CHAPTER FIVE
AIRPORT CONCEPT DEVELOPMENT AND EVALUATION

INTRODUCTION

This chapter identifies and evaluates the airport development alternatives to meet the facility requirements for STL as defined in Chapter 4, *Demand/Capacity and Facility Requirements*. All major functional areas at STL require consideration during this process, which includes airfield development, terminal area expansion and aeronautical support functions. Other considerations include the potential for expanded auto parking and collateral development opportunities. A collateral development white paper was prepared as part of the master plan and is included as Appendix C. Many of the key functional areas of the airport are interrelated and affect the development potential of the surrounding land, either within the current 20-year planning horizon or beyond. The most viable plan will provide the optimum combination of financial viability, ease of construction, and flexibility to adapt to the needs of the aviation industry throughout the 20-year planning period and beyond.

5.1 AIRFIELD CONCEPTS

5.1.1 INTRODUCTION

This section investigates alternatives for providing capacity and capability enhancement of the airfield component within the context of the overall development plan for STL. Master plans strive to maximize efficiency and improve usability while meeting specific design criteria to maintain the highest possible levels of safety. As discussed in Chapter 4, the existing airside facilities at Lambert provide sufficient capacity to meet the demands of the forecast operations. This analysis, therefore, is focused on refinement of the existing airfield facilities to provide added efficiency, increased capability, improved levels of safety and reduced on-going maintenance by optimizing the airfield resources.

As discussed in Chapter 4, the potential for direct cargo service to Asia remains a part of the political and business discourse in St. Louis throughout the planning period. At the time of this report a final decision has not be made but talks with representatives from the People's Republic of China appear to indicate a high likelihood of this service beginning in the near future. The aircraft type and specific destinations are not final but it current consensus indicates direct service will be provided to mainland China from STL utilizing a Boeing 747-400 Freighter. Analysis of the airfield performance of the 747-400 was conducted in Chapter 4 and the results of that analysis are incorporated in this discussion to understand the implications on the future airfield should the cargo service go into effect.

The following sections present an overview of the airfield alternatives analysis process and its findings. The analysis is presented in sections that describe the planning process and the objectives and evaluation of the runways and taxiways.

5.1.2 AIRFIELD PLANNING PROCESS

Ideas and concepts discussed with Airport staff and members of the advisory committees created the overall airfield development objectives, which guided the study. Given the capability of the airfield and the fact that the existing configuration meets the capacity needs of the forecast fleet throughout the planning period, the thrust of this analysis is on refinement of the existing facilities rather than an extensive large-scale airfield redevelopment. Alternatives and concepts identified were evaluated with regard to FAA design criteria and where applicable the relative ongoing cost to operate and maintain pavements.

5.1.3 AIRFIELD PLANNING OBJECTIVES

The airfield planning objectives identified in meetings with Airport staff and the advisory committees became the basis for developing and defining the evaluation criteria. The summarized airfield planning objectives are presented below:

- **Meet Needs Of 20-Year Planning Horizon and Beyond**
  - As currently configured, the airfield provides sufficient throughput capacity to meet the forecast demand; therefore, the primary objective is to maintain that capability.
  - Provide incremental capability in terms of efficiency and safety to maximize utility of existing infrastructure.
- **Minimize Ongoing O&M Costs Associated With Airfield Pavement**
  - Identify opportunities for airfield changes which eliminate pavement areas not needed for safe and efficient movement of aircraft

5.1.4 RUNWAY ALTERNATIVES ANALYSIS

Typically, a master plan for an Airport such as STL would include an extensive analysis of various runway alternatives to meet the capacity needs through the planning horizon. With the relatively recent opening of the third parallel runway, the runway system at STL provides sufficient capacity and the alternatives evaluated are focused on the potential need for runway length and improvement to existing runway safety areas.

5.1.4.1 Runway Length

As discussed in Chapter 4, *Demand/Capacity and Facility Requirements*, Runway 12R-30L at 11,019 feet long, provides sufficient capability to serve the existing and forecast aircraft fleet. However, given the introduction of direct cargo operations to Asia, specifically mainland China, there may be a need to provide

additional runway length to accommodate the potential expansion of international cargo freight service.

The Boeing 747-400 Freighter aircraft is the potential equipment selected to provide cargo service to destinations in Asia, including mainland China. Analysis of the aircraft planning manuals indicate additional runway length requirements beyond the current 11,019 feet, assuming the aircraft departs at maximum takeoff weight (MTOW) during the hot weather conditions experienced in the summer months in St. Louis. Although the decision to start cargo operations is not final, it is prudent to assume that the aircraft may operate at MTOW during summer months to understand the potential implications. Clearly future decisions and opportunities with regard to cargo operations may have impacts on the runway length needed. An analysis of runway length requirements for the 747-400, during hot temperature days at MTOW, indicates the need for an additional 581 feet to provide sufficient runway length. The total length required would be 11,600 feet. It is important to note that operating at less than MTOW or during cooler time-periods reduces the need for additional runway length.

Both taxiways, Charlie and Delta, will extend to the future end of runway pavement. Extending both taxiways provides the same operational flexibility as the current configuration. However, the current and forecast demand levels do not support the need for both taxiways. It is possible that market forces may change and the flexibility associated with the dual parallel taxiways may be justified at a future date. For purposes of the airport master plan, it is prudent to protect the space for extension of the runway and both taxiways, yet recognize the fact that analysis of the costs associated with extending both taxiways may ultimately result in the construction of a single parallel taxiway to the end of the runway.

Finally, please note that the recommended runway length of 11,600 feet is significantly less than the runway extension suggested by the previous airport master plan. The primary reason for the previous runway extension was to relocate the imaginary surfaces associated with the runways such that the midfield terminal concept did not penetrate the surfaces. As discussed in Section 5.2.5 the midfield terminal is not moving forward and thus the runway length associated with clearing the terminal is no longer required.

5.1.4.2 Threshold Displacements

It is possible to provide the necessary physical pavement length by extending either end of Runway 12R-30L by 581-feet to provide 11,600. However to maximize the benefit of any additional runway pavement, the airspace beyond the runway ends must be evaluated to understand the impact of surrounding terrain and objects. To evaluate the utility of the runway extension it is important to understand the potential increase in both departure runway length available and arrival runway length available. As currently configured, the runway has displaced arrival thresholds at each end. The 30L approach is displaced 201 feet and the 12R approach is displaced 467 feet to accommodate obstructions located in the imaginary surfaces. Over time, the obstructions in the approach and departure surfaces change. To understand the impact of extending the runway, the

obstruction data for the two ends of Runway 12R-30L was evaluated to determine if the arrival threshold displacements are still necessary or if the thresholds can be un-displaced.

Runway 30L Obstruction Analysis:

Review of the previously completed 2008 ALP Update and associated ALP narrative report did not provide definitive identification of the object or objects that penetrate the arrival surfaces or control the location of the arrival threshold for Runway 30L. Additionally, the airspace analysis conducted as part of this master plan did not identify any objects below the imaginary surfaces, which could be identified as the controlling object for the 201-foot threshold displacement. Simply stated, the object or objects that drove the need for the current arrival threshold displacement for Runway 30L are not known.

A thorough evaluation of the objects within the Runway 30L approach surfaces identified no objects that would preclude the relocation of the arrival threshold to the physical end of runway. As shown in plan and profile views below (see **Exhibit 5.1-1a, *Runway 30L TERPS W Surface Plan View***, and **Exhibit 5.1-1b, *Runway 30L TERPS W Surface Profile View***), the obstacles identified in the Runway 30L approach consist of the final three lights of the MALSR Approach Light System (ALS). Relocating the Runway 30L arrival threshold to the end of physical pavement requires the clearing of a 34:1 OCS. The final three approach lights (object numbers 8005, 8008, and 8010; in red) would penetrate the TERPS W surface if left in their current location; however, the relocation of the arrival threshold would require that these lights be relocated and reconfigured, and any penetration would be mitigated at that time.

Based on the information presented in the previous paragraphs, it appears that the entire 201-foot Runway 30L displaced threshold could be regained for arrivals. However, Runway 30L has existing design deficiencies relative to longitudinal grades, grade changes, and vertical curves that need to be addressed independent of the location of the runway end or threshold; these issues are presented below.

- The grade at the approach end of Runway 30L exceeds allowable gradients. The first 201 feet of Runway 30L has a negative slope of 1.6%, which exceeds the maximum allowable longitudinal grade of ±1.5 percent anywhere on the runway, as defined in AC 150/5300-13 section 502.2(a). Additionally this exceeds the maximum allowable longitudinal grade of ±0.8 percent in the first and last quarter of the runway length, as defined in AC 150/5300-13 section 502.2(a). These are an issue both with and without the 201-foot displaced threshold.
- The previous Master Plan (circa 2008) documented an issue concerning a vertical curve in the first quarter of Runway 30L at 750 feet. This is an issue both with and without the 201-foot displaced threshold.

Exhibit 5.1-1a
RUNWAY 30L TERPS W SURFACE PLAN VIEW
Lambert-St. Louis International Airport

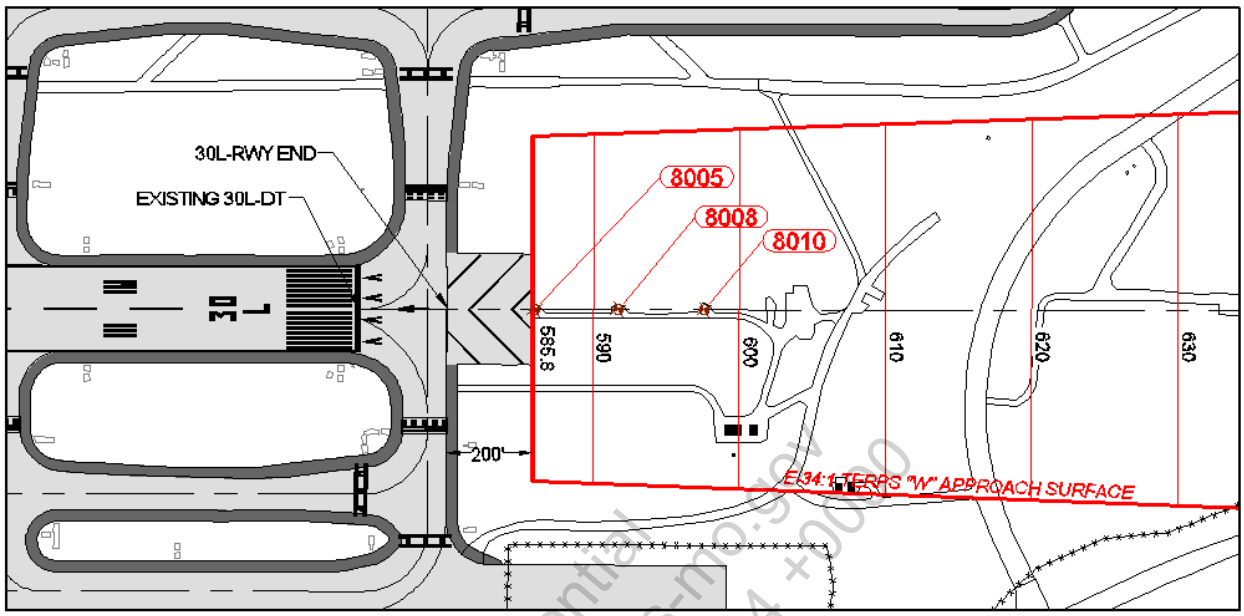
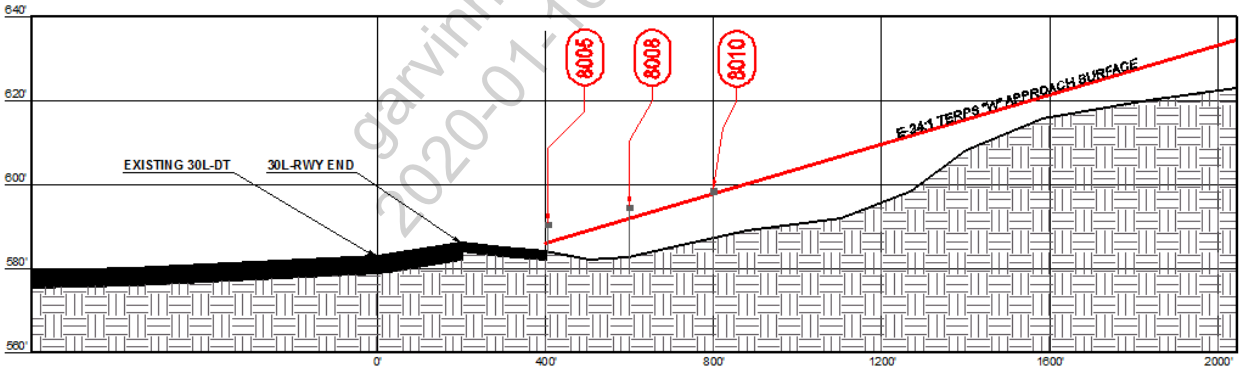


Exhibit 5.1-1b
RUNWAY 30L TERPS W SURFACE PROFILE VIEW
Lambert-St. Louis International Airport



According to the previous 2008 master plan and the current master plan, the aforementioned runway gradient design deficiencies are to be "corrected during reconstruction if feasible." Therefore, the existing Runway 30L arrival threshold could be relocated to the end of pavement (essentially un-displaced) and the length recovered for Runway 30L approaches when the gradient issues and vertical curves described above are corrected (i.e. Alternative 1).

Another option (i.e. Alternative 2) would be to eliminate the 201-foot displaced threshold by relocating the end of runway to the existing Runway 30L displaced threshold. This option would require Taxiway H to be relocated, as well as

addressing the gradient issues and vertical curves described above. This option would shorten the runway by 201 feet. These two alternatives are described and analyzed in Appendix D.

Based on the analysis presented in Appendix D, the preferred location for the Runway 30L arrival threshold is at the existing end of runway pavement (i.e. Alternative 1). As discussed, there are design deficiencies relative to gradients and grade changes identified on Runway 30L. These deficiencies, along with any potential transverse gradient issues, should be addressed when the Runway is scheduled for reconstruction, and corrected if deemed practicable at that time. Based on this analysis, it would be possible to either: (1) relocate the existing arrival threshold to the end of pavement (essentially un-displaced), or (2) eliminate the 201-foot displaced threshold by relocating the end of runway to the existing Runway 30L displaced threshold and relocate Taxiway H, however, the runway gradients and grade issues will need to be addressed. Based on preliminary order of magnitude costs, Alternatives 1 and 2 are within 10 percent of one another, with Alternative 2 being the least expensive. However, this analysis did not include any obstacle mitigation costs that might be identified during the preliminary design phase; but it is likely that obstacle mitigation costs for Alternative 2 would be higher than Alternative 1 since the approach surface would be lower in elevation and therefore result in more obstructions. In addition, Alternative 2 results in a loss of 201 feet of departure length, which would require an additional 201-foot extension to Runway 12R to meet the runway length requirements identified in the current master plan.

In comparison, the Runway 30L Landing Distance Available (LDA) would increase by 201 feet with Alternative 1 (the removal of the existing 201-foot displaced threshold). At this time, the cost differential between Alternatives 1 and 2 is not significant enough to overcome the loss in operational capability resulting from Alternative 2. Therefore, relocating the existing arrival threshold to the end of pavement is the preferred alternative for the current master plan.

Runway 12R Obstruction Analysis:

As with the 30L approach end, review of the 2008 ALP Update and associated ALP narrative report did not identify an object or objects that penetrate the arrival surfaces to Runway 12R. The airspace analysis process described above did not identify any objects below the imaginary surfaces, which could be identified as the controlling object for the 467-foot threshold displacement. At some point in time, the controlling object, which resulted in the 467-foot threshold displacement, was removed.

While the service road closest to the 12R approach end of the runway clearly results in a penetration of the existing OCS surface and should be closed permanently or relocated to eliminate all traffic, it is not the controlling object for the 467-foot threshold displacement. The current master plan will show the service road to be relocated. Therefore, for this analysis, it is assumed that the service road will not be an obstacle.

Analysis of the traverse points and obstruction data reveal that the critical obstruction within the existing arrival surfaces is Banshee Road. **Exhibit 5.1-2a, *Runway 12R TERPS W Surface Plan View Existing Condition*** and **Exhibit 5.1-2b, *Runway 12R TERPS W Surface Profile View Existing Condition***, provide the profile and plan view of the existing condition of the TERPS W Approach Surface associated with Runway 12R. As shown, the alignment and elevation of Banshee road, with the appropriate 15-foot adjustment for vehicle traffic, is below the existing TERPS W surface. The most restrictive Banshee Road traverse point is 2.5 feet below the existing TERPS W surface.

Exhibit 5.1-2a
RUNWAY 12R TERPS W SURFACE PLAN VIEW EXISTING CONDITION
Lambert-St. Louis International Airport

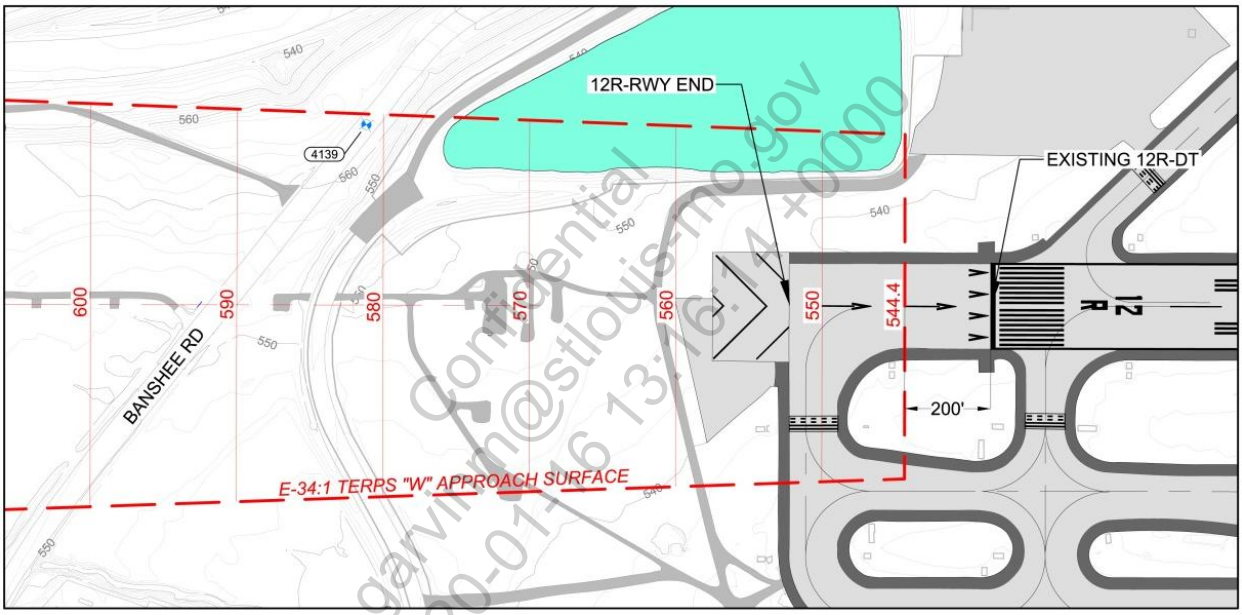
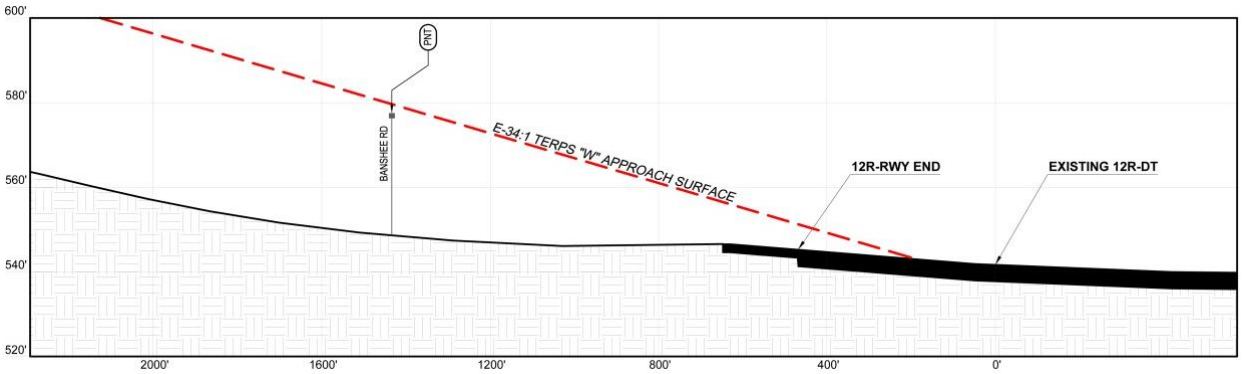


Exhibit 5.1-2b
RUNWAY 12R TERPS W SURFACE PROFILE VIEW EXISTING CONDITION
Lambert-St. Louis International Airport



To determine the amount of runway length that could potentially be recaptured by relocating the existing arrival threshold, the TERPS W surface was relocated westward along the runway centerline to the point at which the surface begins to contact the point in space 15 feet above Banshee Road. As shown in **Exhibit 5.1-2c, *Runway 12R TERPS W Surface Plan View Potential Threshold Relocation***, and **Exhibit 5.1-2d, *Runway 12R TERPS W Surface Profile View Potential Threshold Relocation***, below, the net gain is 86 feet. Attempts to recapture any additional runway length, beyond the 86 feet, would require the relocation of Banshee Road.

Exhibit 5.1-2c
RUNWAY 12R TERPS W SURFACE PLAN VIEW POTENTIAL THRESHOLD RELOCATION
Lambert-St. Louis International Airport

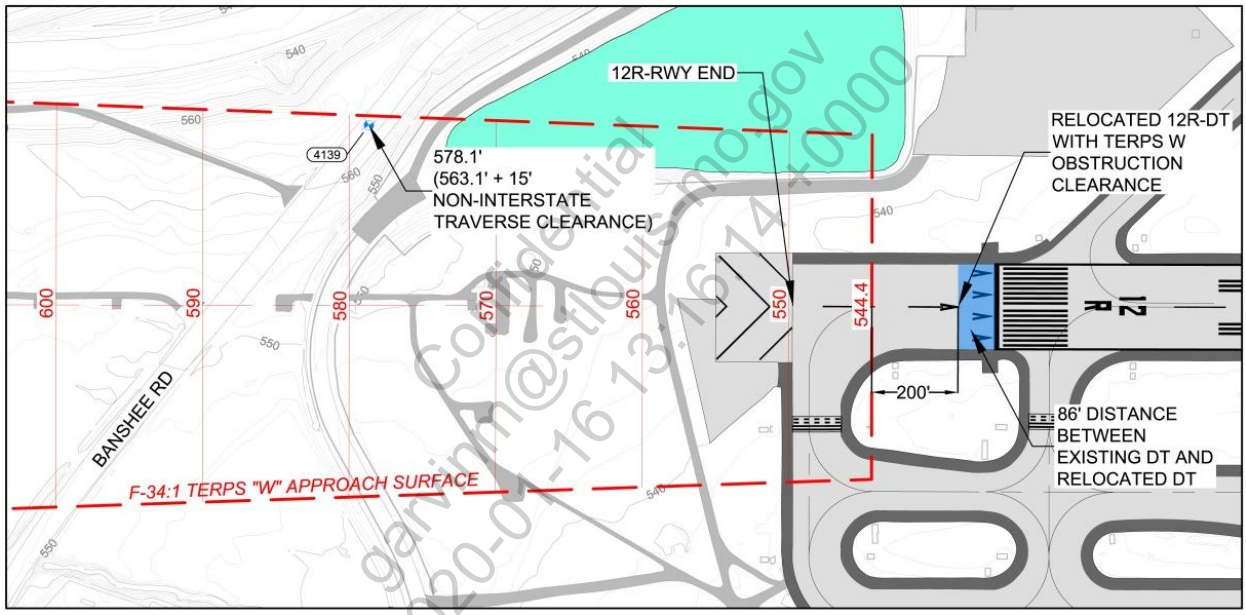
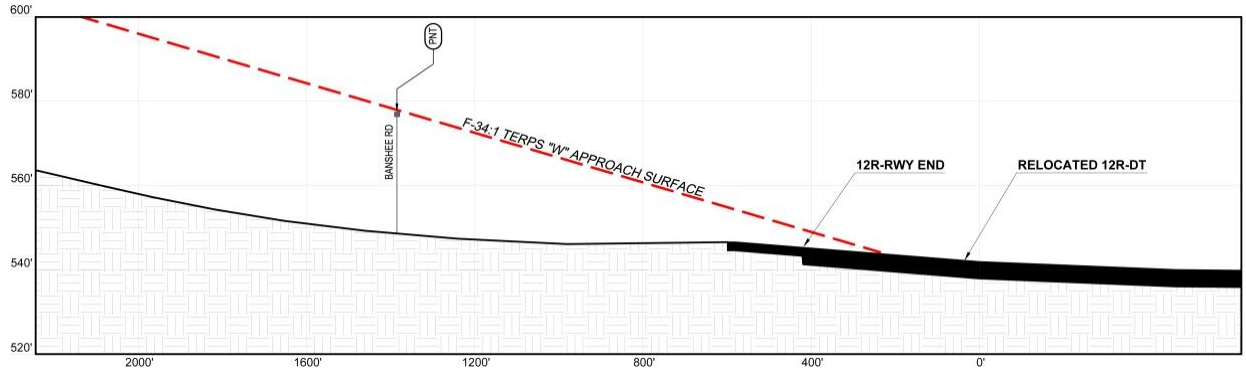


Exhibit 5.1-2d
RUNWAY 12R TERPS W SURFACE PROFILE VIEW POTENTIAL THRESHOLD RELOCATION
Lambert-St. Louis International Airport



Because of the planned 581-foot extension to Runway 12R, Banshee Road will need to be relocated to the west to avoid the future Runway Protection Zone, Runway Safety Area and Object Free Area. Therefore, for this analysis, it is assumed that Banshee Road will not be a penetration to an arrival threshold located at the end of the future 581-foot extension or the existing 467-foot displaced threshold. As a result, the entire 1,048 feet (581 feet + 467 feet) could be used for arrivals/LDA. As long as the existing airport service road and Banshee Road are relocated, the future Runway 12R arrival threshold will not require a displacement.

