach for this study was accomplished through PBCE's Developers and Construction Roundtable, meetings with the Air Carriers, FAA, as well as meetings with developers and crane operators that requested to meet individually. Over the course of the study, PBCE hosted three Developers and Construction Roundtables and SJC provided short updates

introducing the study and review technical crane material with the development community. SJC hosted two meetings with longer presentations on preferred scenario alternatives and impacts discussion. The meetings were well attended by the development community and served as opportunities to ask questions and provide feedback to the study findings.

The development community's largest concern focused on the maximum crane height permitted above buildings, as well as the schedule and cost implications associated with permitted crane heights. To address the concerns from the development community, Scenario 3B was identified to provide the most crane height flexibility to developers in the Downtown Core and Diridon Station Areas, while utilizing methods identified later in the memo to minimize Air Carrier impacts to maintain safety on approaches and departures.

Task 3: Air Service Weight Penalty Analysis and Construction Crane Height Guidance

This task analyzed the air service weight penalties associated with temporary construction crane height increases in the study area for Scenarios 3, 3A, and 3B.

Technical analysis assessed the aircraft performance impact (weight penalties) under each scenario using various combinations of aircraft types, destinations, and seasonal temperatures. The following charts illustrate the passenger (PAX) and cargo penalties that specific aircraft serving selected existing non-stop markets are projected to incur under Scenarios 3, 3A, and 3B in the summer and winter months for a fully booked plane (100% load factor). While Landrum & Brown modeled accurate weight impacts, SJC continues to work with Air Carriers to determine precise weight impacts for these specific aircraft and routes. Note that weight penalties occur only during south flow weather conditions (13% of annual operations).

Transcontinental – New York Market – Assessment of Potential Weight Penalties Runway 12L

New York - JFK Winter (63° F)		A320-200 (150 seats/2,390 lbs. cargo)				B737-800 (175 seats/6,100 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	-	-	2,390	100%	-	-	1,070	18%
Scenario 3A	Reduced air carrier instrument procedure protection	-	-	2,390	100%	-	-	1,070	18%
Scenario 3B	Protect critical air carrier instrument procedure protection	4	3%	2,390	100%	-	-	1,960	32%
New York - JFK Summer (81.3° F)		A320-200 (150 seats/840 lbs. cargo)				B737-800 (175 seats/5,270 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	7	5%	840	-	-	-	2,130	40%
Scenario 3A	Reduced air carrier instrument procedure protection	7	5%	840	-	-	-	2,130	40%
Scenario 3B	Protect critical air carrier instrument procedure protection	11	7%	840	-	-	-	3,010	57%

Hawaii – Honolulu Market – Assessment of Potential Weight Penalties Runway 12L

Hawaii - HNL Winter (63° F)		A321 NEO (189 seats/580 lbs. cargo)				B737-800 (175 seats/No cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	2	1%	580	100%	13	7%	-	-
Scenario 3A	Reduced air carrier instrument procedure protection	2	1%	580	100%	13	7%	-	-
Scenario 3B	Protect critical air carrier instrument procedure protection	5	3%	580	100%	17	10%	-	-
Hawaii - HNL Summer (81.3° F)		A321 NEO (189 seats/3,510 lbs. cargo)				B737-800 (175 seats/40 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	-	-	1,640	47%	9	5%	40	100%
Scenario 3A	Reduced air carrier instrument procedure protection	-	-	1,640	47%	9	5%	40	100%
Scenario 3B	Protect critical air carrier instrument procedure protection	-	-	2,290	65%	13	7%	40	100%

Europe - Frankfurt Market - Assessment of Potential Weight Penalties Runway 12L

Frankfurt - FRA Winter (68° F)		B787-9 (290 seats/2,970 lbs. cargo)				B777-300ER (370 seats/55,480 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	37	13%	2,970	100%	-	-	9,780	18%
Scenario 3A	Reduced air carrier instrument procedure protection	60	21%	2,970	100%	-	-	21,020	38%
Scenario 3B	Protect critical air carrier instrument procedure protection	120	41%	2,970	100%	-	-	38,060	69%
Frankfurt - FRA Summer (81.3° F)		B787-9 (290 seats/370 lbs. cargo)				B777-300ER (370 seats/53,680 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	46	16%	370	100%	-	-	10,500	20%
Scenario 3A	Reduced air carrier instrument procedure protection	69	24%	370	100%	-	-	21,390	40%
Scenario 3B	Protect critical air carrier instrument procedure protection	128	44%	370	100%	-	-	38,630	72%

Asia – Beijing Market - Assessment of Potential Weight Penalties Runway 12L

Beijing - PEK Winter (68° F)		B787-9 (290 seats/No cargo)				B777-300ER (370 seats/41,450 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	83	29%	-	-	-	-	10,210	25%
Scenario 3A	Reduced air carrier instrument procedure protection	105	36%	-	-	-	-	21,940	53%
Scenario 3B	Protect critical air carrier instrument procedure protection	163	56%	-	-	-	-	39,710	96%
Beijing - PEK Summer (81.3° F)		B787-9 (290 seats/No cargo)				B777-300ER (370 seats/39,580 lbs. cargo)			
		PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost	PAX Penalty	% of PAX Lost	Cargo Penalty (lbs.)	% of Cargo Lost
Scenario 3	Protect Primary Airline Instrument Procedures	84	29%	-	-	-	-	10,430	26%
Scenario 3A	Reduced air carrier instrument procedure protection	106	36%	-	-	-	-	21,250	54%
Scenario 3B	Protect critical air carrier instrument procedure protection	162	56%	-	-	-	-	37,360	94%

Scenarios 3 and 3A provided protection for primary Air Carrier procedures and highlighted that for most of the Downtown Core and Diridon Station Area, any minor increases in crane height created the potential for sizeable weight penalties for the Air Carriers in the four markets analyzed.