Please note that there will be the need for clearing of terrain and obstacles within the on-airport property in order to satisfy FAR Part 77 Precision approach requirements. However, this will be required with or without the 1,048-foot displaced threshold. All obstacles have been identified in the ALP Plans Package and have a disposition noted.

While the Runway 12R extension is required to meet departure length requirements identified by the current master plan, there are no obstructions that necessitate the extension be constructed as a displaced threshold, as long as the existing Airport service road and Banshee Road are relocated. The service road and Banshee Road will have to be relocated as a result of the Runway 12R extension and its safety surfaces, regardless if the extension is constructed as a displaced threshold or not. Therefore, for this analysis, it is assumed that the service road and Banshee Road will not be an obstacle and the 581-foot Runway 12R extension can be built for departures as well as takeoffs (i.e. no displaced threshold). As a result, the future Runway 12R LDA would increase by 1,048 feet with the removal of the existing 467-foot displace threshold and no need to displace the future 581-foot runway extension.

5.1.4.3 Runway Safety Areas

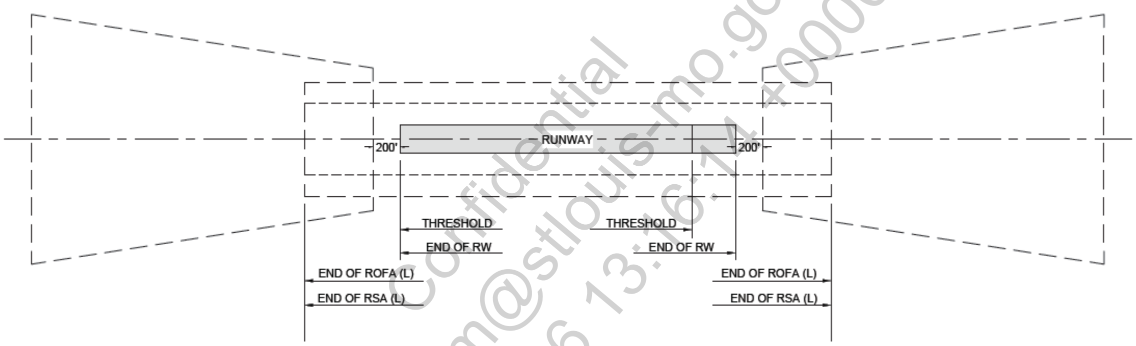
Two of the eight runway ends at Lambert do not provide full 500-foot wide by 1,000-foot long runway safety areas; 12L and 24. Each of the deficient runway ends is mitigated with the use of declared distances. **Table 5.1-1, *Declared Distances for Runways 12L-30R and 6-24***, provides an overview of the declared distances for each of the deficient runway ends. While these distances do not match the distances currently published in the FAA's Airport Facility Directory, North Central U.S. Effective November 15, 2012, they indicate the lengths available when evaluating the RSAs with a strict interpretation of the application of the fixed by function requirement in AC150-5300 with regard to navigational aids in the RSA. Given the declared distances published in the FAA's Airport Facility Directory, the Localizers for Runway 12L and 24 are currently located within the respective Runway Safety Areas. Localizers, by definition, are not fixed by function and are therefore precluded from the RSA. It is recommended that the declared distances for these runways be adjusted to reflect the lengths provided in Table 5.1-1 until such time that the localizers are relocated outside the full length RSA. **Exhibit 5.1-3, *Declared Distances Calculations for All Runways***, illustrates how the Declared Distances for all the runway were calculated.

Table 5.1-1
DECLARED DISTANCES FOR RUNWAYS 12L-30R AND 6-24
Lambert-St. Louis International Airport

RUNWAY	LENGTH (FT)	TORA (FT)	TODA (FT)	ASDA (FT)	LDA (FT)
Runway 6	7,602	7,602	7,602	7,348	7,348
Runway 24	7,602	7,602	7,602	7,602	7,602
Runway 12L	9,012	9,012	9,012	9,012	9,012
Runway 30R	9,012	9,012	9,012	8,947	8,947

Source: Landrum & Brown analysis

Exhibit 5.1-3
DECLARED DISTANCE CALCULATIONS FOR ALL RUNWAYS
Lambert-St. Louis International Airport



APPENDIX 14:
DECLARED DISTANCES

Takeoff Run Available (TORA) is the runway length declared available and suitable for the ground run of an airplane take off. The Departure Runway Protection Zone (DPRT-RPZ) at the end of runway controls the TORA. The TORA can not exceed Runway Length.

TORA = The distance between the start of takeoff and the start of RPZ minus 200 feet.

Takeoff Distance Available (TODA) is the TORA plus the length of any remaining runway or clearway (1.25%) beyond the far end of the TORA. The clearway is clearly defined area connected to and extending beyond the runway end available for completion of the take off operation of turbine-powered airplanes. According to the FAA standards the clearway must be at least 500 feet wide centered on the runway centerline. The TODA can not exceed the Runway Length plus 1,000 feet.

TODA = The distance between the start of takeoff and the end of runway plus clearway

Accelerate Stop Distance Available (ASDA) is the runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff. The stopway is an area beyond the takeoff runway centered on the extended runway centerline. The Runway Safety Area (RSA) length beyond the far end of runway controls the ASDA.

ASDA = The distance between the start of takeoff and the actual end of RSA or OFA (whichever is shorter) minus the recommended length of RSA or OFA (per FAA AC 150/5300-13) plus stopway

Landing Distance Available (LDA) is the runway length declared available and suitable for a landing airplane.

LDA = The distance between the displaced threshold and the actual end of RSA or OFA (whichever is shorter) minus the recommended length of RSA or OFA (per FAA AC 150/5300-13)

DECLARED DISTANCES

ITEM	RUNWAY 12L-30R (9,012')			
	12L		30R	
	EXISTING	FUTURE	EXISTING	FUTURE
TORA	9,012	9,012	9,012	9,012
TODA	9,012	9,012	9,012	9,012
ASDA	9,012	9,012	8,947 *2	9012 *1
LDA	9,012	9,012	8,947 *2	9012 *1

ITEM	RUNWAY 11-29 (9,000')			
	11		29	
	EXISTING	FUTURE	EXISTING	FUTURE
TORA	9,000	9,000	9,000	9,000
TODA	9,000	9,000	9,000	9,000
ASDA	9,000	9,000	9,000	9,000
LDA	9,000	9,000	9,000	9,000

ITEM	RUNWAY 6-24 (7,602')			
	6		24	
	EXISTING	FUTURE	EXISTING	FUTURE
TORA	7,602	7,602	7,602	7,602
TODA	7,602	7,602	7,602	7,602
ASDA	7348 *5	7602 *1	7,602	7,602
LDA	7348 *5	7602 *1	7,602	7,602

ITEM	RUNWAY 12R-30L (EXISTING 11,019') (FUTURE 11,600')			
	12R		30L	
	EXISTING	FUTURE *6	EXISTING	FUTURE *6
TORA	11,019	11,600	11,019	11,019
TODA	11,019	11,600	11,019	11,019
ASDA	11,019	11,600	11,019	11,600
LDA	10,552 *3	10552 *7	10,818 *4	11,399 *4

Declared Distance Notes

*1 LOCALIZER TO BE RELOCATED TO A MINIMUM OF 1000' FROM RUNWAY END
*2 R/W 12L RSA BEYOND R/W END IS 65' SHORT OF 1,000' STANDARD (LOCALIZER)
*3 R/W 12R HAS A 467' DISPLACED THRESHOLD
*4 R/W 30L HAS A 201' DISPLACED THRESHOLD
*5 R/W 24 RSA BEYOND R/W END IS 254' SHORT OF 1,000 STANDARD (LOCALIZER)
*6 R/W 12R HAS A 581' EXTENSION PLANNED INTENDED TO ENHANCE 12R DEPARTURES, NOT 30L DEPARTURES.
*7 R/W 12R HAS A 1048' DISPLACED THRESHOLD

Although mitigation by use of declared distances is acceptable, the extension of the RSA to full length and width where practicable is preferred. If providing a full length and width RSA is not possible, several options are available to the airport including installation of an Engineered Materials Arrestor System (EMAS), use of declared distances, and reduced dimensions of the RSA. These four alternatives were assessed in this analysis of the four deficient RSAs:

1. **Extension of RSA to full length and width**
2. **Installation of EMAS bed off the existing end of runway**
3. **Declared distances**
4. **Reduced dimensions**

As stated above, two of the eight runway ends at STL do not have the regulatory required RSA dimensions directly off the respective runway pavement edges. The four RSA design deficiencies are as follows:

1. **Runway 12L RSA – Length 935', Deficiency 65'**
2. **Runway 24 RSA – Length 746', Deficiency 254'**

5.1.4.4 Runway 24 Approach RSA Alternatives

In an effort to resolve the RSA deficiencies for Runway 6-24, four alternatives were identified and assessed in this analysis. Only one of the Runway 6-24 alternatives investigated involve the deployment of an EMAS on one existing runway end. The alternatives are as follows:

1. **Installation of a Standard 70-knot EMAS on the north end of Runway 6-24 with no shift in the runway alignment** – As shown in **Exhibit 5.1-4, *Runway 24 Approach – RSA with EMAS***, the EMAS bed dimensions are 600' long by 190' wide contained within the existing RSA dimensions (750' long by 500' wide). The alternative does not involve a relocation of the localizer or a relocation of Banshee Road in order to provide for a conforming RSA. This option eliminates the need for declared distances on Runway 6-24.
2. **Relocation of the localizer with RSA extension the extent possible without affecting adjacent roadway** – Construct a 1,000' long by 500' wide full length RSA in the approach to Runway 24. As shown in **Exhibit 5.1-5, *Runway 24 Approach – Full Width RSA***, the localizer is relocated to a point approximately 1,050 feet from the end of the runway. A small portion of the RSA (the northeastern most corner), located approximately 910 feet from the runway end, is excluded to permit the relocation of the service road along the perimeter fence; this will allow Banshee Road to remain in its current alignment. The application of declared distances would normally be required due to the penetration of the service road into the RSA. However, representatives of the FAA have indicated that due to the low utilization of the runway and the limited number of aircraft excursions that roll beyond 910 feet, they would be agreeable to a non-conforming RSA without use of declared distances (based on Figure A8-1

in FAA Airport Design AC 150/5300-13). The FAAs recognizes that the Airport would in fact be improving the existing condition to the extent practicable, given limited runway utilization and the extensive costs associated with relocating Banshee Road.

3. **Relocation of the localizer with RSA extension the extent possible with a 90-foot reduction in available runway** – Similar to Option 2 above, except the length of the RSA lost to the small portion in the Northeast corner would be mitigated with declared distances. The declared distances would reduce the runway length by approximately 90 feet.

4. **Declared distance** – This alternative utilizes the existing RSA dimensions (746' long by 500' wide) and utilizes declared distances to provide for a full RSA. This is the existing condition as shown in **Exhibit 5.1-6, *Runway 24 Approach – Declared Distances***.

Given the limited utilization of the runway, alternative 1 is not considered practical due to the significant costs associated with installing and maintaining an EMAS system. The short-term recommendation is to continue with the existing declared distances until money is available to relocate the localizer outside the RSA to permit the length to be extended to 910 feet as described in option 2 above. The current FAA plans indicate that the money will be available for this project in 2015.

Exhibit 5.1-4
RUNWAY 24 APPROACH – RSA WITH EMAS
Lambert-St. Louis International Airport

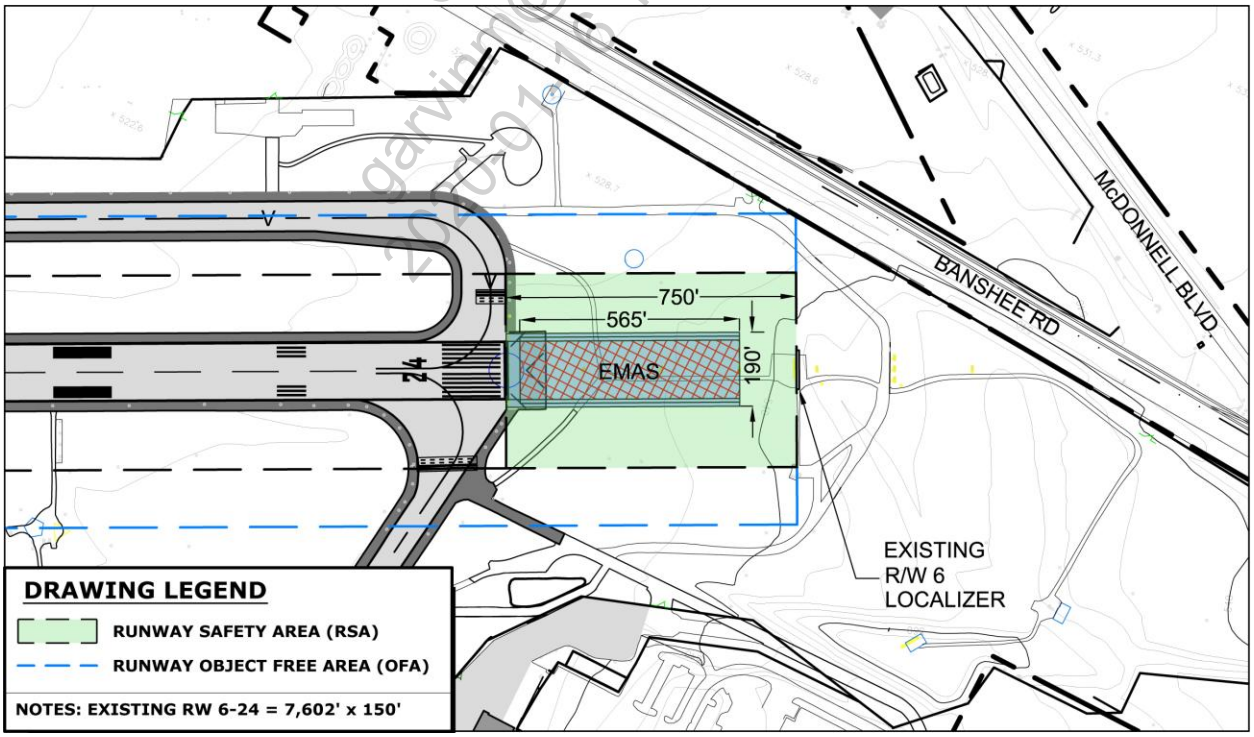


Exhibit 5.1-5
RUNWAY 24 APPROACH - FULL WIDTH RSA
Lambert-St. Louis International Airport

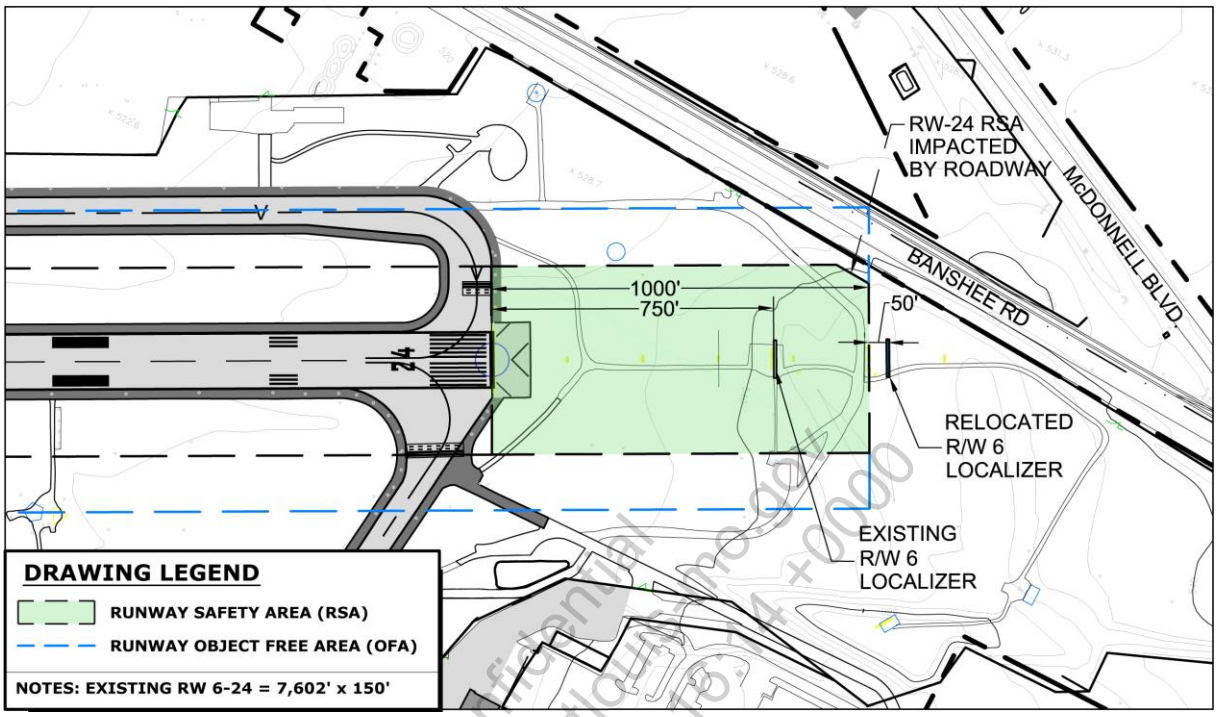
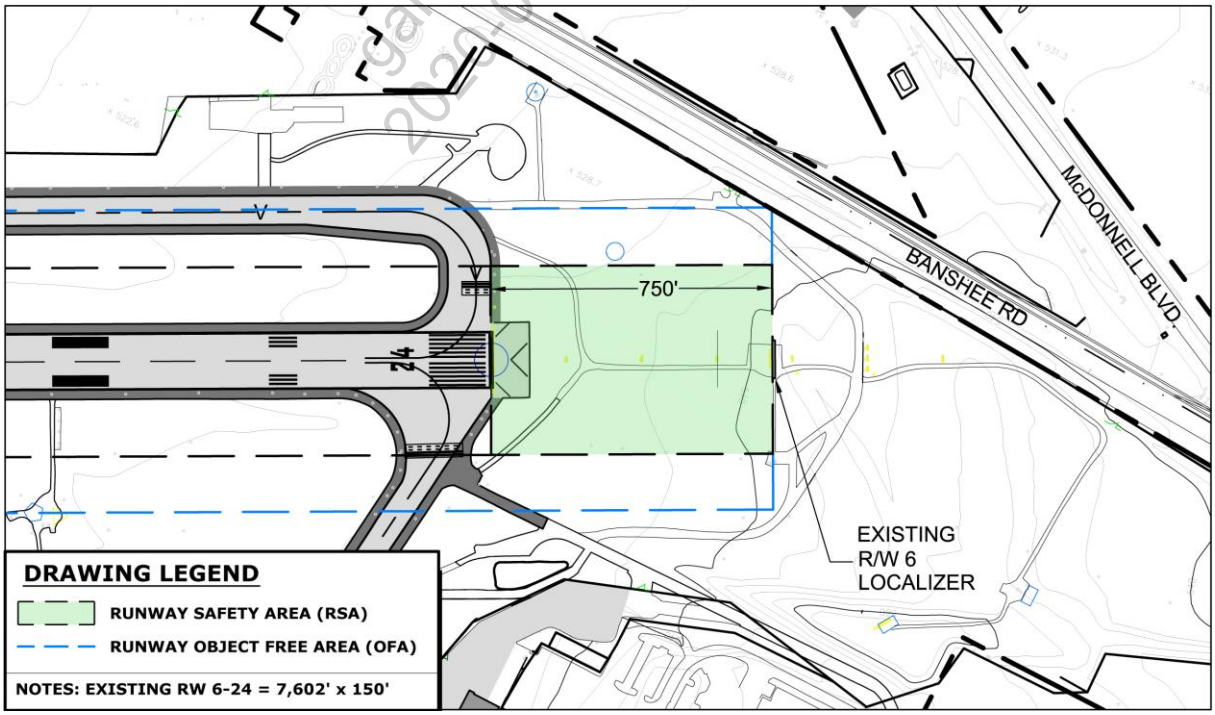


Exhibit 5.1-6
RUNWAY 24 APPROACH - DECLARED DISTANCES
Lambert-St. Louis International Airport



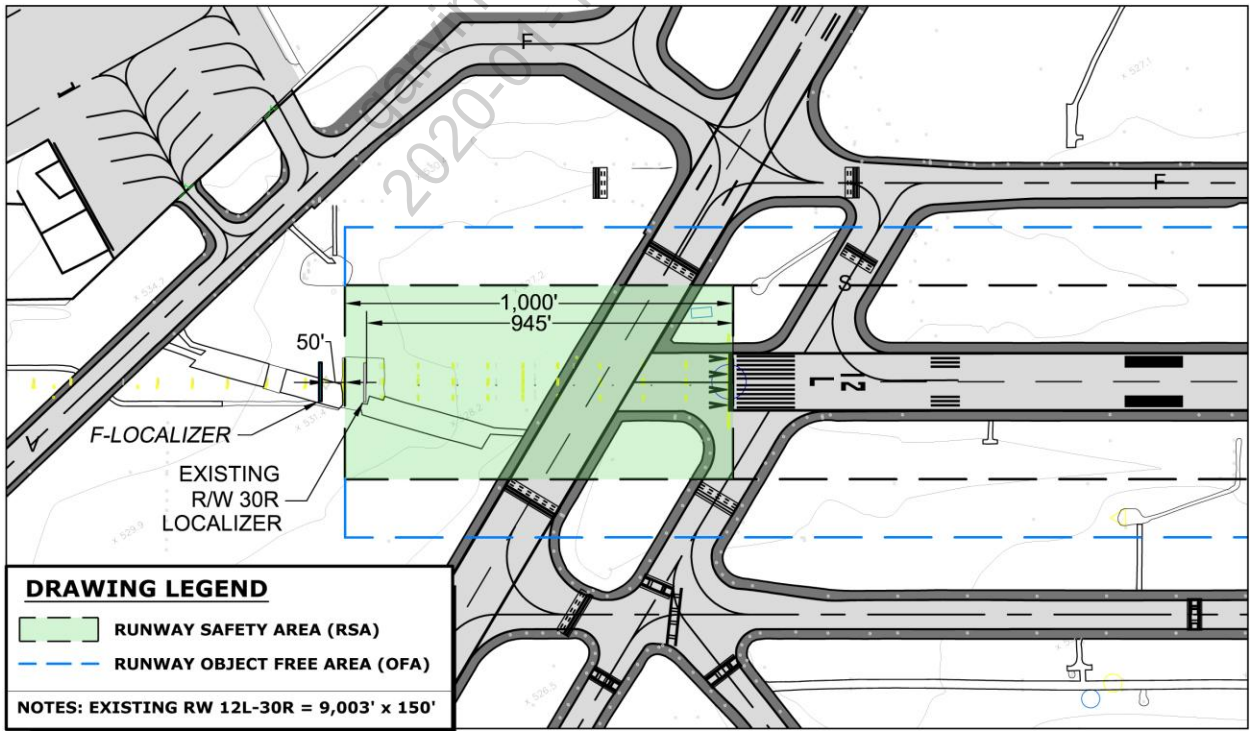
5.1.4.5 Runway 12L Approach RSA Alternatives

Similarly, for Runway 12L-30R, the two options evaluated to resolve the RSA deficiencies include extending to full length RSAs and declared distances. EMAS was not considered as a viable alternative due to the availability of land beyond the end of runway.

1. **Relocation of the localizer with RSA extension of full length with RSA extension of full width and reduced declared distances –** Construct 1,000' long by 500' wide full length RSA's off 12L approach end. As shown in **Exhibit 5.1-7, *Runway 30L Approach – Full Length and Width RSA***, this option relocates existing Runway 30R localizer west along extended runway centerline to a point 1050' beyond end of pavement. This option eliminates the need to utilize declared distances to mitigate the 55-foot deficiency.
2. **Declared distance –** This alternative utilizes the existing suitable RSA area off the runway and utilizes declared distances to provide the 65-feet for compliance on the Runway 12L Approach end of the runway.

The short-term recommendation is to continue with the existing declared distances until the money is available to relocate the localizer outside the RSA. Please note that the FAA ATO is currently evaluating the disposition of the Runway 30R localizer.

Exhibit 5.1-7
RUNWAY 12L APPROACH – FULL LENGTH AND WIDTH RSA
Lambert-St. Louis International Airport



Note: The FAA ATO is currently evaluating the disposition of the Runway 30R localizer.

5.1.5 TAXIWAY IMPROVEMENTS

Secondary to runway alternatives and improvements are taxiway improvements. An airport's taxiway system must complement and coordinate with its runway system to keep aircraft traffic flows moving smoothly and unconstrained on the ground. All existing runways at STL have a full-length parallel taxiway and in some places, there is a dual-parallel taxiway system with bypass capability at the runway departure ends. This type of taxiway system is important to provide adequate departure sequencing and queuing opportunities.

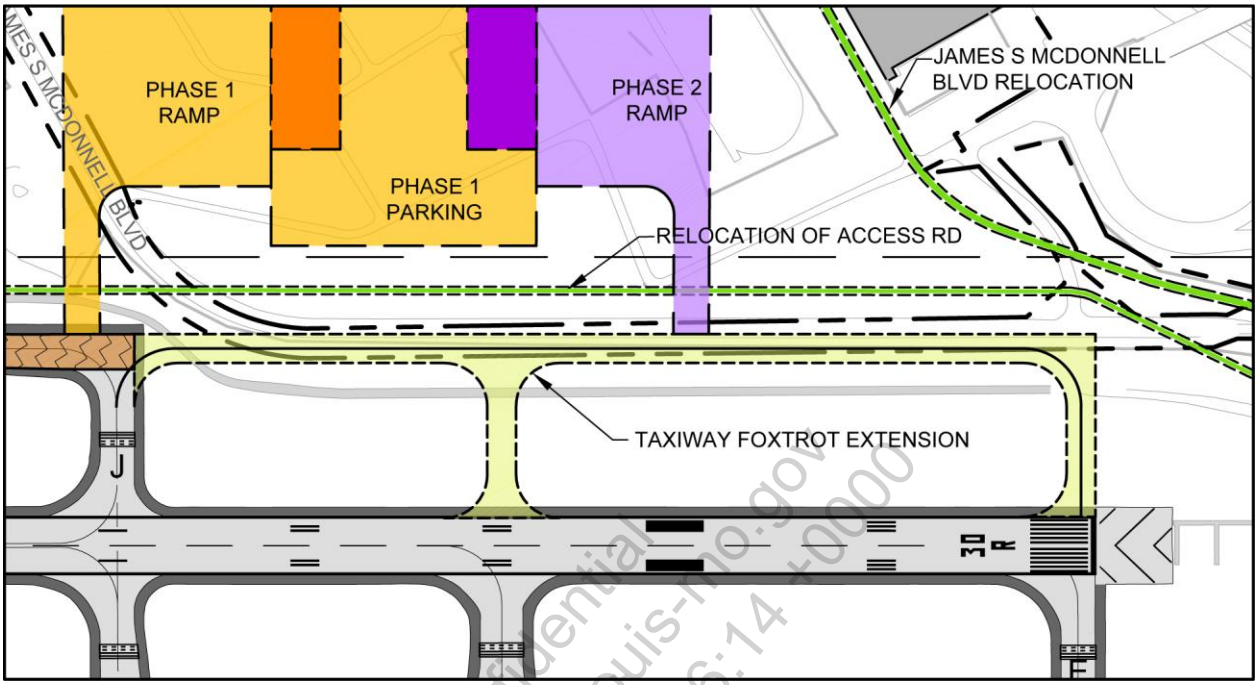
5.1.5.1 Taxiway Foxtrot Extension

As currently configured Runway 12L-30R has a single full length parallel taxiway to the south, Taxiway Echo, and a single taxiway to the north, Taxiway Foxtrot, that extends from the 12L approach end at Taxiway Sierra to the intersection with Taxiway Juliet. From Taxiway Juliet to the 30R Approach end, the runway has a single parallel taxiway, Taxiway Echo, and does not provide bypass capabilities. From an operational perspective, this situation can be problematic in both arrival and departure modes.

The first challenge is for aircraft arriving on Runway 12L taxiing to facilities north of the runway. Aircraft requiring more than 6,400 feet of runway length will not be able to make the 90-degree exit at Taxiway Juliet; and must then exit to Taxiway Echo and subsequently cross the runway to access the parking position at the FBO or one of the cargo facilities. Although the population of aircraft that regularly need more than 6,400 feet in landing length is limited, it does include most of the cargo aircraft utilizing the airfield and in limited operating scenarios, some of the larger corporate jets. The extension of Taxiway Foxtrot to the end of runway with a connecting taxiway aligned with Taxiway Hotel, as shown in **Exhibit 5.1-8, *Taxiway Foxtrot Extension***, would provide additional exits to the north, reducing the number of runway crossings and providing a safer operation with less opportunity for aircraft movement conflicts.

Extension of Taxiway Foxtrot to the end of the runway also permits the continued use of the entire length of Runway 12L-30R during scenarios where sections of Taxiway Echo in the midfield are under construction. In the current configuration, any construction on Taxiway Echo east of Taxiway Juliet would reduce the available runway length to 6,400-feet unless aircraft were permitted to back-taxi on the runway; back taxiing is not a desirable solution for a busy airfield. When interviewed, ATCT personnel indicated that while the additional taxiway was not necessary, it would be beneficial and provide additional flexibility to their operation. It is acknowledged that this project would not be undertaken until such time it could be fully justified by demand.

Exhibit 5.1-8
TAXIWAY FOXTROT EXTENSION
Lambert-St. Louis International Airport



5.1.5.2 Taxiway Victor Realignment

Runway end 12R has a single access/exit taxiway to the north, Taxiway Victor, that connects the north and east sides of the airport to the Runway 12R threshold. As currently configured, Taxiway Victor enters the Runway 12R end at an angle and if an aircraft intends to depart from the physical end of pavement it must cross over the threshold for Runway 12R and enter the runway from the south via Taxiways Delta or Charlie. From an operational perspective, this situation can be problematic in both arrival and departure modes.

Initial evaluations were conducted relative to the realignment of Taxiway Victor; this evaluation indicated the entire storm water detention structure would be eliminated as well as numerous impacts to access roads within the Airport Operations Area (AOA). This evaluation is presented below.

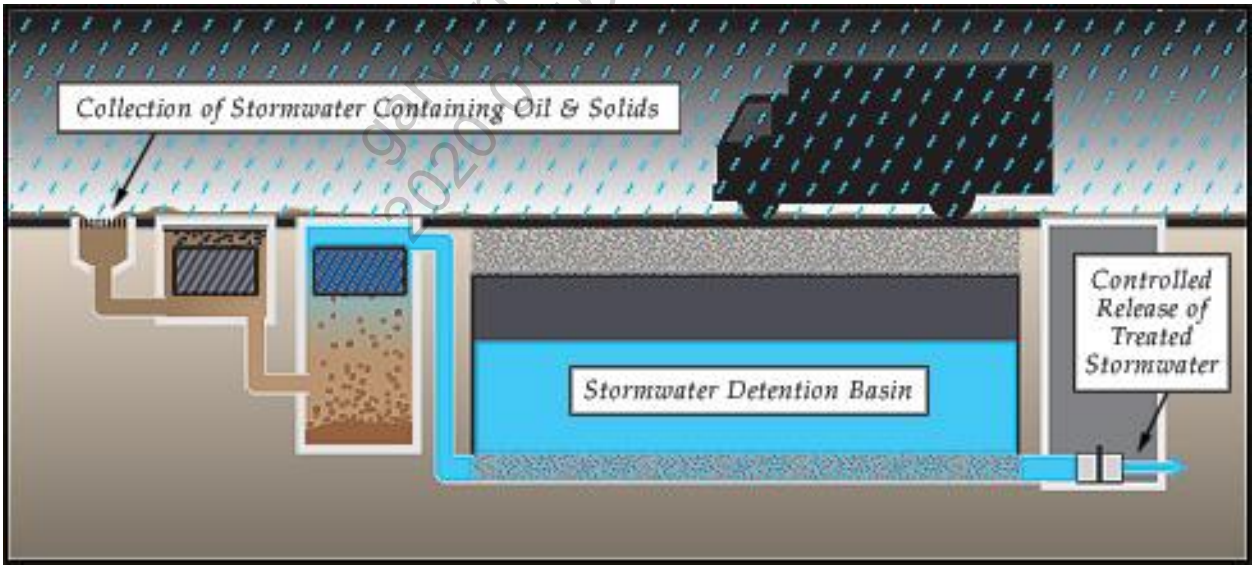
The detention basin located directly north of the Runway 12R Approach serves to capture water run-off from Lindbergh Boulevard. The roadway alignment was changed as part of the Airport expansion project associated with the addition of Runway 11-29 to the airfield. The newly aligned portion of Lindbergh Boulevard is depressed from the natural terrain from the intersection with Natural Bridge Road through the tunnel under Runway 11-29, adjacent to Fee Fee Road and Missouri Bottom Road. The road bed returns to the original elevation in the vicinity of Missouri Bottom Road.

Storm water run-off from the majority of the roadway north and east of the extended centerline of Runway 12L-30R is routed through the detention basin in question. To realign and extend Taxiway Victor parallel to Runway 12L-30R to the end of runway, a significant portion of the detention basin will need to be eliminated. Given the topography constraints in the area and the proximity to the Coldwater Creek culvert, options to relocate to other parts of the airfield are limited. Initial analysis has identified a few potential options to reclaim sufficient detention basin capacity should the Taxiway Victor extension and realignment proceed.

The first option is to reconfigure the existing basin by extending to the east into the paved area currently used to test airfield marking equipment and to store assorted construction materials, aggregate and soil. The resulting shape would be more elongated but appears to provide sufficient area to retain the necessary capacity.

The second option is to create/install subsurface storm water detention basins (see **Exhibit 5.1-9, *Subsurface Storm Water Detention Basin Alternative***) upstream of the current detention basin, potential north of and under Banshee Road to capture some of the capacity. Depending on timing and technology improvements, it may be possible to locate the subsurface detention basin under the taxiway; however, it is not known if systems suitable for supporting the weight of taxiing aircraft are currently available.

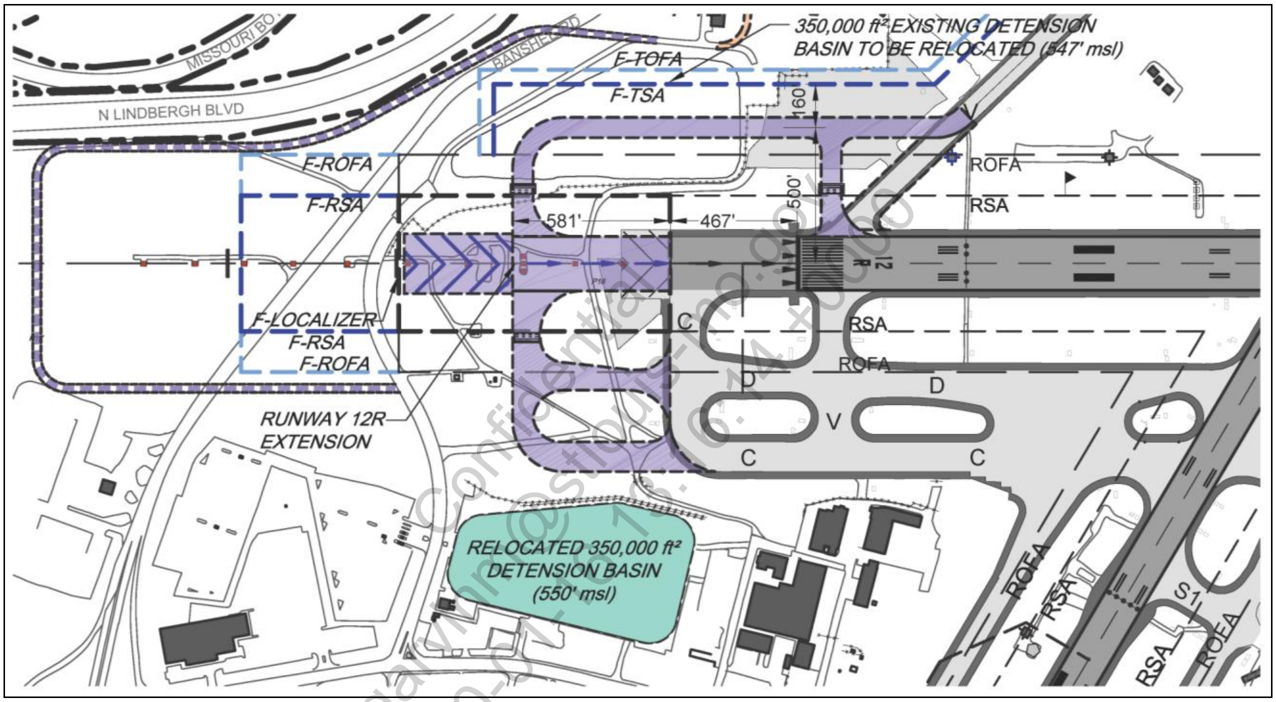
Exhibit 5.1-9
SUBSURFACE STORM WATER DETENTION BASIN ALTERNATIVE
Lambert-St. Louis International Airport



Source : http://www.brentwood-ind.com/water/stormwater.html

The third and preferred option (see **Exhibit 5.1-10, *Detention Basin Relocation Alternative***) is to relocate the detention basin to the area between the Airport Office and the Field Maintenance facilities. The unused parking lot provides an area with similar potential capacity. The site presents a few significant challenges including the proximity to Coldwater Creek and the distance from the low point on Lindbergh Boulevard.

Exhibit 5.1-10
DETENTION BASIN RELOCATION ALTERNATIVE
Lambert-St. Louis International Airport

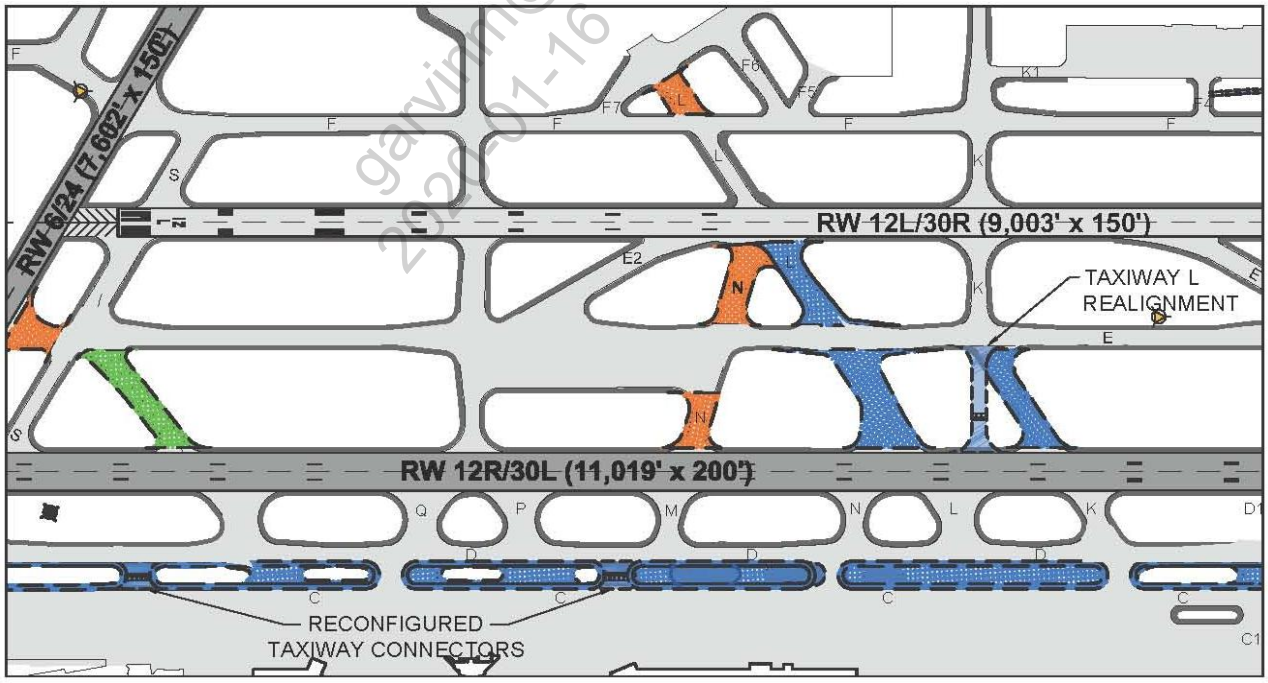


5.1.5.3 Runways 12L-30R and 12R-30L Taxiway Geometry

As with most large hub airports, the airfield at STL has gone through many expansion programs to provide additional capacity and capability. As demand grew, additional taxiways and runway exits were built to maximize the efficiency of the runways to provide the greatest possible throughput. Simultaneous to the expansion and capacity programs, the aircraft fleet was changing and the aircraft airfield performance abilities improved with the introduction of better technologies. Rarely do airport's look at the existing pavements to evaluate what pavement, if any, is superfluous. Typically, there is significant resistance to removing pavement from the airfield as it removes options for taxiing aircraft. However, the recurring cost to maintain the additional pavements are significant.

Exhibit 5.1-11, *Midfield Taxiway Geometry*, presents a future midfield taxiway geometry that retains airfield functionality while incrementally improving safety and efficiency. The majority of the work required to reach this airfield geometry involves removal of exiting pavement, illustrated with the tan hatch pattern, such as Taxiway Lima, the portion of Taxiway Kilo between TWY Echo and Runway 12R-30L and Taxiway November between the parallel runways. Also, note the pavement removal associated with the reconfiguration of the islands between TWY Charlie and TWY Delta.

Exhibit 5.1-11
MIDFIELD TAXIWAY GEOMETRY
Lambert-St. Louis International Airport



New pavement is illustrated in light yellow on Exhibit 5.1-11. Taxiway Kilo is realigned between Runway 12R-30L and Taxiway Echo to provide a straight taxiway from the north side of the airfield to the south side. Also, note the reconfigured taxiways between Taxiway Charlie and Delta. These connectors provide the necessary connection points between the two taxiways while eliminating additional pavement and minimizing the locations where aircraft could taxi directly from the ramp to the runway without making a turn.

Airfield geometry improvements for the taxiway complex (connecting the old airfield to the new runway) are presented in **Exhibit 5.1-12, *Taxiway Bravo Realignment***. As with the changes discussed above, these improvements are intended to incrementally increase the efficiency of the airfield without adding significant expense. Taxiway Bravo currently crosses Runway 6-24 at an odd angle. The recommended configuration realigns the intersection to a 90-degree intersection provides better spatial awareness for pilots when approaching the runway intersection.

Exhibit 5.1-12
TAXIWAY BRAVO REALIGNMENT
Lambert-St. Louis International Airport

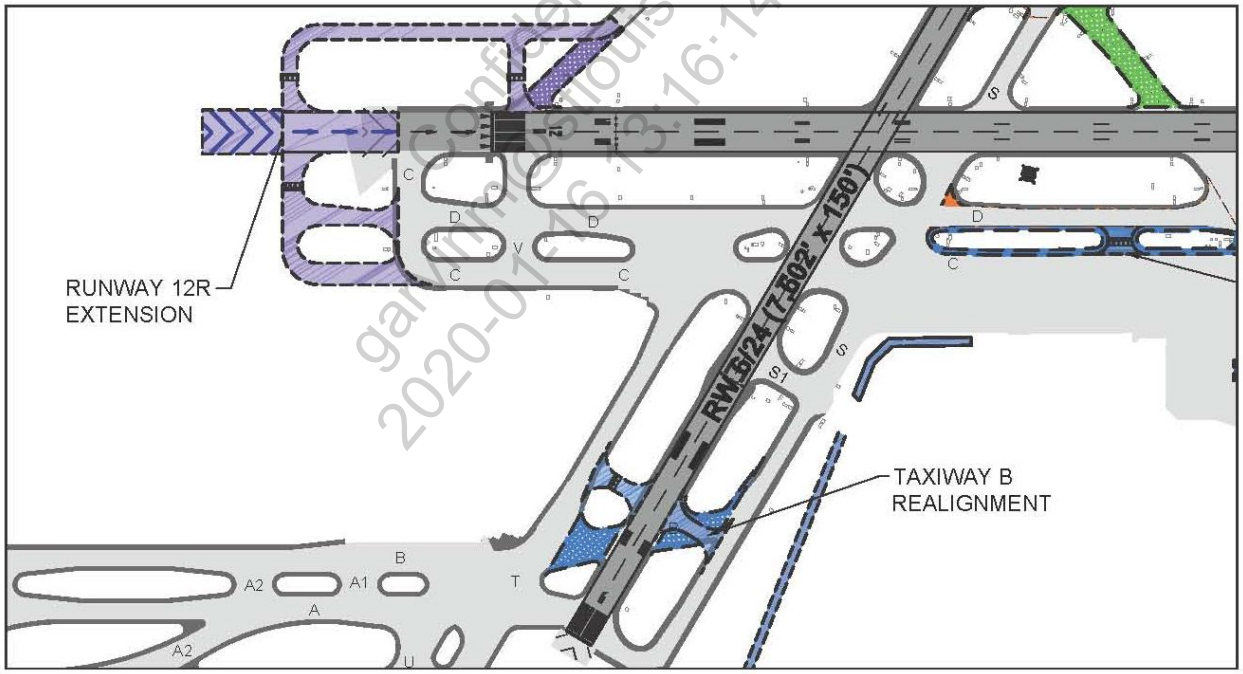
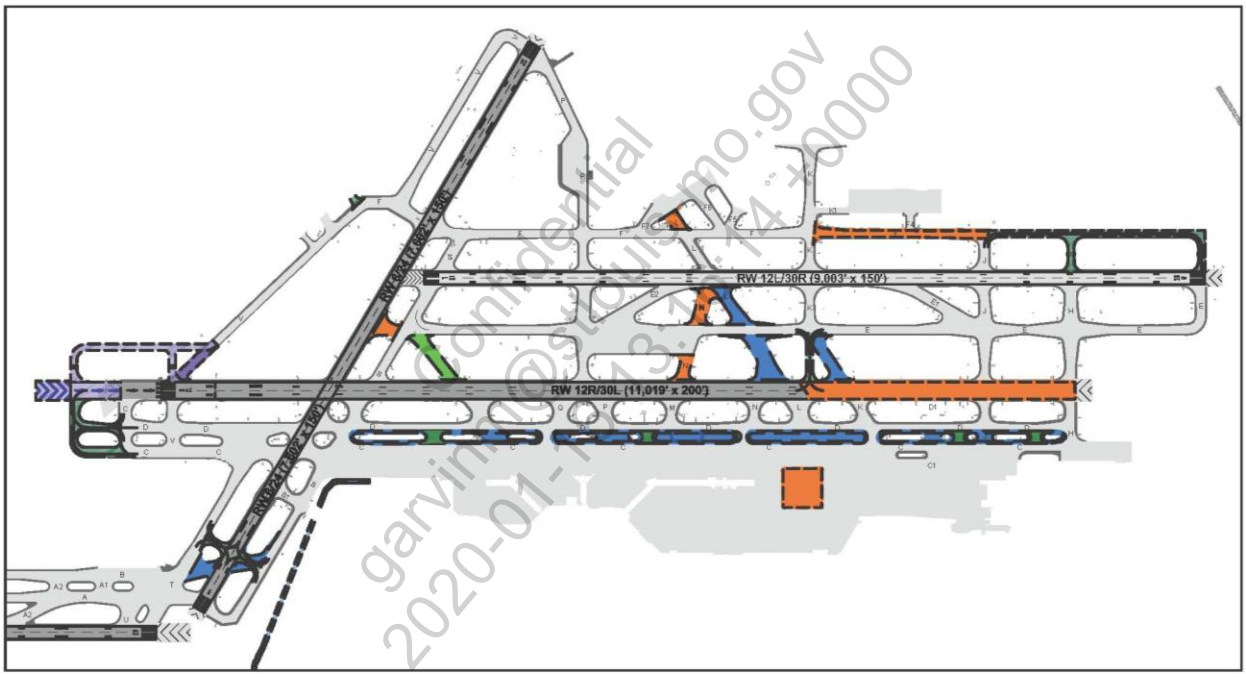


Exhibit 5.1-13, *Future Airfield Geometry*, shows the overall view of the future airfield configuration. Pavement removal should occur in line with the pavement management program and not removed as separate programs. For example, changes to Taxiway Bravo, as shown on the exhibit, utilize much of the existing pavement but require additional pavement on the west side of Runway 6-24. The work should not be conducted as a separate project rather it should be incorporated into the rehabilitation of Runway 6-24 or Taxiway Tango. Similarly, the removal of pavement and reconfiguration of the islands between Taxiways Charlie and Delta should be incorporated into pavement management projects associated with the ongoing maintenance of these pavement areas.