Scenario 3B which has the most significant Air Service impacts, allows for the maximum temporary crane heights above the existing building height limit while retaining the critical Air Carrier procedures at SJC. However, Scenario 3B demonstrates that higher crane heights create significant weight impacts that carry over to even SJC's domestic markets in addition to international markets. Hawaiian markets (represented by Honolulu) see the largest weight penalty increase with the loss of 17 passengers (10%) and no cargo in the Winter months, while Transcontinental markets (represented by New York) weight penalty increase to 11 passengers (7%) and no cargo in the Summer. European markets (represented by Frankfurt) would see significant weight penalty increases, including the loss of all cargo and a 128 passenger (44%) penalty in the Summer. The Asian market (represented by Beijing) would see the largest weight penalty increase to 163 passengers (56%) and loss of all cargo year-round.

To mitigate for increased weight penalties associated with Scenario 3B construction crane heights, the City will prepare a Construction Crane Guidance Document to be included in all development permits for Downtown and Diridon Station Area projects. This includes exploring a construction crane permit fee to support a Landing Fee Reduction Program for air carriers that incur either cargo or passenger weight impacts on account of construction cranes in the Downtown Core and Diridon Station Area. This guidance document will outline three methods for developers to minimize impacts:

1. Utilize crane jumps to ensure cranes are only at their maximum height (impacting SJC air service) for the shortest duration possible and not for the entire project duration.
2. Limit maximum crane heights to a 6-month timeframe.

3. Schedule maximum crane heights during April – September, when SJC is in South flow for the shortest duration.

All air carriers are required to pay a landing fee each time they land at SJC. Landing fees are based on certified maximum gross landing weight of the aircraft. To further mitigate increased weight penalties associated with Scenario 3B construction crane heights, staff will explore a Landing Fee Reduction Program for any impacted operations. Staff will further explore a construction crane permit fee to support any such landing fee reductions provided to airlines for those operations that are impacted by crane heights and experience the removal of passengers and cargo.

CONCLUSION

The Construction Crane Height Guidance Study considered stakeholder input from the development community, crane operators, Air Carriers, FAA, Downtown Association, and multiple City departments. After much consideration, staff is recommending that the City move forward preparing a Construction Crane Guidance Document and exploring a landing fee reduction program for any impacted operations. Staff will continue to work to ensure the FAA protects the critical instrument procedures Air Carriers required to safely arrive and depart into SJC while still permitting developers to utilize construction cranes above the maximum approved downtown building heights.

EVALUATION AND FOLLOW-UP

Airport, Planning, Building and Code Enforcement and Office of Economic Development staff shall implement the recommendations brought forward in this memorandum upon Council approval and report the relevant impacts of these recommendations back to the appropriate council committee, as necessary.

CLIMATE SMART SAN JOSE

The recommendation in this memo has no effect on Climate Smart San José energy, water, or mobility goals.

POLICY ALTERNATIVES

Alternative: Allow temporary construction cranes to be erected only to the existing Downtown Building Height limits.

Pros: This alternative would provide the maximum protection of the airspace for Mineta San José International Airport.

Cons: Utilizing the downtown building height limits as the temporary construction cranes height limits would not provide any opportunities for additional development heights in the Downtown Core or the Diridon Station Area.

Reason for not recommending: Implementing this policy alternative would prevent San José from maximizing the development of its urban core, which is a fundamental principle of the Envision 2040 General Plan, without significant gains to airport or airline operations.

PUBLIC OUTREACH

Stakeholder outreach for this study was accomplished through PBCE's Developers and Construction Roundtable, meetings with the Air Carriers, FAA, and Downtown Association, as well as meetings with developers and crane operators that requested to meet individually. Over the course of the study, PBCE hosted three Developers and Construction Roundtables and SJC provided short updates introducing the study and review technical crane material with the development community. SJC hosted two meetings with longer presentations on preferred scenario alternatives and impacts discussion. The meetings were well attended by the development community and served as opportunities to ask questions and provide feedback to the study.

This memorandum will be posted to the City of San Jose's website for the February 22, 2021 Community and Economic Development Committee meeting.

COORDINATION

This memorandum has been coordinated with the Office of Economic Development, Planning, Building and Code Enforcement, Department of Transportation, Public Works, and the City Attorney's Office.

COMMISSION RECOMMENDATION/INPUT

The Airport Commission was briefed on the Crane Height Guidance Study on November 4, 2020 and given the opportunity to review the scope, initial technical analysis, and provide feedback. The commission continued its discussion of this study at a second meeting on February 8, 2021.

FISCAL/POLICY ALIGNMENT

The recommendations in this memorandum are consistent with the Envision San Jose 2040 General Plan amended on 03/10/2020 to continue developing a world-class airport and build national and international connections by attracting new air service to it (Goal IE-4.2).

COMMUNITY AND ECONOMIC DEVELOPMENT COMMITTEE

February 12, 2021

Subject: Construction Crane Height Guidance Study

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CEQA

Not a Project, PP17-008, general procedure and policy-making resulting in no physical changes to the environment.

/s/

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/s/

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/s/

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For questions, please contact John Aitken, Airport Director, at 408-392-3610.