Exhibit 5.1-13
FUTURE AIRFIELD GEOMETRY
Lambert-St. Louis International Airport



5.2 TERMINAL ALTERNATIVES

5.2.1 INTRODUCTION

Chapter Five of the Master Plan Update Report investigates alternatives for providing capacity increases to future terminal facilities and their associated landside access, potential people mover systems and terminal support facilities within the context of the overall land use plan for the airport. The terminal concepts also incorporate potential ground access improvements and investigate phasing options for these facilities. The alternatives in this chapter depict the Airport's 20-year terminal area needs for new terminal facilities based on Chapter 4, *Demand/Capacity and Facility Requirements*. Additional information can be found in Appendix E.

Generally, master plans strive to maximize efficiency and improve user convenience for future facilities by increasing capacity and providing operational enhancements for airside, terminal, and landside components of the plan. As discussed in Chapter 4, the existing facilities at Lambert provide sufficient capacity throughout the planning period; therefore, this analysis is directed toward the optimization and enhancement of the facilities and configurations, which will ultimately provide a convenient and functional facility that supports user convenience and provides opportunities to maximize potential revenues. Additionally, terminal area plans endeavor to be flexible and responsive to changing operational scenarios that may emerge over time. In order to identify the best future terminal area plan, this study examined fourteen (14) concepts before selecting the single preferred terminal alternative. These concepts explored the potential for expanding and consolidating the existing terminals.

The following sections present an overview of the terminal alternatives analysis process and its findings. These sections are organized to describe the planning process, goals and objectives, terminal site envelope analysis, initial terminal alternatives, refined terminal alternatives, short-listed terminal alternatives, evaluation of short-listed alternatives, and the preferred terminal alternative.

5.2.2 PLANNING PROCESS

Ideas and concepts discussed with Airport staff and members of the advisory committees created the terminal development objectives, which guided the study. Understanding the wants and needs of the airport through these objectives, an initial set of terminal evaluation criteria were developed and reviewed with the Airport staff. These evaluation criteria assisted in selecting alternatives to be further refined. Additionally, where an initial alternative underperformed for a particular criterion this led to refinements of the alternatives or dropped from further evaluation.

The terminal evaluation criteria were then further refined and organized into a weighted matrix format by the consultant team. The matrix and the weightings for each criterion went through a review process with Airport staff prior to presentation to the CAC and TAC. This reviewed criteria and weighted matrix served as a tool to assist the Airport staff in selecting the preferred terminal alternative.

5.2.3 TERMINAL DEVELOPMENT OBJECTIVES

The terminal development objectives and key planning attributes identified in meetings with Airport staff and the advisory committees became the basis for developing and defining the evaluation criteria. The summarized terminal development objectives are presented below:

- **MEET NEEDS OF 20-YEAR PLANNING HORIZON AND BEYOND**
  - Provide adequate number and gauge of terminal gates to meet future demand effectively and efficiently.
  - Incorporate sufficient flexibility to expand to meet needs beyond planning horizon.
- **BUILD ON "AIRPORT EXPERIENCE PROGRAM"**
  - Improve passenger experience and airport operations
  - Provide pleasant, safe and customer-friendly facilities for passengers & tenants

5.2.4 KEY PLANNING ATTRIBUTES

The terminal development objectives have slightly different implications and applications for the three functional areas of the terminal facilities: airside, terminal and landside. Providing safe and efficient facilities that meet the needs of passengers, airlines and tenants requires a balancing of competing demands for space. The key planning attributes are as follows:

AIRSIDE

- Meets 20-year gate requirements
- Provides efficient airside access
- Accommodates dual taxilanes in the terminal area to reduce congestion and permit two way flow of taxiing aircraft
- Provide sufficient aircraft pushback zones to permit safe and efficient pushbacks with minimal aircraft maneuvering
- Maximize double-loaded concourses to reduce walking distances from gate to gate and security to gate
- Accommodate enhanced lateral movement (moving walkways)

TERMINAL

- Meets 20-year demand requirements
- Enhance passenger convenience
- Provide adequate space for new TSA security screening equipment and procedures
- Provide a centralized consolidated concessions core to maximize revenue generation potential
- Improve international passenger facility connections

LANDSIDE

- Meets 20-year curb and parking requirements
- Maintain convenient short-term covered parking with expansion capabilities
- Simplify terminal ingress/egress and access points

IMPLEMENTATION FEASIBILITY

- Ensure ability to effectively phase construction
- Minimize impact to existing operations
- Operational effectiveness of initial phase
- Safeguard sufficient envelope for future terminal expansion beyond 20-year planning horizon

5.2.5 TERMINAL SITE ENVELOPE ANALYSIS

The study examined several different site envelope possibilities for accommodating the future STL terminal complex within the existing runway configurations. The potential expansion sites for terminal facilities were examined in compliance with the operational planning criteria found in the FAA Advisory Circular 150/5300-13, *Airport Design*.

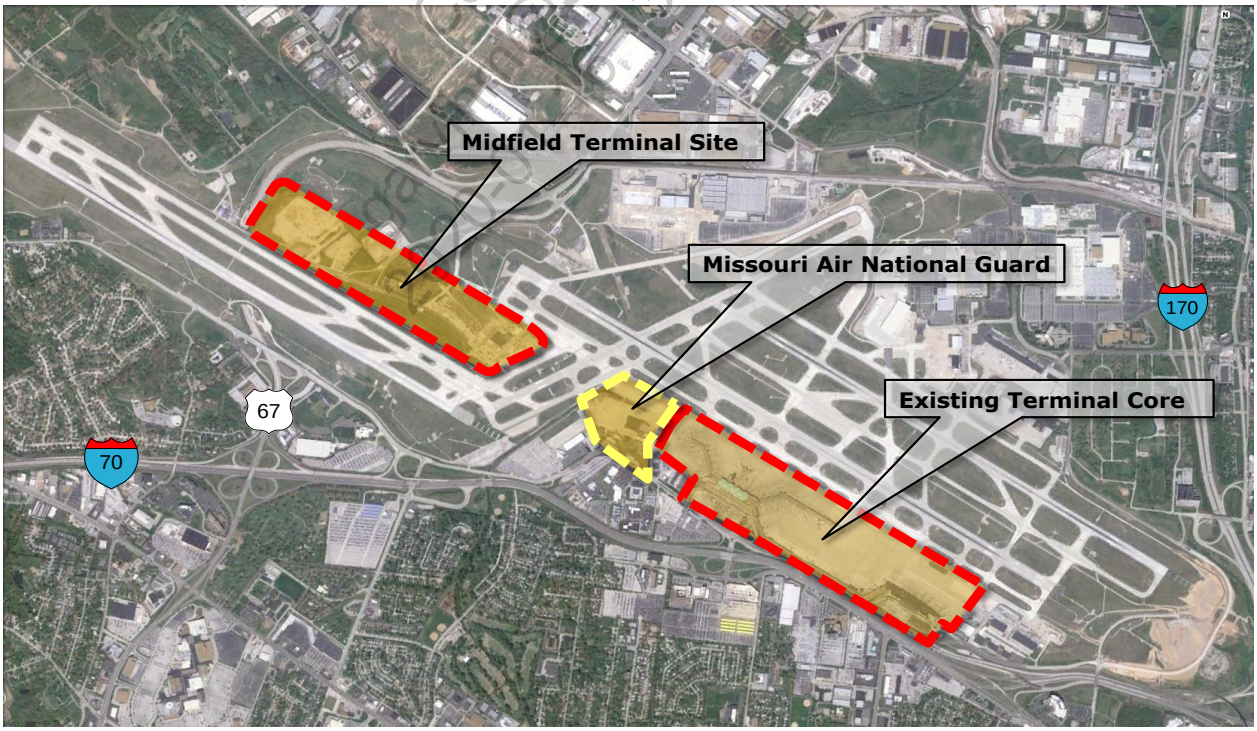
Early planning discussions during the study considered various options by which the present terminal configurations could be modified and the midfield site envelope for a new single consolidated terminal complex as presented in the previous ALP were explored. The three options shown on **Exhibit 5.2-1, *Proposed Terminal Land Envelopes***, include:

- **Existing Terminal Core** - the existing central core bounded to the north by Taxiway Charlie, Lambert International Boulevard to the south, Cargo City to the east, and the Missouri Air National Guard facility to the west
- **Missouri Air National Guard** – extension of the exiting terminal core to the west, extending to Taxiway Sierra
- **Midfield Terminal Site** - the area between existing Runway 11-29 and the extended centerline of Runway 12R-30L, west of Runway 6-24

An important factor when considering these site envelopes for terminal complex expansion included ground transportation issues such as connection to existing roadway infrastructures and incorporating the existing light rail system. Other key factors included impacts on existing facilities during phased construction, utilities and existing infrastructure access, existing terrain, [1]FAR Part 77 regulations, and taxi times to existing runways.

Initial analysis of the midfield terminal site revealed significant restrictions on the potential building envelope. The proximity to Runway 11-29 and Runway 12R-30L and their associated taxiways resulted in a relatively narrow development site. Setbacks from the taxiways and FAR Part 77 imaginary surfaces associated with the airspace restrictions limit the horizontal and vertical dimensions of the potential terminal facility. Multiple concepts were explored, however, the limited width of the site resulted in options with lengthy concourses and limited ability for dual taxilanes. Access to existing roadway infrastructure and a lengthy extension to the existing light rail were also assumed prohibitively expensive. Ultimately, the Midfield site was abandoned as an option because it fails to provide any additional development potential when compared to the existing terminal area core. Various terminal complex alternatives were analyzed for the remaining two envelopes as described in the following sections.

Exhibit 5.2-1
PROPOSED TERMINAL LAND ENVELOPES
Lambert-St. Louis International Airport



[1] FAR Part 77 Obstruction Standards contained in FAA Advisory Circular 150/5360 states: A number of imaginary surfaces relating to each runway have been established in order to provide a basis of judging whether an object or building presents an obstruction to air navigation. The size of the surface is determined by the category of each runway and by the approach system used.

5.2.6 INITIAL TERMINAL ALTERNATIVES

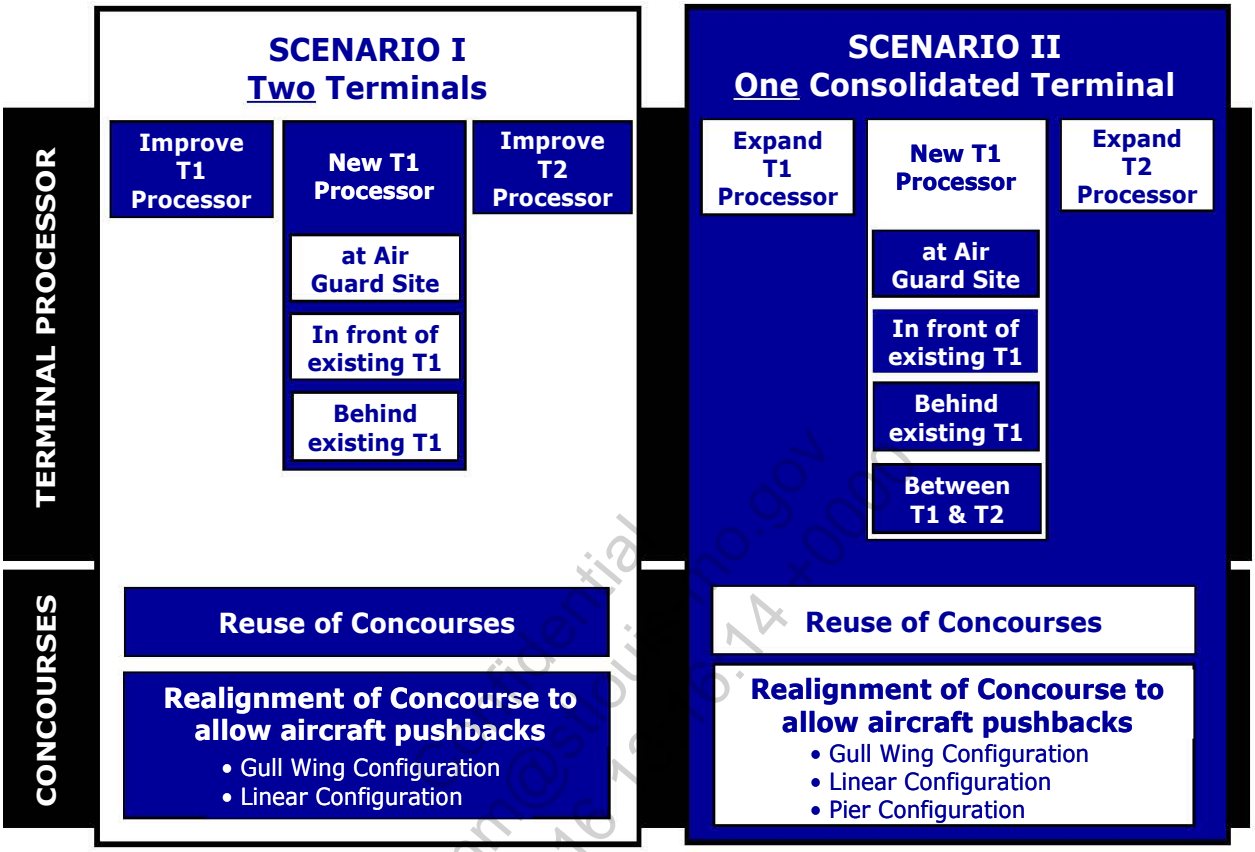
Throughout the terminal planning process, a common set of parameters was used in the development of terminal complex alternatives. All of the alternatives were developed using industry accepted planning criteria such as FAA's Advisory Circular 150/5300-13 relative to taxiway and taxilane design criteria, aircraft parking depth, wing-tip spacing, aircraft dimensional criteria, and concourse and terminal dimensioning based on the *Demand/Capacity and Facility Requirements* section of Chapter 4.

In addition to the previously described terminal development objectives, the following considerations were incorporated in the development of the terminal complex alternatives:

- Achieve a balance between airside, terminal, and landside capacities of the terminal area;
- Provide the flexibility for phased implementation with minimal impact to on-going operations;
- Minimize impact on other airport functions such as air cargo, maintenance support, and landside access;
- Build upon the ongoing airport experience program;
- Maintain and improve passenger convenience and amenities throughout all phases of the plan

Two overall terminal development strategies were taken into consideration to further define the direction of the terminal development process. These two strategies include maintaining two separate terminals and consolidation into one terminal. From these two scenarios, multiple concepts were developed based on the reuse of the existing terminals or replacement of the T1 processor and the configuration of concourses and passenger movement areas as shown in **Exhibit 5.2-2, *Terminal Development Strategies***. The terminal development process generated a total of 14 alternatives that are described below.

Exhibit 5.2-2
TERMINAL DEVELOPMENT STRATEGIES
Lambert-St. Louis International Airport



5.2.6.1 Scenario I – Two-Terminal Alternatives

Exhibit 5.2-3, *Scenario I–A-1 (Baseline)*, maintains the current two terminal airline operating alignment and reuses the existing terminal processors and concourses while closing Concourses B and D. The existing concourses A & C at Terminal 1 (T1) also have the potential for increased width allowing for additional hold room depth and passenger circulation. The staggered departures/arrival curb arrangement at T1 is retained with a new lowered arrivals curb. This alternative also introduces a potential short-term surface parking lot/ground transportation center between T1 and Terminal 2 (T2) in order to accommodate the temporary relocated traffic at Terminal 1 while the existing arrivals roadway is being lowered. This area also has the potential to become a long-term covered parking structure using existing Concourse D as the non-secure passenger link back to T1 or the use of shuttle busses. Additional parking expansion south of the existing T1 garage across Lambert International Boulevard (LIB) with future expansion potential is required to meet the 20-year parking demand.

Expansion of the T2 single-loaded concourse east into the area currently occupied by Cargo City is required in order to accommodate the future 20-year gate requirement. Baggage claim is also expanded to the west for additional capacity. An additional two level parking deck is constructed on the surface lot east of the existing T2 garage providing approximately 300 additional stalls. The current international processing functions in the Federal Inspection Services (FIS) area are also retained.

Exhibit 5.2-3
SCENARIO I-A-1 (Baseline)
Lambert-St. Louis International Airport

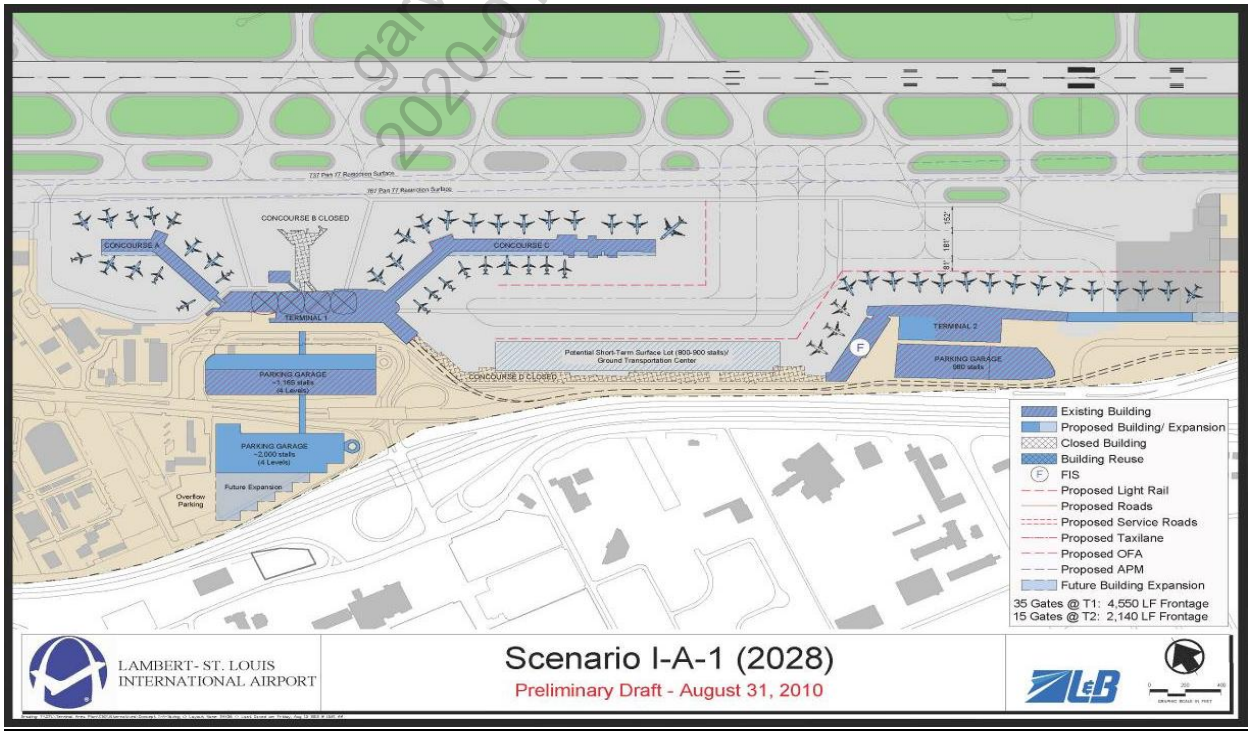


Exhibit 5.2-4, *Scenario I-B-1a*, maintains the current two terminal airline operating alignment, reuses existing terminal processors, and realigns and widens a portion of T1's concourse A and C "Gull-wing" alignment to provide area for increased aircraft parking depth and pushback zone. Concourses B and D are removed and closed respectively, and T1's staggered departures/arrival curb arrangement is retained with a new lowered arrivals curb.

International gates and FIS functions are relocated from T2 to T1 and expansion of T2's baggage claim is required to meet future demand. Both terminal parking garages are expanded to meet future demand. The existing maintenance shops and HOST flight kitchen require relocation.

Exhibit 5.2-4
SCENARIO I-B-1a
Lambert-St. Louis International Airport

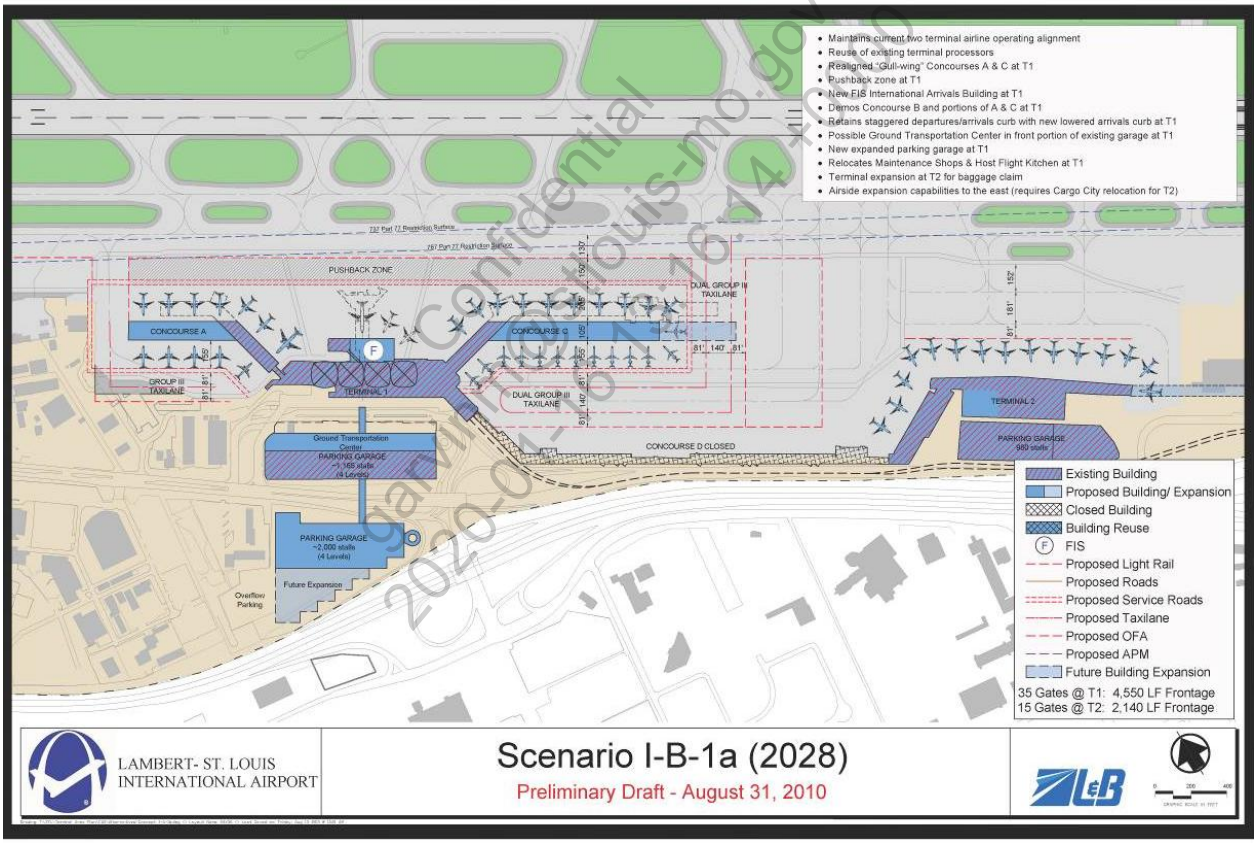


Exhibit 5.2-5, Scenario I-B-1b, maintains the current two terminal airline operating alignment while retaining both terminal processors. T1's concourse A and C "Gull-wing" alignment is demolished in order to construct a wider linear double-loaded concourse with increased aircraft parking depth and pushback zone and centrally located passenger security screening and concessions mall. Concourse B and D are removed and closed respectively. The staggered departures/arrival curb arrangement at T1 is retained with a new lowered arrivals curb.

International gates and FIS functions are relocated from T2 to T1 and expansion of T2's baggage claim is required to meet future demand. Both terminal parking garages are expanded to meet future demand. The existing maintenance shops and HOST flight kitchen require relocation.

Exhibit 5.2-5
SCENARIO I-B-1b
Lambert-St. Louis International Airport

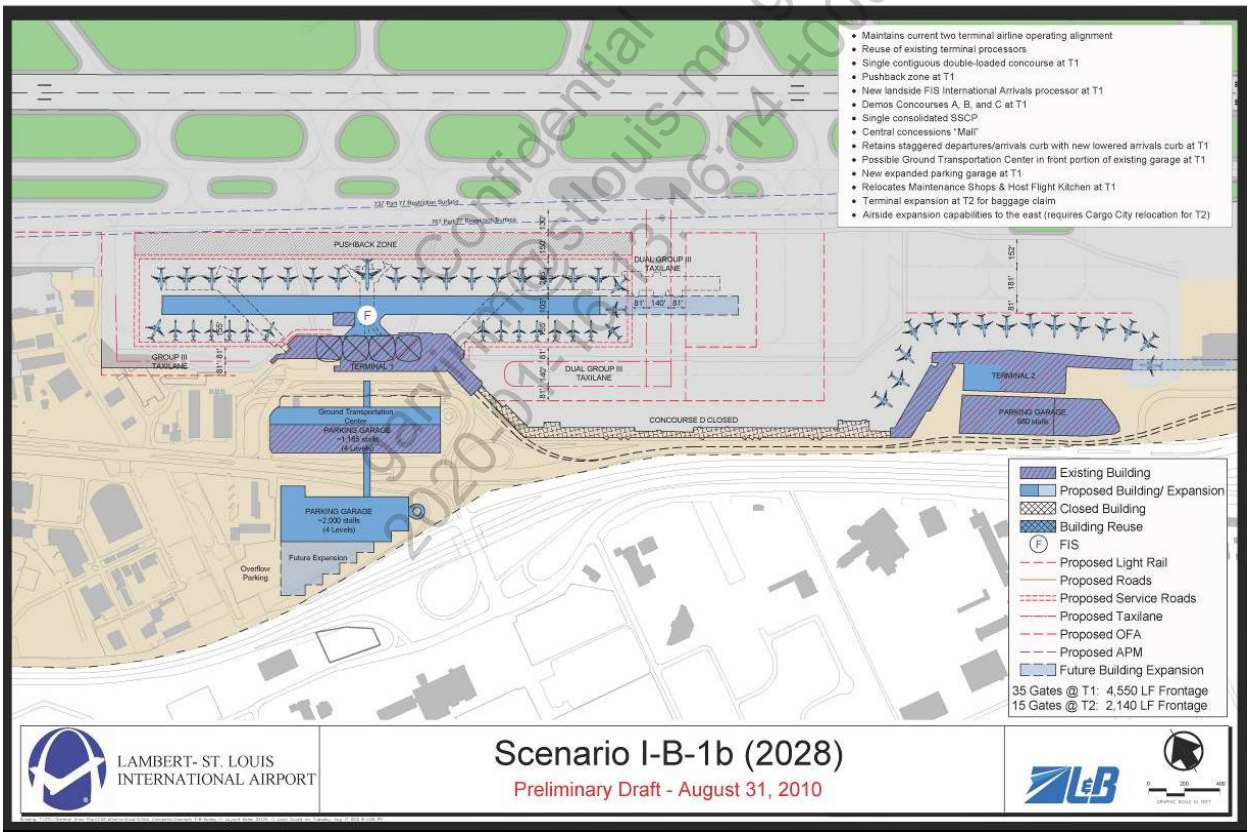


Exhibit 5.2-6, Scenario I-C-1, maintains the current two terminal airline operating alignment, reuses the existing T2 processor, and relocates T1 to the Missouri Air National Guard site. This provides area to construct a new double-loaded linear concourse alignment providing increased aircraft parking depth and pushback zone and centrally located passenger security screening and concessions mall. Existing T1 facilities are eliminated except for the parking garage.

International gates and FIS functions are relocated from T2 to T1 and expansion of T2's baggage claim is required to meet future demand. A new T1 parking garage is constructed and the T2 parking garage is expanded to meet future demand.

Lambert International Boulevard is realigned in order to accommodate the new T1 parking garage. The existing light rail alignment is extended to a new station at the T1 parking garage abandoning the existing station at the current T1 location. The existing Air Traffic Control Tower (ATCT) at T1 would require relocation as well as the maintenance shops, HOST flight kitchen, Main Power Plant, and cooling towers.

Exhibit 5.2-6
SCENARIO I-C-1
Lambert-St. Louis International Airport

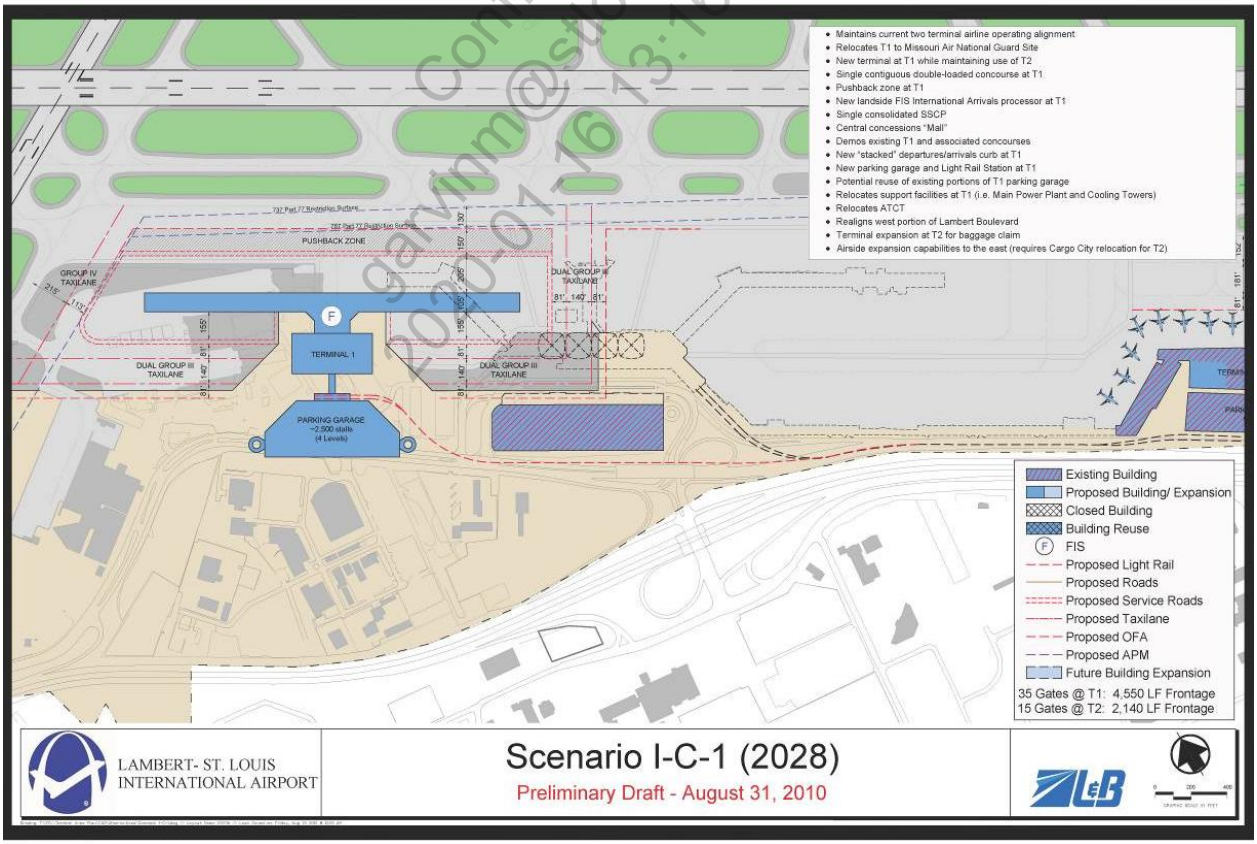


Exhibit 5.2-7, *Scenario I-D-1*, maintains the current two terminal airline operating alignment and reuses the existing T2 processor. T1 is replaced airside of the existing location providing a central consolidated passenger security screening area and concessions mall. The existing T1 "Gull-wing" concourse alignment is demolished in order to construct a new wider linear double-loaded concourse providing increased aircraft parking depth and pushback zone. Concourses B and D are also removed.

International gates and FIS functions are relocated from T2 to T1 and expansion of T2's baggage claim is required to meet future demand. A new T1 parking garage is constructed in the location of the existing and the T2 parking garage is expanded to meet future demand.

The existing light rail alignment is extended to a new station at the T1 parking garage abandoning the existing station at the current T1 location. The existing ATCT at T1 would require relocation as well as the maintenance shops, HOST flight kitchen, Main Power Plant, and cooling towers.

Exhibit 5.2-7
SCENARIO I-D-1
Lambert-St. Louis International Airport

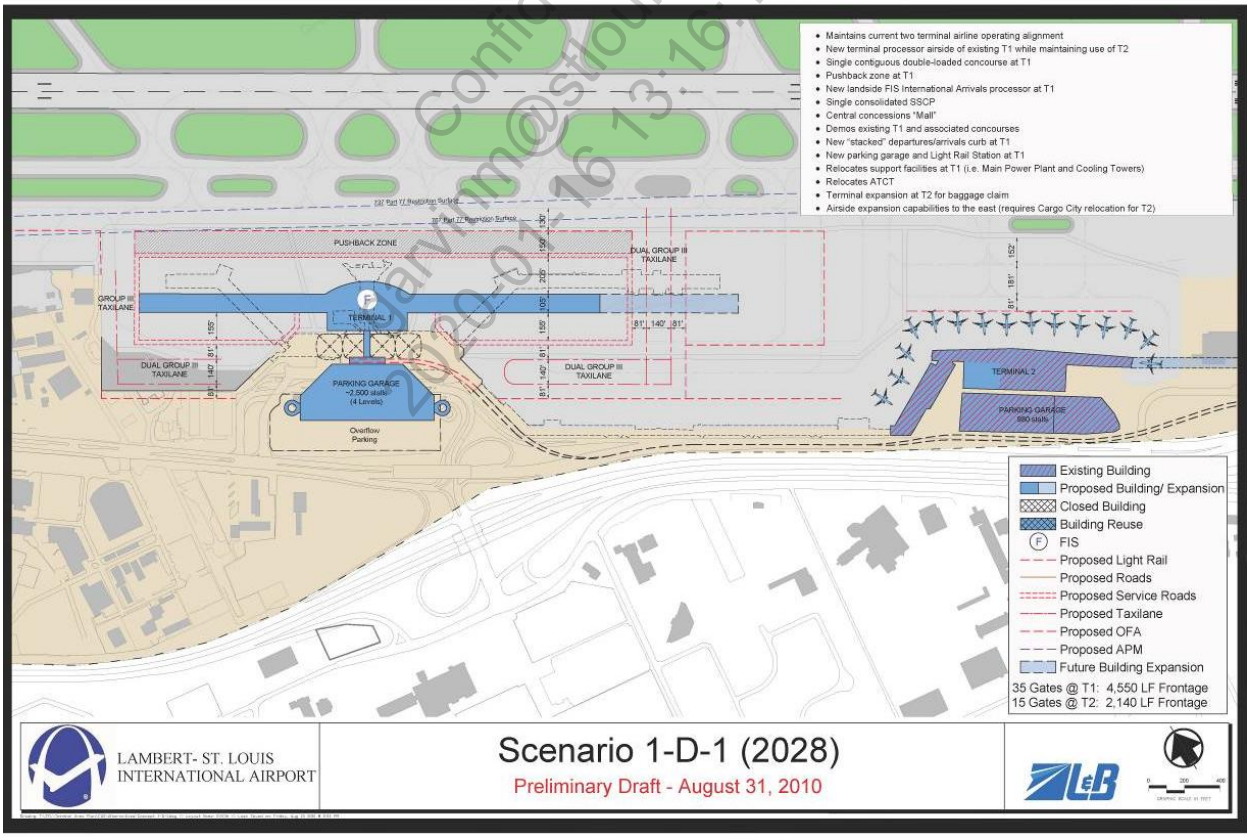


Exhibit 5.2-8, ***Scenario I-D-2a***, maintains the current two terminal airline operating alignment and reuses the existing T2 processor. A portion of the existing T1 garage is removed to allow for a new "stacked" departures/arrivals curb constructed south of the existing staggered curb. This also allows for a new T1 processor landside of the existing location providing a central consolidated passenger security screening area and concessions mall. Portions of the existing T1 "Gull-wing" concourse alignment are realigned and widened to provide increased aircraft parking depths and pushback zone. Concourses B and D are also removed and closed respectively.

International gates and FIS functions are relocated from T2 to T1 and expansion of T2's baggage claim is required to meet future demand. Both terminal parking garages are expanded to meet future demand. The existing maintenance shops and HOST flight kitchen require relocation.

Exhibit 5.2-8
SCENARIO I-D-2a
Lambert-St. Louis International Airport

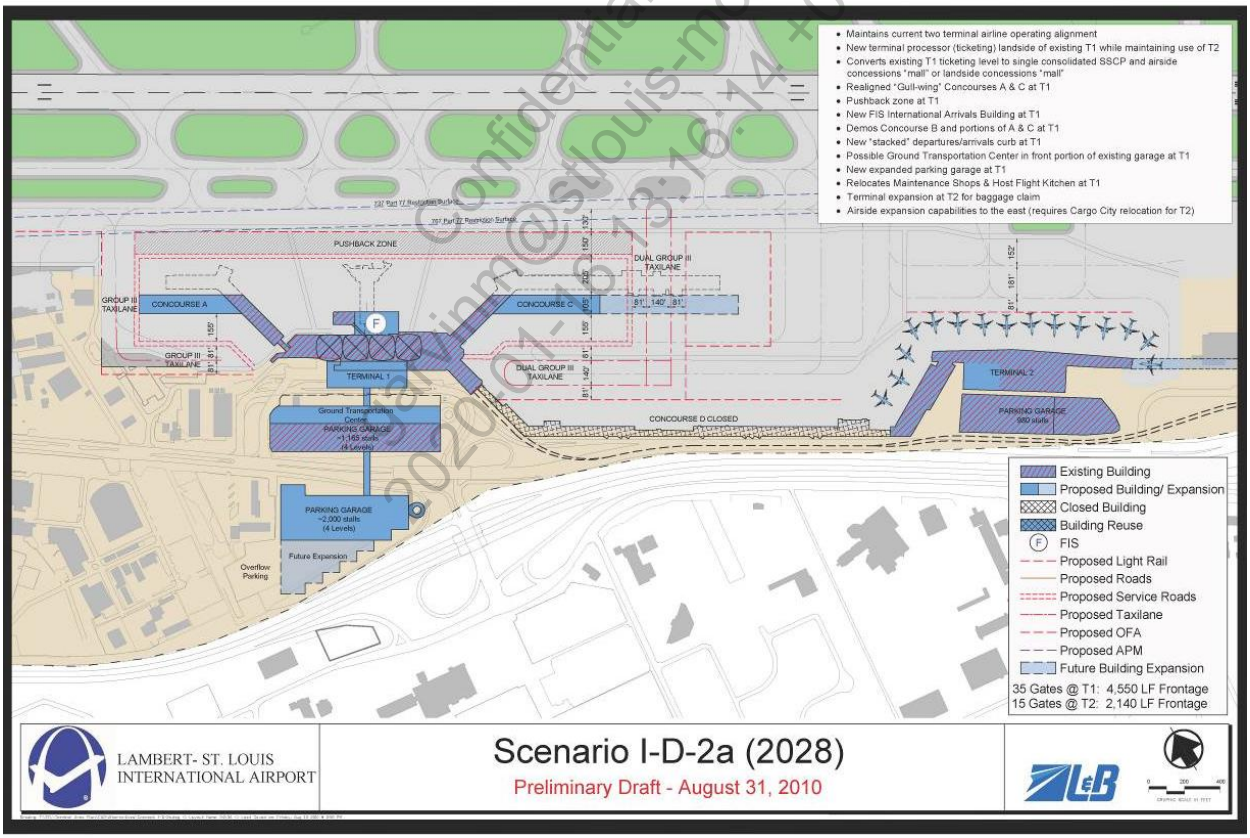
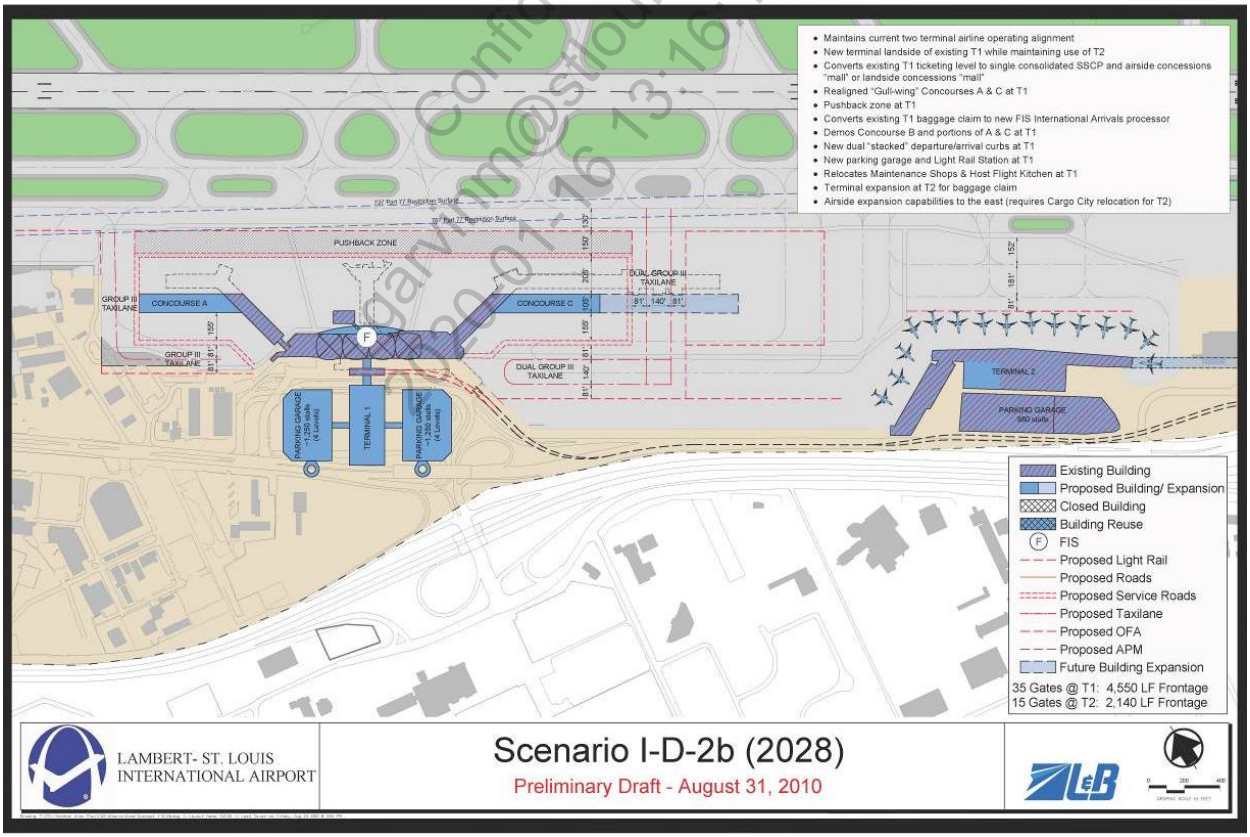


Exhibit 5.2-9, ***Scenario I-D-2b***, maintains the current two terminal airline operating alignment and reuses the existing T2 processor. A new dual-curb landside T1 processor is constructed between two new multi-decked parking structures in the location of the current garage. Existing T1 ticketing is reconfigured as a single consolidated passenger security screening area and concessions mall. Portions of the existing "Gull-wing" concourse alignment are realigned and widened to provide increased aircraft parking depths and pushback zone. Concourses B and D are also removed and closed respectively.

International gates and FIS functions are relocated from T2 to T1 and expansion of T2's baggage claim is required to meet future demand. The T2 parking garage is also expanded to meet future demand.

Lambert International Boulevard is realigned in order to accommodate the new T1 parking garage. The existing light rail alignment is extended to a new station at the T1 parking garage abandoning the existing station at the current T1 location. The existing maintenance shops and HOST flight kitchen require relocation.

Exhibit 5.2-9
SCENARIO I-D-2b
Lambert-St. Louis International Airport



5.2.6.2 Scenario II – Consolidated Terminal Alternatives

Exhibit 5.2-10, *Scenario II-B-1*, consolidates all operations at T1 into a wider linear double-loaded concourse providing increased aircraft parking depths and pushback zone with centrally located passenger security screening and concessions mall. The existing staggered departures/arrival curb is retained with expansion of curb front capabilities. Concourses B and D are also removed and closed respectively. An Automated People Mover (APM) system is provided to enhance passengers' level of service and decrease walking distances.

International gates and FIS functions are relocated from T2 to T1 and T2 is potentially reused for other development uses. The T1 parking garage is expanded to meet future demand and the T2 light rail station and garage are retained for potential remote parking capabilities. The existing maintenance shops and HOST flight kitchen require relocation.

Exhibit 5.2-10
SCENARIO II-B-1
Lambert-St. Louis International Airport

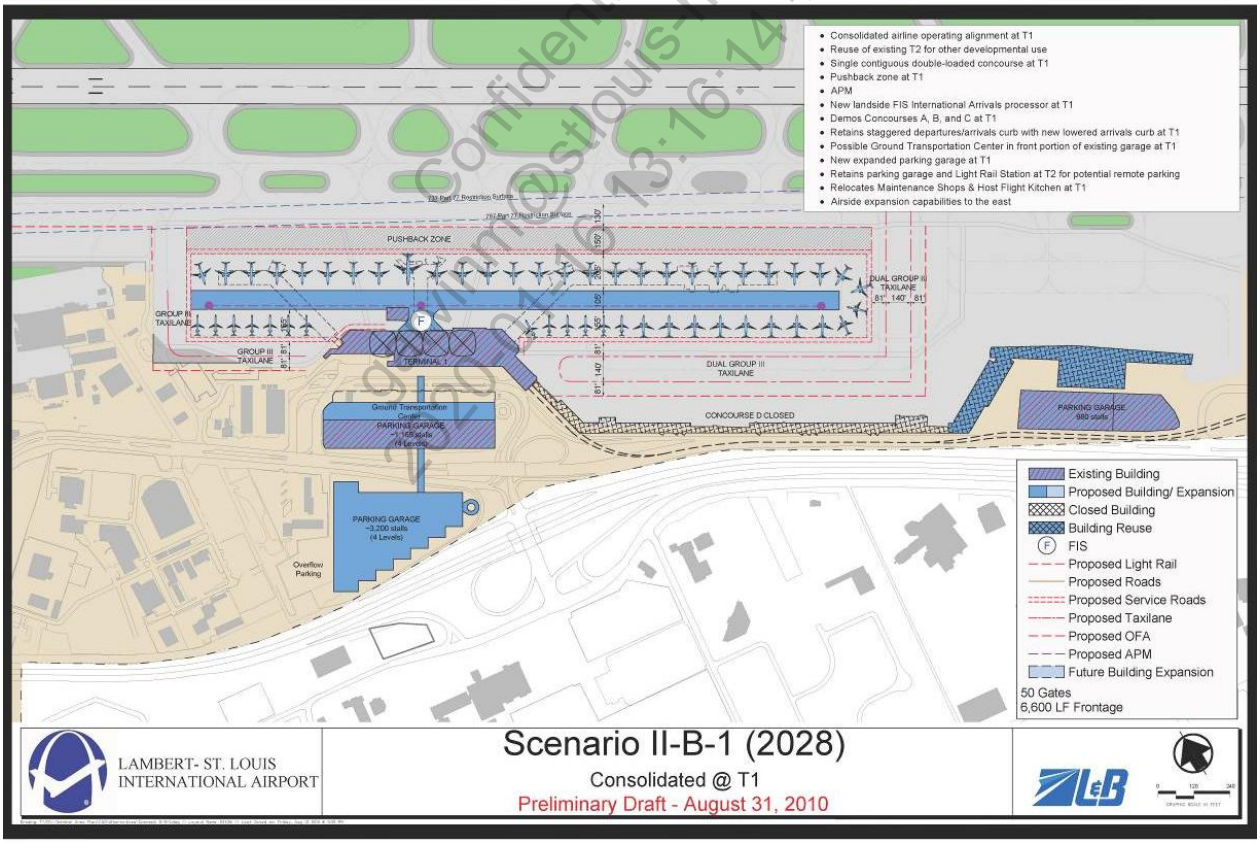


Exhibit 5.2-11, *Scenario II-B-2*, consolidates all operations at T2 into wider multiple double-loaded piers. Expansion of T2's ticketing and baggage claim allows for a centrally located passenger security screening area and concessions mall. A new centrally located FIS processing area is also constructed. The existing Cargo City to the east of the existing terminal is relocated to allow for airside concourse gate expansion. An APM system is provided to enhance passengers' level of service and decrease walking distances.

The existing "stacked" departures/arrival curb is retained with expansion of curb front capabilities. New egress access roadways are constructed and linked to LIB. The existing T2 parking garage is expanded to meet future demand requirements and the T1 garage and light rail station are retained for potential remote parking capabilities. The existing T1 concourses are removed with the processor retained for other development use. The existing ATCT at T1 is also retained.

Exhibit 5.2-11
SCENARIO II-B-2
Lambert-St. Louis International Airport

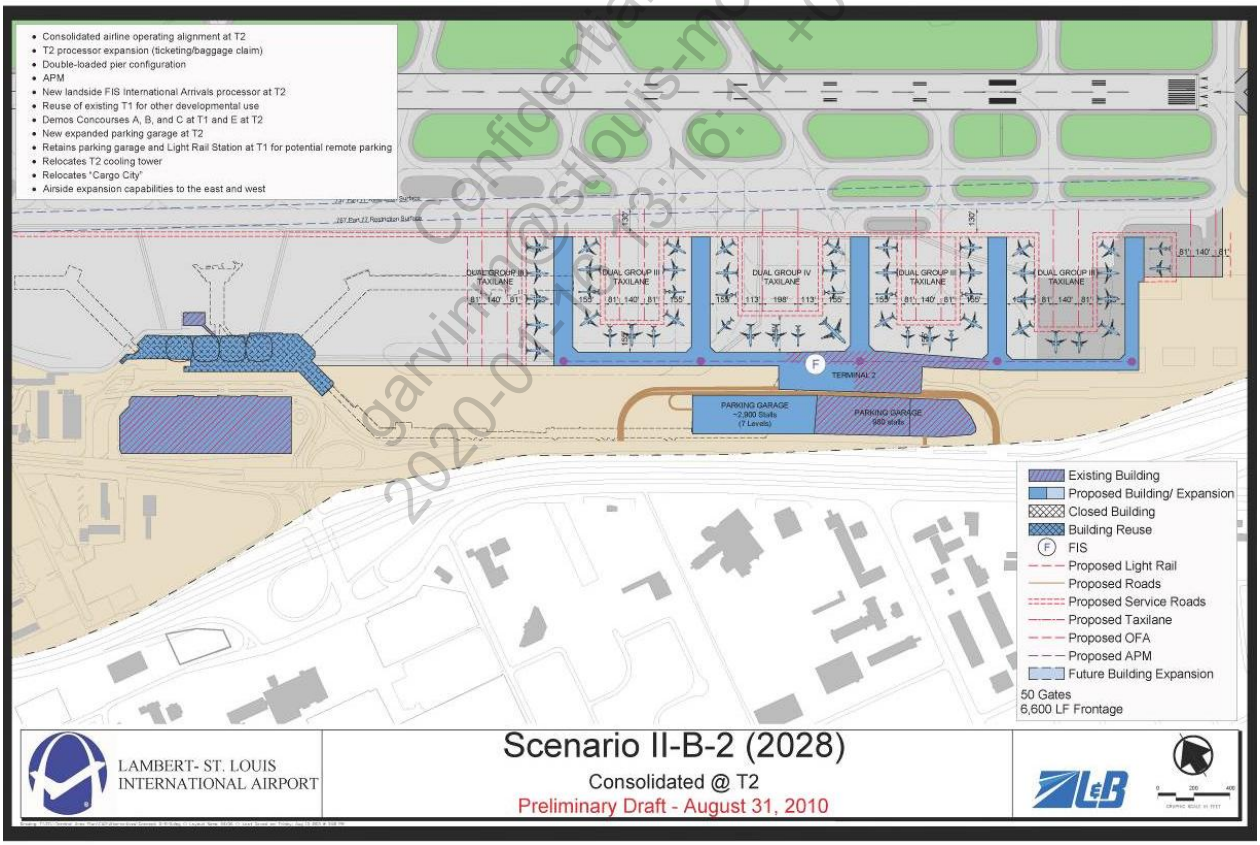


Exhibit 5.2-12, *Scenario II-C-1*, constructs a new consolidated terminal processor between T 1 and T 2. The exiting T1 single-loaded linear concourse is extended to meet a new double-loaded concourse along the existing T1 Concourse C alignment. Both concourses terminate into a new terminal processor with centrally located passenger security screening and concessions mall. A new landside international FIS processing area is also constructed near the centrally located international arrivals gates providing short walking distances. An APM system is provided to enhance passengers' level of service and decrease walking distances.

A new "stacked" departures/arrivals curb is constructed with new ingress/egress roadway access along with a new multi-decked parking garage and light rail station. Both existing parking garages are retained for potential remote parking capabilities. T1 and all existing concourses are removed and the existing T2 processor is retained for other development use. The existing ATCT at T1 is also retained.

Exhibit 5.2-12
SCENARIO II-C-1
Lambert-St. Louis International Airport

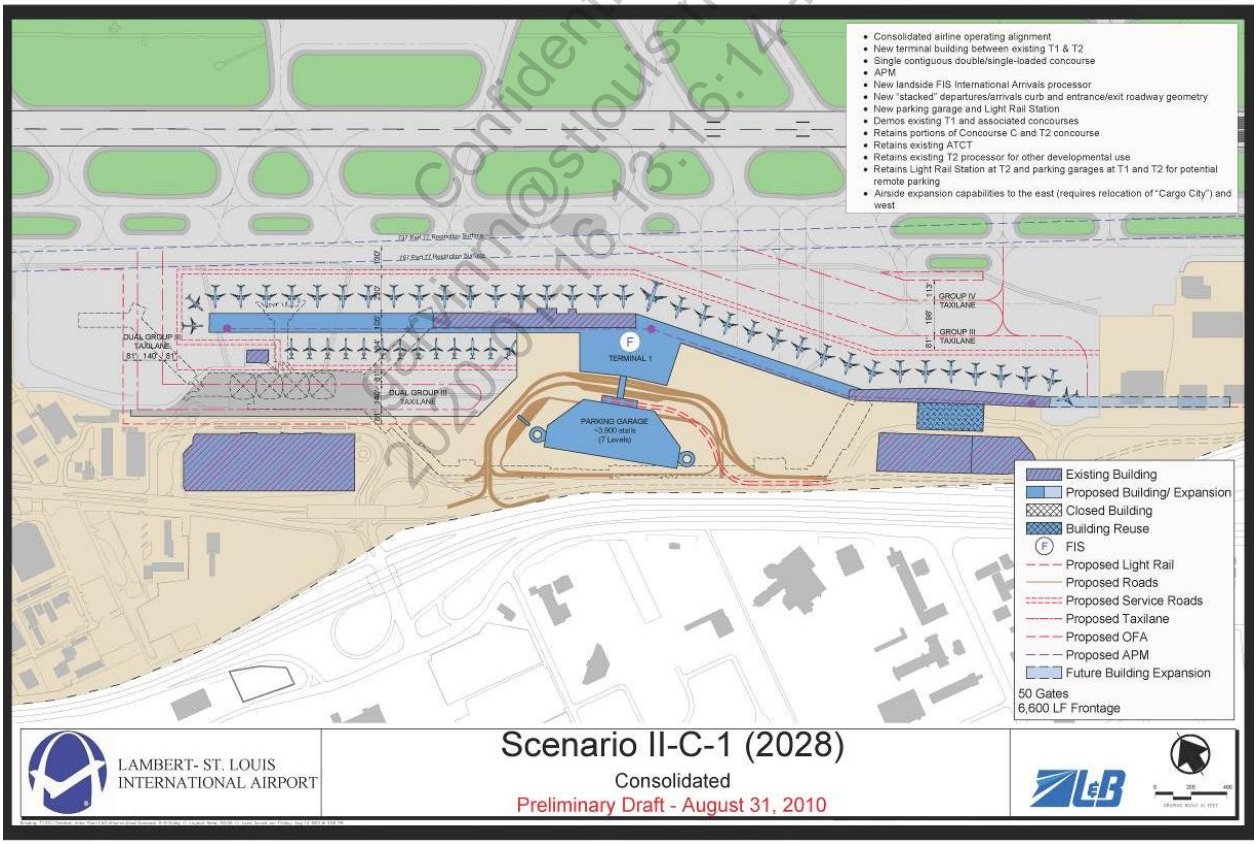


Exhibit 5.2-13, Scenario II-C-2, constructs a new consolidated terminal processor located on Missouri Air National Guard site. This provides area to construct a new double-loaded linear concourse alignment providing increased aircraft parking depth and pushback zone and centrally located passenger security screening and concessions mall. A new landside international FIS processing area is also constructed near the centrally located international arrivals gates providing short walking distances. An APM system is provided to enhance passengers' level of service and decrease walking distances. Existing T1 facilities are eliminated except for the parking garage and T2 is retained for other development use.

Lambert International Boulevard is realigned in order to accommodate the new T1 parking garage. The existing light rail alignment is extended to a new station at the new consolidated terminal parking garage, abandoning the existing station at the current T1 location. The existing T2 station and parking garage could be retained for remote parking capabilities. The existing ATCT would potentially require relocation along with the maintenance shops, HOST flight kitchen, Main Power Plant, and cooling towers.

Exhibit 5.2-13
SCENARIO II-C-2
Lambert-St. Louis International Airport

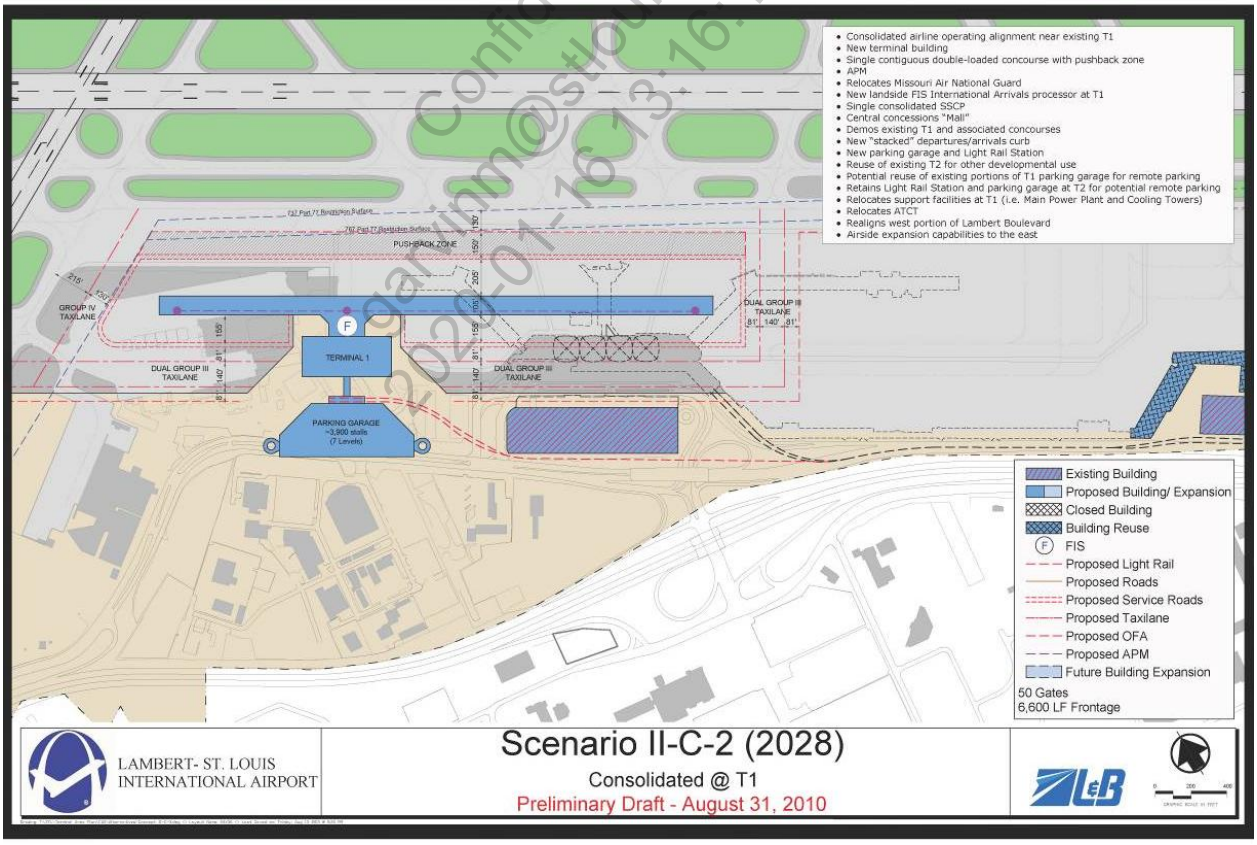


Exhibit 5.2-14, *Scenario II-D-1*, constructs a new consolidated terminal airside of the existing T1 processor. This provides for a centrally located passenger security screening area and concessions mall. The existing T1 "Gull-wing" concourse alignment is eliminated and a wider linear double-loaded concourse is constructed providing increased aircraft parking depth and pushback zone.

A new landside international FIS processing area is also constructed near the centrally located international arrivals gates providing short walking distances. An APM system is provided to enhance passengers' level of service and decrease walking distances. Existing T1 facilities are eliminated and T2 retained for other development use and potential remote parking capabilities.

The existing light rail alignment is extended to a new station at the T1 parking garage abandoning the existing station at the current T1 location. The existing ATCT would require relocation as well as the existing maintenance shops and HOST flight kitchen.

Exhibit 5.2-14
SCENARIO II-D-1
Lambert-St. Louis International Airport

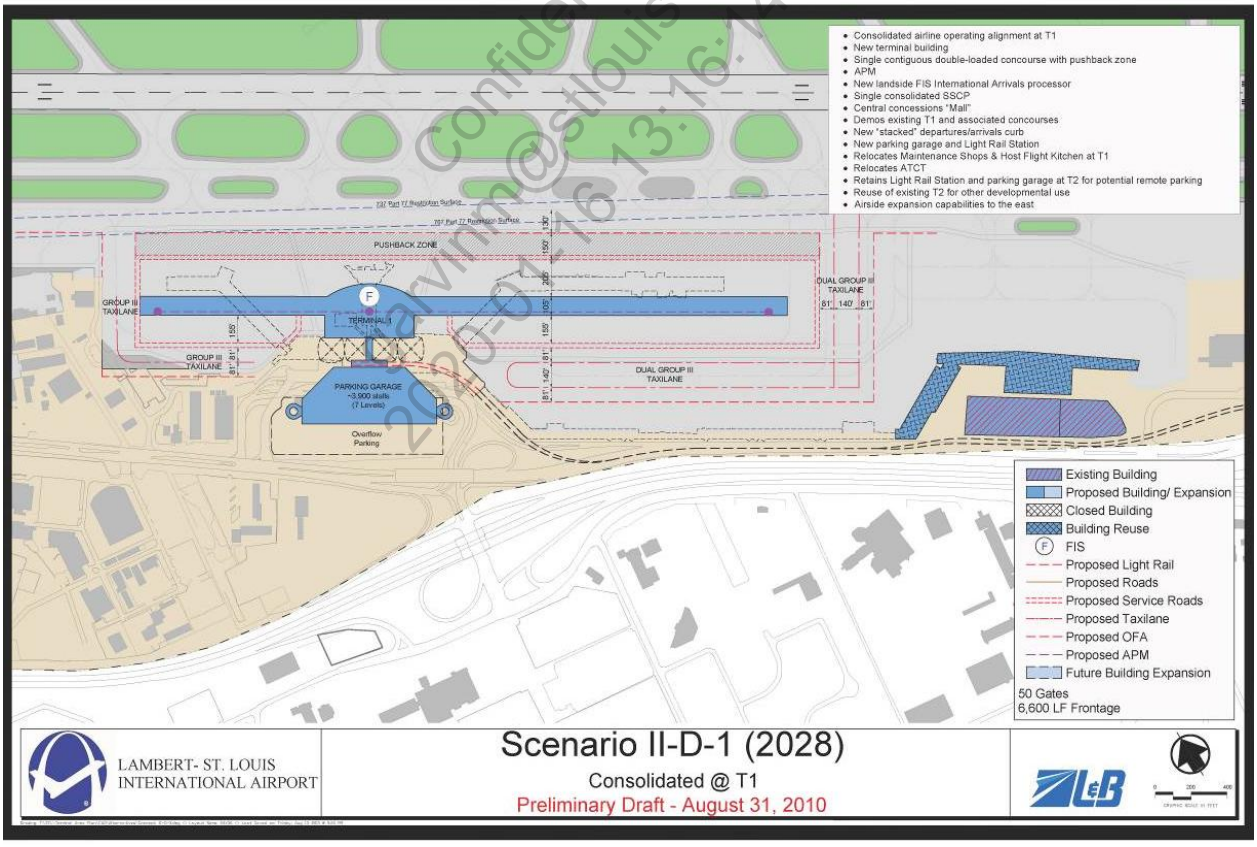


Exhibit 5.2-15, *Scenario II-D-2*, constructs a new consolidated terminal processor located landside of the existing T1 terminal processor. This provides for a centrally located passenger security screening area and concessions mall. Portions of the existing T1 "Gull-wing" concourse alignment are realigned and widened to provide increased aircraft parking depths and pushback zone. Concourses B and D are also removed. A new landside international FIS processing area is also constructed near the centrally located international arrivals gates providing short walking distances.

A portion of the existing T1 garage is removed to allow for a new "stacked" departures/arrivals curb constructed south of the existing staggered curb. The T1 parking garage is expanded to meet future demand and the T2 light rail station and garage are retained for potential remote parking capabilities. T2 is also retained for other development use. The existing maintenance shops and HOST flight kitchen require relocation.

Exhibit 5.2-15
SCENARIO II-D-2
Lambert-St. Louis International Airport

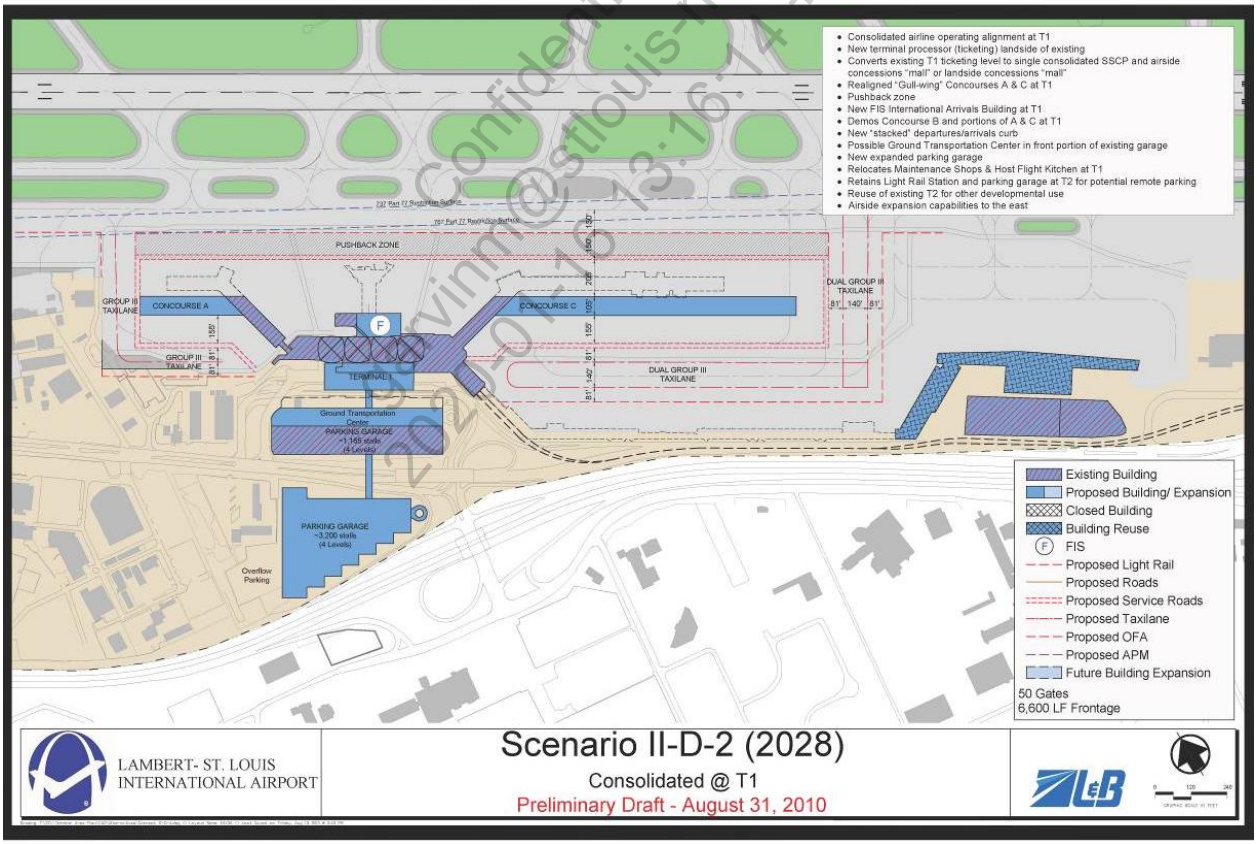
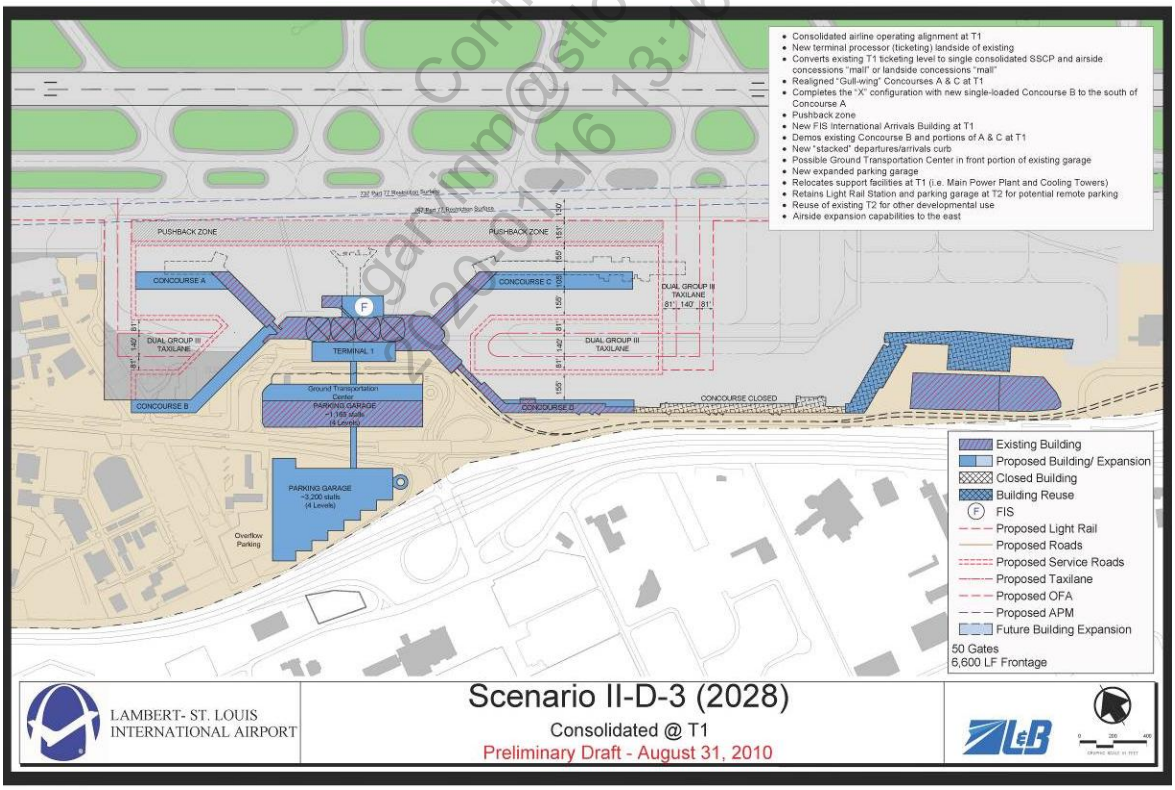


Exhibit 5.2-16, *Scenario II-D-3*, constructs a new consolidated terminal processor located landside of the existing T1 terminal processor. This provides for a centrally located passenger security screening area and concessions mall. Portions of the existing T1 "Gull-wing" concourse alignment are realigned and widened to provide increased aircraft parking depths and pushback zone. A portion of existing Concourse D remains and to complete the "X" gate configuration an additional single-loaded concourse on the west side of T1 is constructed. A new landside international FIS processing area is also constructed near the centrally located international arrivals gates providing short walking distances. Concourse B is removed and the remaining portion of Concourse D not used for passenger activity is closed.

A portion of the existing T1 garage is removed to allow for a new "stacked" departures/arrivals curb constructed south of the existing staggered curb. The T1 parking garage is expanded to meet future demand and the T2 light rail station and garage are retained for potential remote parking capabilities. T2 is also retained for other development use. The existing maintenance shops, HOST flight kitchen, Main Power Plant, and cooling towers require relocation.

Exhibit 5.2-16
SCENARIO II-D-3
Lambert-St. Louis International Airport



5.2.7 INITIAL TERMINAL ALTERNATIVES EVALUATION

Following the development of the 14 alternatives, an initial evaluation matrix shown in **Table 5.2-1, *Initial Terminal Alternative Comparisons***, was created using the key planning attributes previously described. A series of positive and negative attributes where then formulated in order to evaluate each of the alternatives one against another. A meeting was held with Airport staff to discuss and evaluate the alternatives based on the initial evaluation matrix. Alternatives that processed the most positive attributes were suggested as the best to move forward. At the conclusion of the meeting with Airport staff, five shortlist alternatives were selected for further investigation and evaluation.

Table 5.2-1
INITIAL TERMINAL ALTERNATIVE COMPARISONS
Lambert-St. Louis International Airport

Characteristics	Scenario													
	I – Two Terminals							II – One Terminal						
	Current Airline Operating Alignment							Consolidated Airline Operating Alignment						
								@ or Near T1					T1&T2	@T2
	I-A-1	I-B-1a	I-B-1b	I-C-1	I-D-1	I-D-2a	I-D-2b	II-B-1	II-C-2	II-D-1	II-D-2	II-D-3	II-C-1	II-B-2
Existing T1 A & C Concourse Alignement	✈													
Repositioned T1 A & C Concourse Alignement		✈	✈					✈						
Repositioned T1 A & C Concourse Alignment with Repositioned Curb and/or New Terminal														
Between T1 & T2													✈	
Missouri Air Guard Site				✈					✈					
Airside of Existing T1					✈					✈				
Landside of Existing T1						✈	✈				✈	✈		
"Gull-wing" Concourse	✈	✈									✈	✈		
Linear Concourse			✈	✈	✈	✈	✈	✈	✈	✈			✈	
Pier Concourse														✈
Staggered Arrivals/Departures Curb	✈	✈	✈					✈						
Stacked arrivals/departures curb				✈	✈	✈	✈		✈	✈	✈	✈	✈	✈
Positive Attributes														
Meets 2028 & Beyond Gate Requirements	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fully Double-Loaded Concourses								√	√	√	√		√	√
Aircraft Pushback Zone		√	√	√	√	√	√	√	√	√	√	√		
Short O&D Pax Walking Distances	√	√	√	√	√	√		√	√	√		√	√	√
Single Consolidated SSCP			√	√	√	√	√	√	√	√	√	√	√	√
Central Concessions "Mall"			√	√	√	√	√	√	√	√	√	√	√	√
Favorable Phasing Ability														
Airside	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Landside				√					√				√	√
Minimal Landside Support Facility Relocation	√	√	√		√	√	√	√		√	√		√	√
Potential LEED New Construction Certification	√[1]	√	√	√	√	√	√	√	√	√	√	√	√	√
Negative Attributes														
Relocates ATCT				X	X				X	X				
Single Taxilanes	X	X	X			X	X	X		X	X	X		
Single-loaded Concourses	X	X	X	X	X	X	X					X	X	
Extensive walking distances requires APM System								X	X	X			X	X
Decentralized SSCP	X	X												
Decentralized Airside Concessions	X	X												X
Intl Bag Recheck due to Airside FIS	X													
Significant Landside Phasing Constraints					X	X	X			X	X			X
Requires Missouri Air National Guard site				X					X					
Extensive Landside Support Facilities Relocation				X	X				X			X		
Realigns or Extends Light Rail Station				X	X		X		X	X			X	
Major Roadway Realignment				X			X		X				X	X
Requires Major New Infrastructure				X	X	X	X		X	X	X	X	X	X
Significant Implementation & Phasing Issues					X	X	X	X		X	X	X		
Significant Cost Implications				X	X	X	X	X	X	X	X	X	X	X
Unweighted Score	0	2	6	-1	0	2	-1	5	1	1	3	1	3	3

Notes: 1 Could be considered under LEED New Construction if the project included major HVAC renovation, significant envelope modifications, and major interior rehabilitation.
Key: √ = +1, X = -1

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5.2.8 SHORT-LISTED TERMINAL ALTERNATIVES

The initial terminal development alternatives were created to cover a variety of feasible terminal area expansion options. These 14 alternatives were assessed against the initial planning criteria previously presented. These criteria were then used to eliminate alternatives that were considered less desirable or significantly deficient. The results of this initial assessment led to the selection of the five short-listed terminal alternatives shown in **Exhibit 5.2-17, *Short-Listed Terminal Alternatives Matrix***, and **5.2-18, *Short-Listed Terminal Alternatives***. To aid in the evaluation process pros and cons for each of the short-listed alternatives were developed and discussed prior to the development of the more detailed criterion which were established and defined as described in Section 5.2.9, *Evaluation of Short-Listed Alternatives*. Refinements to the plans were on-going and are presented below with their associated pros and cons.

Exhibit 5.2-17
SHORT-LISTED TERMINAL ALTERNATIVES MATRIX
Lambert-St. Louis International Airport

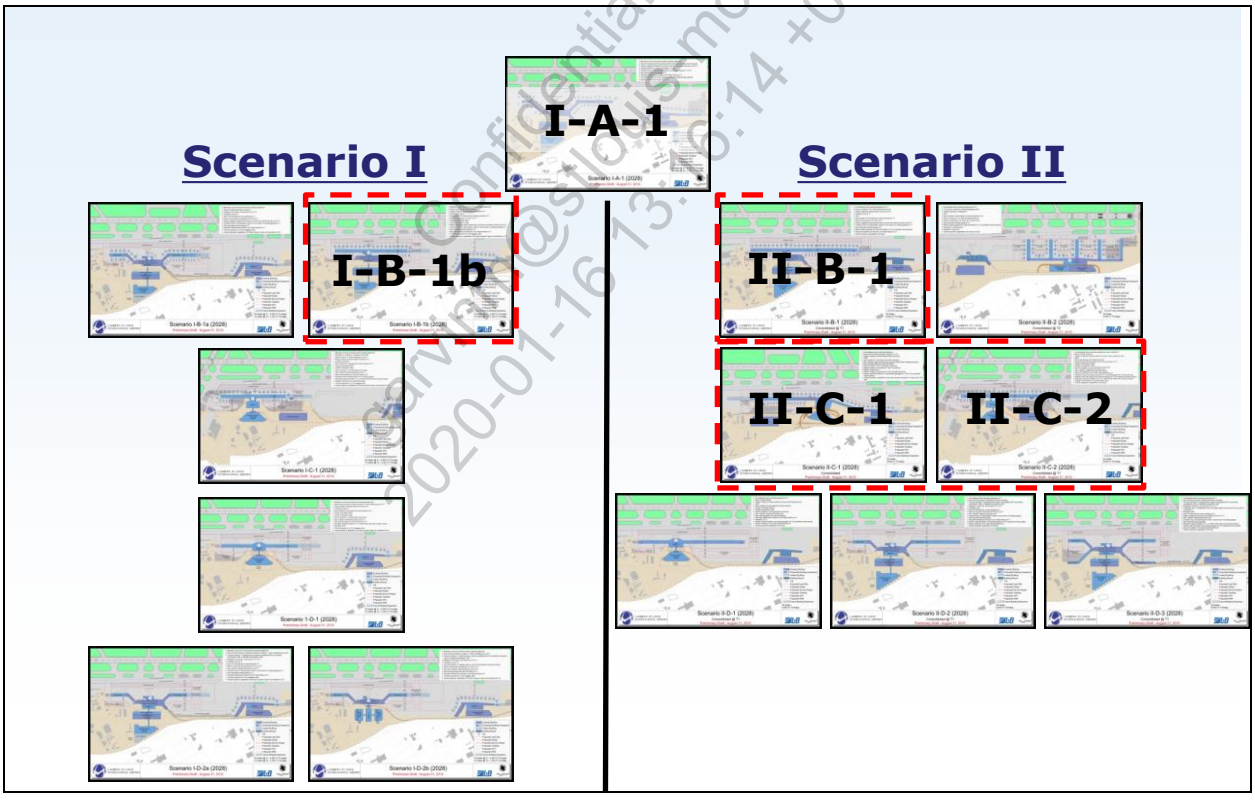
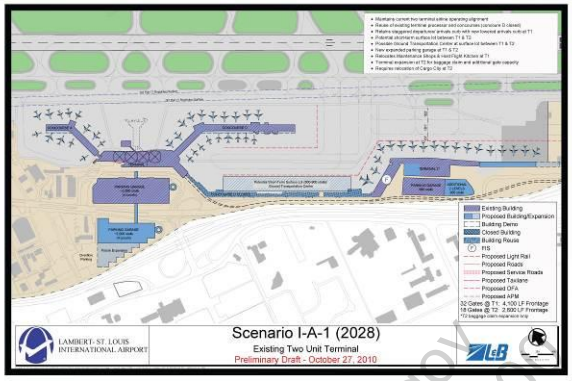
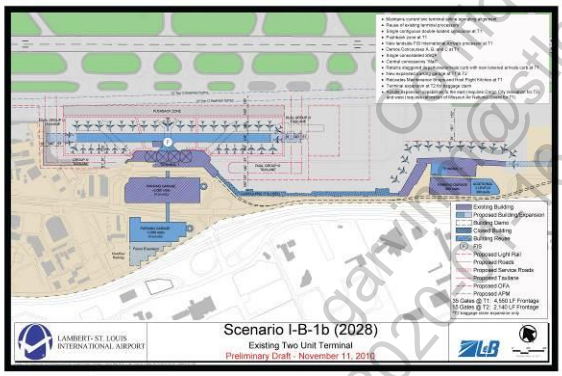


Exhibit 5.2-18
SHORT-LISTED TERMINAL ALTERNATIVES
Lambert-St. Louis International Airport

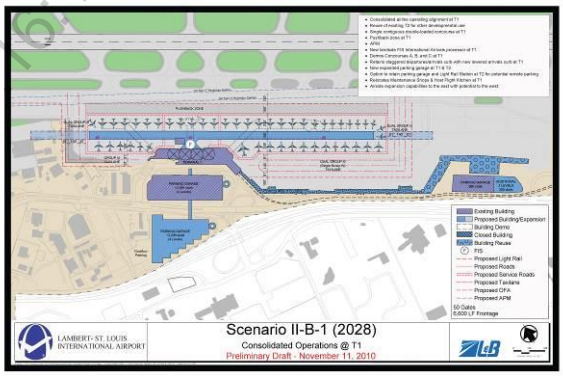
SCENARIO I-A-1



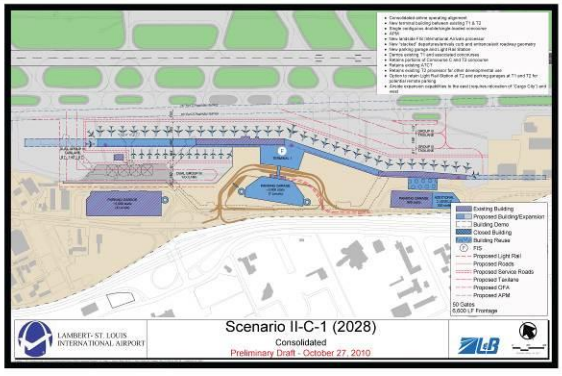
SCENARIO I-B-1b



SCENARIO II-B-1



SCENARIO II-C-1



SCENARIO II-C-2

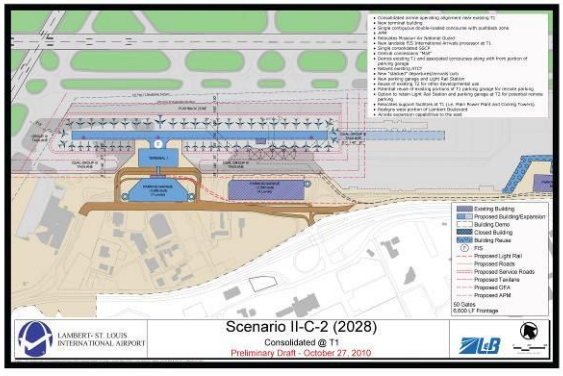


Exhibit 5.2-19, *Scenario I-A-1 (Baseline)*, as previously described, maintains the current two terminal airline operating alignment and reuses the exiting terminal processors. This alternative represents a "minimum" build condition to which the remaining alternatives were compared.

PROS:

Airside

- Meets MP 2028 gate capacity
- Provides ability to expand concourse/gate capacity incrementally
- Reuse of existing apron and taxi infrastructure
- Retains existing Air Traffic Control Tower (ATCT) at T1
- Maintains short O&D passenger walking distances from security screening checkpoints (SSCP)

Terminal

- Reuse of existing terminals and concessions with ability to grow into existing capacity
- Retains double loaded concourses at T1
- Potential for concourse circulation expansion (width) at T1
- Minimal apron rehabilitation/expansion

Landside

- Reuse of some of the existing entrance roadway infrastructure
- Maintains existing light rail stations at terminals
- Convenience of close-in covered parking
- New lowered arrivals level roadway at T1
- New parking garage expansion at T1 and T2

CONS:

Airside

- Aircraft pushback operations onto active taxiway Charlie at T1
- Single taxilane along the south Concourse A gates at T1 limit efficient aircraft movements if expansion occurs
- Missouri Air National Guard limits expansion to the west beyond 2028 MP horizon

Terminal

- No moving walkways in concourses at T1 without circulation expansion which impacts on-going operations
- Decentralized concessions program at T1 post security resulting from the splitting of passenger flows; inability to develop a primary secure airside concessions hall with exposure to all passengers thereby limiting concession choices and revenues performance
- Requires baggage claim expansion at T2 to meet future demand
- Cost to maintain existing T1 infrastructure which is 40-50 plus years old today and 70 plus by 2028
- Cost to maintain multiple unit terminals and operations
- Limited existing T1 Concourse A expansion ability to the west in event mainline carriers grow and would require realignment of airlines between Concourse A and C
- Existing airside international arrivals processing facility

Landside

- Challenge of maintaining existing operations while building new terminal roadway infrastructure at T1
- Retains existing departures curb over baggage claim at T1
- Tight landside envelope at both terminals
- Limited close-in parking expansion capabilities at T2 (see Section 5.3.8)
- Limited arrivals curb expansion opportunities beyond existing capacity at T2
- Challenge of increasing departures curb capacity while maintaining existing operations at T2

Implementation

- Complexity of building new T1 arrivals roadway infrastructure while maintaining existing roadway operations
- Landside phasing ability
- Cost and difficulty
- Consideration of possible security issues, Foreign Object Debris (FOD) containment, and blast deflection requirements

Environmental

- Keeping existing terminals potentially limits the applicability of new LEED sustainable design approaches, more efficient Mechanical, Electrical and Plumbing (MEP) systems and environmentally friendly materials

Exhibit 5.2-19
SCENARIO I-A-1 (BASELINE)
Lambert-St. Louis International Airport

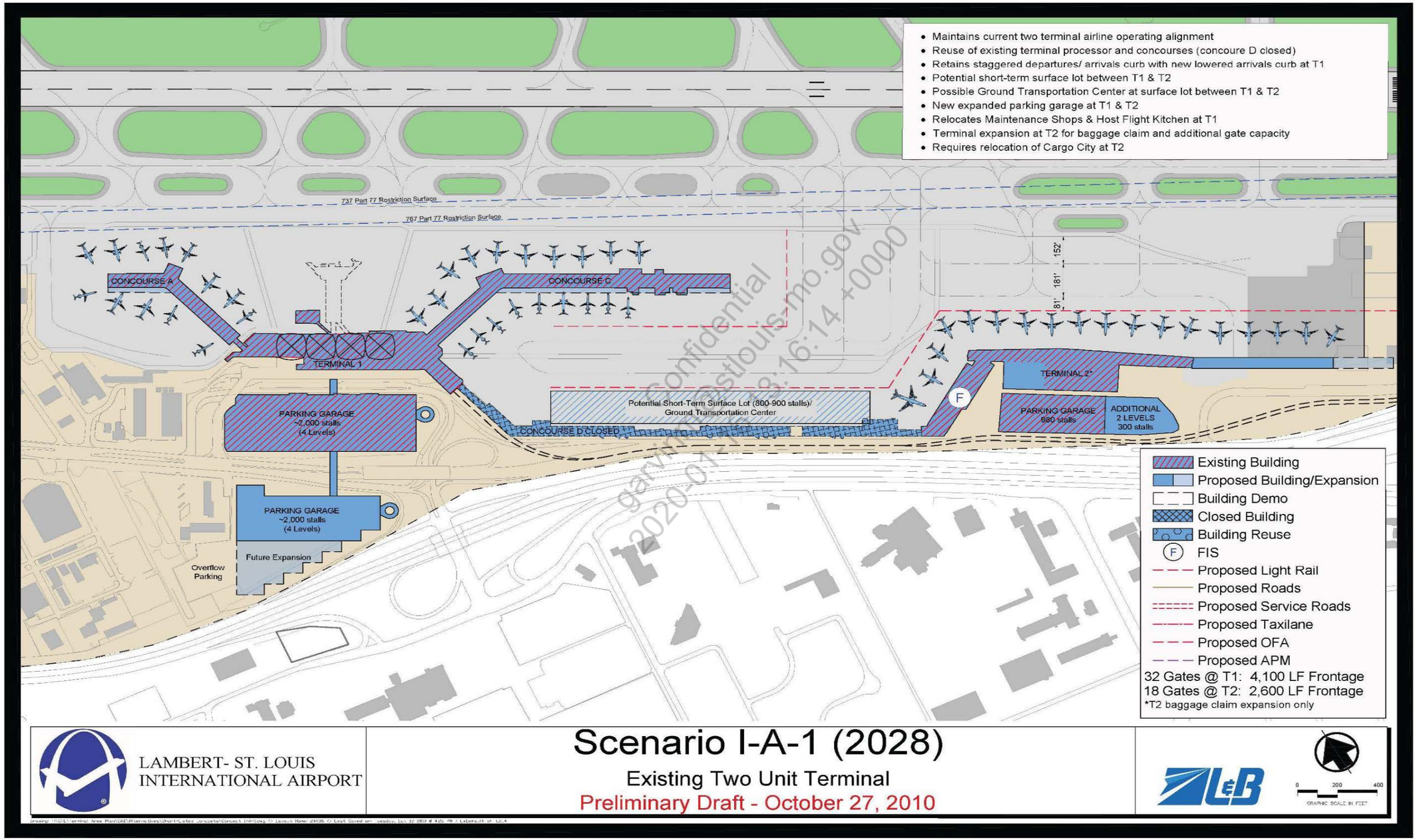


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Exhibit 5.2-20, Scenario I-B-1b, as previously described, maintains the current two terminal airline operating alignment and reuses the existing terminal processors.

PROS:

Airside

- Meets MP 2028 aircraft gate capacity in single contiguous flight line with incremental gate expansion potential
- Realigned concourse alignment at T1 allows for pushback zone to increase airside taxi flow efficiency
- Potential for dual taxilanes at both terminals
- Retains existing ATCT
- Minimal apron rehabilitation/expansion

Terminal

- Reuse of existing terminals and concessions with ability to grow into existing capacity
- Efficient wider double-loaded concourses at T1
- Centralized security for more efficient operation which flows all outbound passengers past a primary concession hall and allows enhanced product variety and revenue performance
- Landside "walk to" international arrivals processing facility at T1

Landside

- Reuse of some of the existing entrance roadway infrastructure
- Maintains existing light rail stations at terminals
- Convenience of close-in covered parking
- New lowered arrivals level roadway at T1
- New parking garage expansion at T1 and T2

Environmental

- Partial new construction offers opportunity to incorporate LEED sustainability design principles and materials

CONS:

Airside

- T1 westward concourse construction requires relocation of some landside support facilities
- Missouri Air National Guard limits expansion to the west beyond 2028 MP horizon
- Longer walking distances to furthest gates at T1

Terminal

- Requires baggage claim expansion at T2 to meet future demand
- Cost to maintain existing T1 infrastructure which is 40-50 plus years old today and 70 plus by 2028
- Cost to maintain multiple unit terminals and operations

Landside

- Challenge of maintaining existing operations while building new terminal roadway infrastructure at T1
- Retains existing departures curb over baggage claim T1
- Tight landside envelope at both terminals
- Limited close-in parking expansion capabilities at T2
- Limited arrivals curb expansion opportunities beyond existing capacity at T2
- Challenge of increasing departures curb capacity while maintaining existing operations at T2
- Requires relocation of existing maintenance shops and HOST flight kitchen

Implementation

- Complexity of building new T1 arrivals roadway infrastructure while maintaining existing roadway operations
- Landside phasing ability
- Cost and difficulty

Environmental

- Keeping existing terminals potentially limits the applicability of new LEED sustainable design approaches, more efficient Mechanical, Electrical and Plumbing (MEP) systems and environmentally friendly materials

Exhibit 5.2-20
SCENARIO I-B-1b
Lambert-St. Louis International Airport

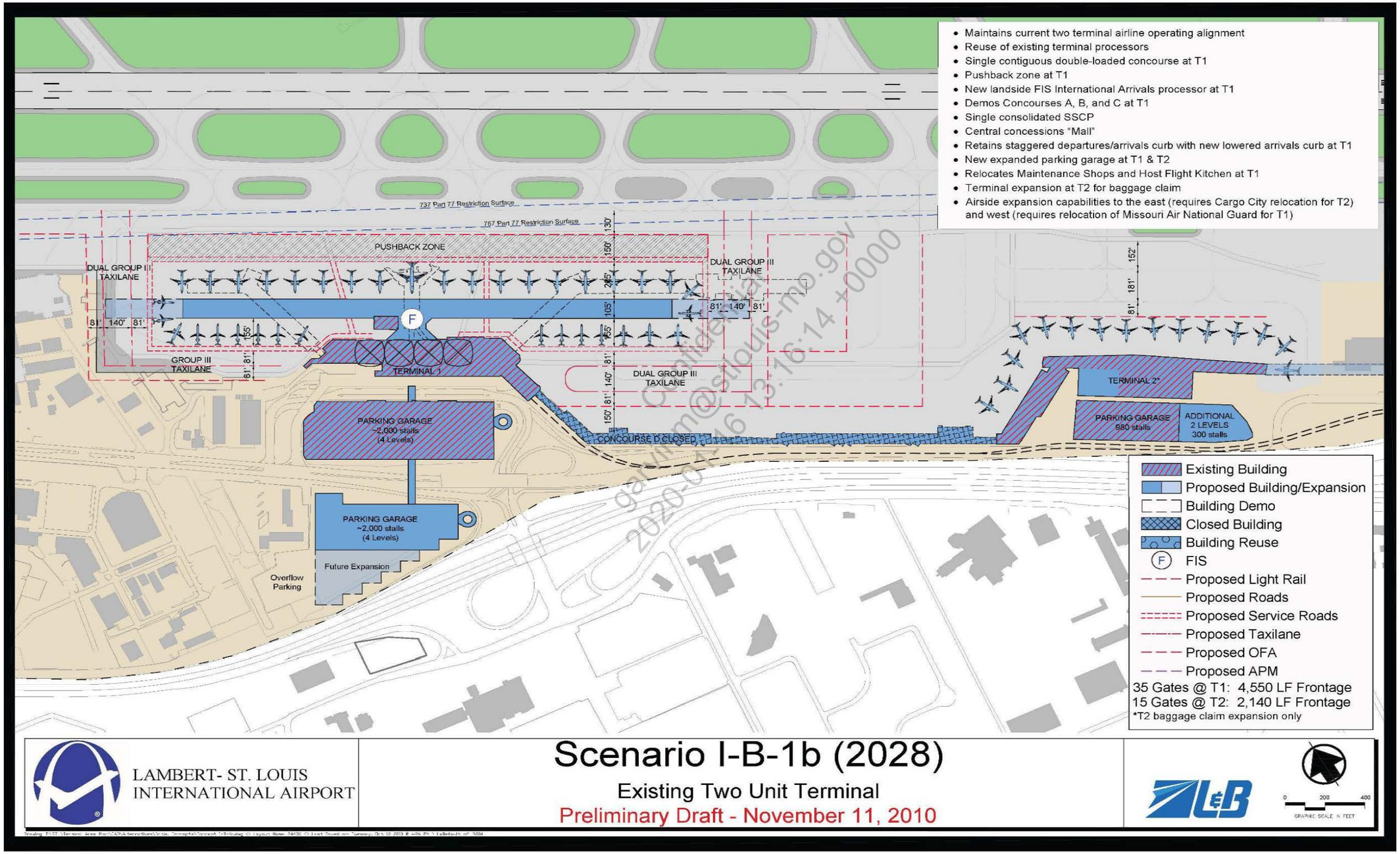

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Exhibit 5.2-21, *Scenario II-B-1*, as previously described, consolidates all passenger operations at T1 and constructs a new linear double-loaded concourse alignment.

PROS:

Airside

- Meets MP 2028 aircraft gate capacity in single contiguous flight line with incremental gate expansion potential
- Realigned concourse alignment at T1 allows for pushback zone to increase airside taxi flow efficiency
- Potential for dual taxilanes
- Retains existing ATCT
- Minimal apron rehabilitation/expansion

Terminal

- Consolidated terminal operations at T1
- Reuse of existing terminals and concessions with ability to grow into existing capacity (some additional area required in baggage make-up area of T1)
- Efficient wider double-loaded concourses
- Automated People Mover (APM)
- Centralized security for more efficient operation which flows all outbound passengers past a primary concession hall and allows enhanced product variety and revenue performance
- Landside "walk to" international arrivals processing facility

Landside

- Reuse of some of the existing entrance roadway infrastructure
- Maintains existing "Metrolink" light rail station
- Convenience of close-in covered parking
- New lowered arrivals level roadway
- New parking garage expansion

Environmental

- Partial new construction offers opportunity to incorporate LEED sustainability design principles and materials

CONS:

Airside

- T1 westward concourse construction requires relocation of some landside support facilities
- Missouri Air National Guard limits expansion to the west beyond 2028 MP horizon
- Longer walking distances to furthest gates at T1
- Requires some type of assisted people mover device (APM)

Terminal

- Cost to maintain existing T1 infrastructure which is 40-50 plus years old today and 70 plus by 2028

Landside

- Challenge of maintaining existing operations while building new terminal roadway infrastructure at T1
- Retains existing departures curb over baggage claim T1
- Requires relocation of existing maintenance shops and HOST flight kitchen

Implementation

- Complexity of building new T1 arrivals roadway infrastructure while maintaining existing roadway operations
- Landside phasing ability
- Cost and difficulty

Environmental

- Keeping existing terminals potentially limits the applicability of new LEED sustainable design approaches, more efficient Mechanical, Electrical and Plumbing (MEP) systems and environmentally friendly materials

Exhibit 5-2.21
SCENARIO II-B-1
Lambert-St. Louis International Airport

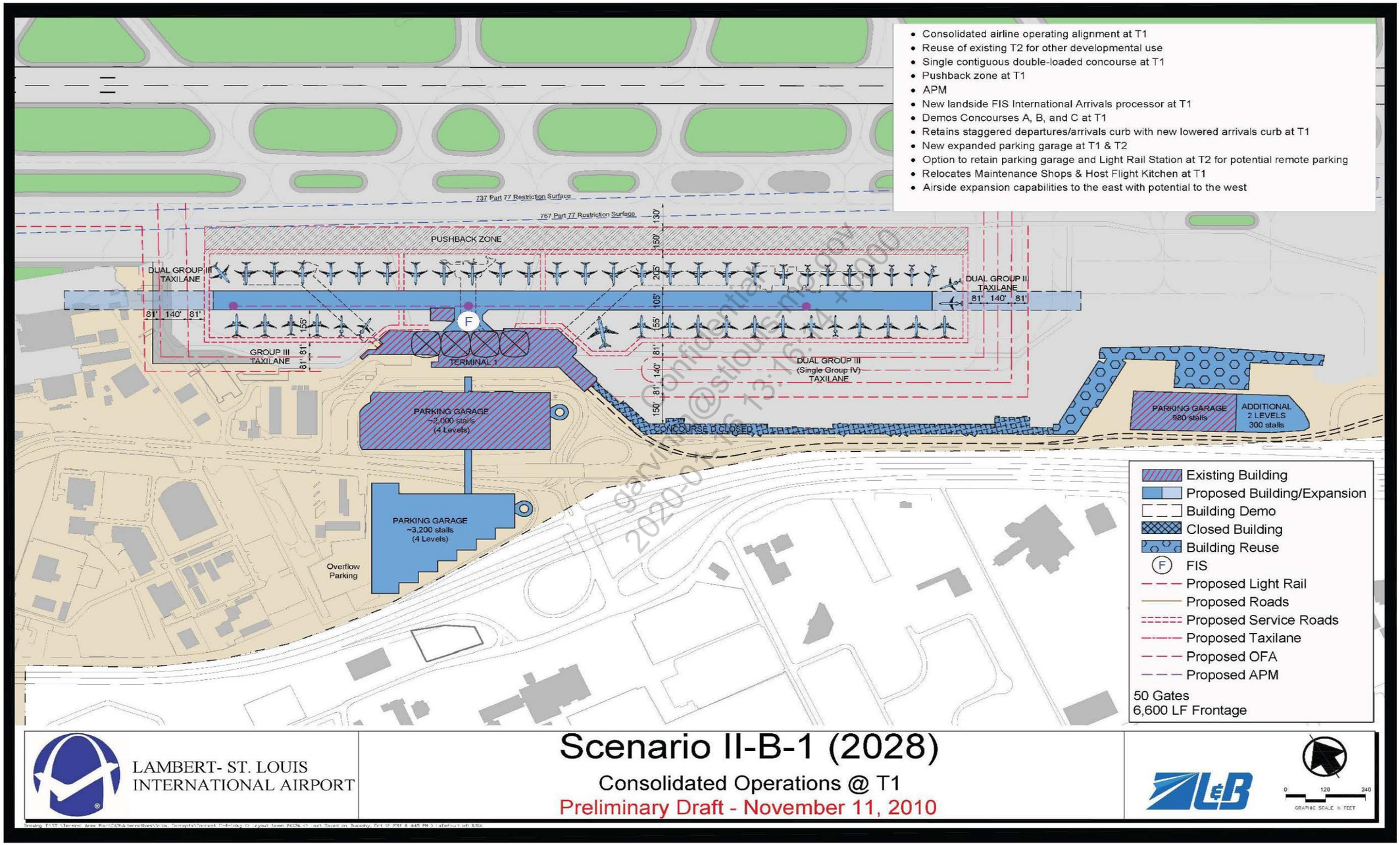

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Exhibit 5.2-22, Scenario II-C-1, as previously described, consolidates all passenger operations into a new terminal processor between existing T1 and T2 while utilizing portions of the existing terminal concourses. New ingress and egress access roadway infrastructure is also constructed.

PROS:

Airside

- Meets MP 2028 aircraft gate capacity with incremental gate expansion potential
- Partial dual taxilanes
- Retains existing ATCT

Terminal

- Consolidated terminal operations into new centralized terminal location between T1 and T2 with incremental expansion capabilities
- Reutilizes existing Concourse C and Terminal 2 concourse infrastructure
- Efficient double-loaded concourses to the west
- Centralized security for more efficient operation which flows all outbound passengers past a primary concession hall and allows enhanced product variety and revenue performance
- Landside "walk to" international arrivals processing facility

Landside

- Convenience of close-in covered parking
- New multi-level parking garage

Environmental

- Partial new construction offers opportunity to incorporate LEED sustainability design principles and materials

CONS:

Airside

- ✈ Aircraft pushback operations onto active taxiway Charlie at existing Concourse C
- ✈ Half the contact gates are on single loaded concourse creating longer walking distances
- ✈ Longer walking distances to furthest east gates
- ✈ Requires some type of assisted people mover device (APM)

Terminal

- ✈ Requires new infrastructure

Landside

- ✈ Challenge of maintaining existing operations while building new consolidated terminal and roadway infrastructure
- ✈ Long narrow site
- ✈ Requires new light rail station and alignment to terminal

Implementation

- ✈ Airside/Landside phasing ability while maintaining existing operations
- ✈ Cost and difficulty

Exhibit 5.2-22
SCENARIO II-C-1
Lambert-St. Louis International Airport

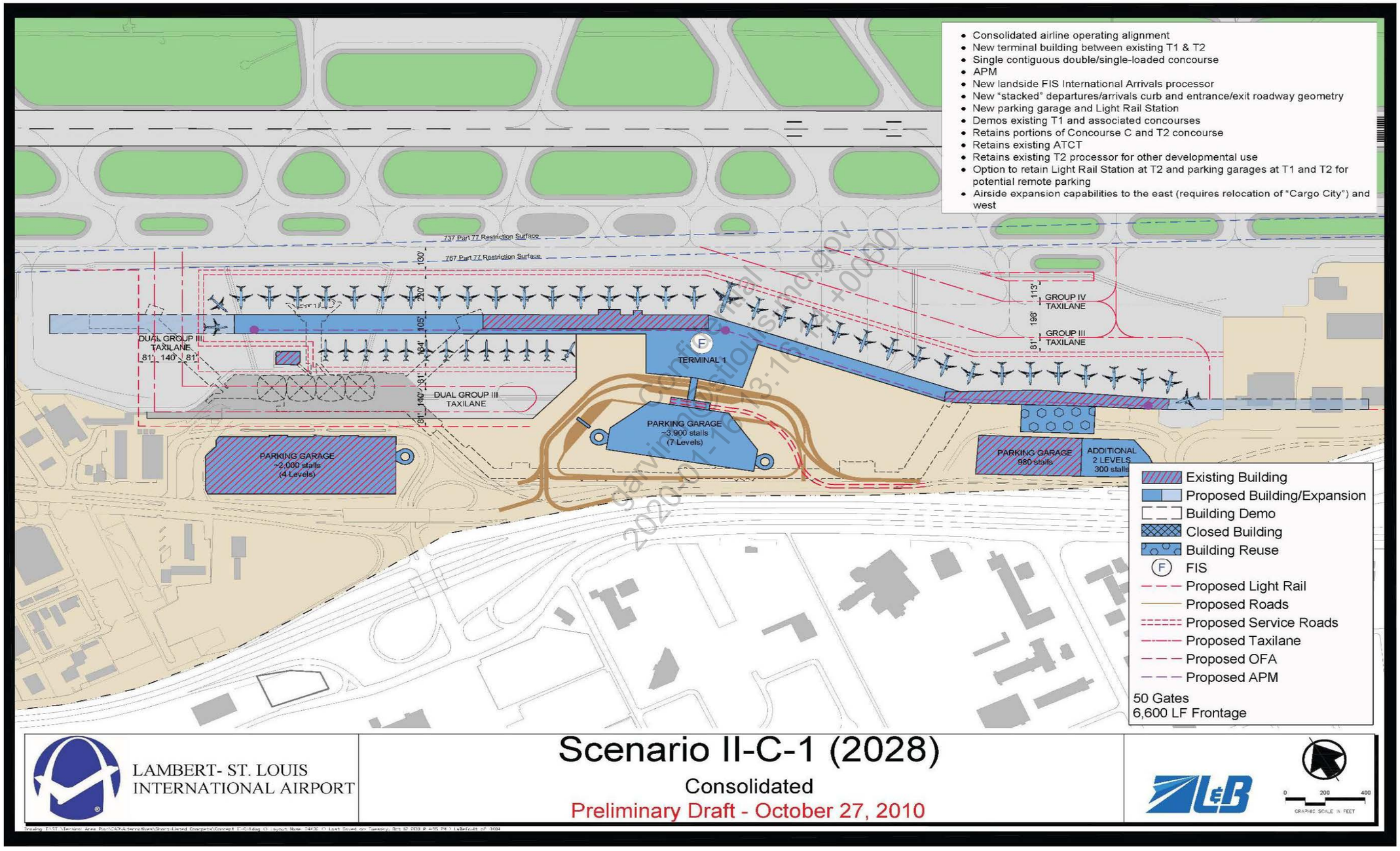

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Exhibit 5.2-23, Scenario II-C-2, as previously described, consolidates all passenger operations into a new terminal at the existing Missouri Air National Guard site. New ingress and egress access roadway infrastructure is also constructed.

PROS:

Airside

- Meets MP 2028 aircraft gate capacity in single contiguous flight line with incremental gate expansion potential to the east
- Realigned concourse alignment at T1 allows for pushback zone to increase airside taxi flow efficiency
- Dual taxilanes
- Retains existing ATCT

Terminal

- Consolidated terminal operations into new single terminal near existing T1 location
- New processor provides capacity to meet 2028 demand and beyond with incremental expansion capabilities
- Efficient wider double-loaded concourses
- Centralized security for more efficient operation which flows all outbound passengers past a primary concession hall and allows enhanced product variety and revenue performance
- Landside "walk to" international arrivals processing facility

Landside

- Provides new entrance/exit roadway infrastructure
- New "stacked" departures/arrivals curb
- Convenience of close-in covered parking
- New multi-level parking garage

Implementation

- Allows easier construction implementation and phasing while maintaining current operations

Environmental

- Completely new terminal construction maximizes opportunity to incorporate LEED sustainability design principles and materials at T1

CONS:

Airside

- ✈ Extensive apron rehabilitation/expansion and taxi infrastructure
- ✈ No gate expansion potential to the west
- ✈ Longer walking distances to furthest east gates
- ✈ Requires some type of assisted people mover device (APM)

Terminal

- ✈ Part 77 surface limitations and Runway 6/24 taxiway obstacle free areas (OFA) limit gate expansion at T1
- ✈ Non-centralized terminal processor to airside concourse

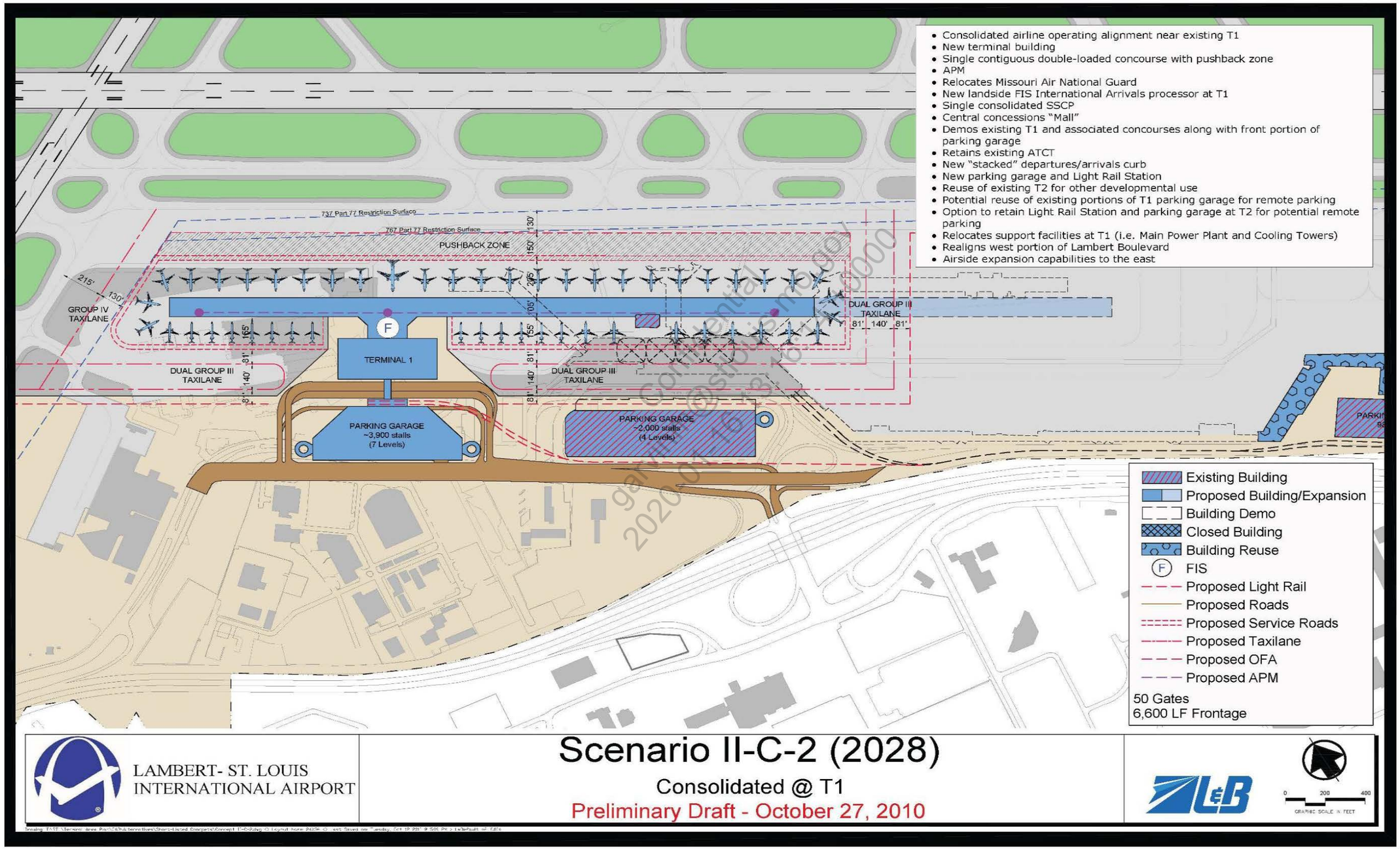
Landside

- ✈ Requires relocation of some landside support facilities along with Missouri Air National Guard
- ✈ Requires new landside access and infrastructure
- ✈ Requires realignment of Lambert Boulevard
- ✈ Requires new light rail station and alignment to terminal
- ✈ Requires relocation of existing maintenance shops, HOST flight kitchen**,** Main Power Plant, and cooling towers

Implementation

- Site requires entirely new terminal complex infrastructure

Exhibit 5.2-23
SCENARIO II-C-2
Lambert-St. Louis International Airport



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5.2.9 EVALUATION OF SHORT-LISTED ALTERNATIVES

The weightings and evaluation criterion shown in Table 5.2-3 were prepared for review and then presented to Airport staff during a working session held in October of 2010. Based on comments received from the Airport staff during the session the weightings and criteria were then refined and scores revised. Each Major Category of criteria and, secondarily, each individual criterion were assigned a relative weighted percentage as compared to each of the other evaluation criteria. The individual criteria weightings and definitions are described in **Table 5.2-2, *Terminal Alternative Evaluation Criteria Weighting***, and **Table 5.2-3, *Terminal Alternative Evaluation Criteria Definitions***, respectively. **Table 5.2-4, *Terminal Short-List Alternatives Evaluation Matrix Summary***, shows the matrix scoring results of the short-listed alternatives.

Table 5.2-2
TERMINAL ALTERNATIVE EVALUATION CRITERIA WEIGHTING
Lambert-St. Louis International Airport

EVALUATION CRITERIA WEIGHTINGS			
Criteria Categories		**Importance (Weightings)**	
		Major Category	Secondary Category
1. AIRSIDE	1.1 Meets Required Aircraft Parking Capacity 1.2 Aircraft Gate Use Flexibility 1.3 Apron/Taxilane Efficiency 1.4 Taxi Distance to Runway Ends and Exits	20%	30% 25% 25% 20%
2. TERMINAL	2.1 Meets Required Terminal Capacity 2.2 Maximizes Flexibility for Potential Operational Changes 2.3 Ability to Meet Primary Stakeholder Missions (airlines) 2.4 Passenger Convenience and Comfort *2.4.1. Origin and Destination Traffic* *2.4.2. Connecting Traffic* 2.5 Security Efficiency 2.6 Passenger Orientation to Processing 2.7 Connectivity to Other Key Facilities 2.8 Concessions Revenue Potential	20%	20% 5% 15% 30% *20%* *10%* 15% 5% 5% 5%
3. LANDSIDE	3.1 Meets Required Curb Capacity and Adequate LOS 3.2 Effectiveness of Access/Egress Roads 3.3 Ease of Passenger Orientation to Roads 3.4 Provides Easy Access to Future Mass Transit	20%	30% 30% 30% 10%
4. IMPLEMENTATION FEASABILITY	4.1 Ability to Phase Construction/Modifications *4.4.1. Airside/Terminal* *4.4.2. Landside* 4.2 Operational Effectiveness of Initial Phase *4.2.1. Airside/Terminal* *4.2.2. Landside*	10%	50% *25%* 25% 50% *25%* 25%
5. ENVIRONMENTAL ISSUES	5.1 Air and Water Quality 5.2 Sustainability	5%	50% 50%
6. LAND USE	6.1 Effective Utilization of Land for Aviation Needs 6.2 Potential Collateral Development Options 6.3 Safeguards Future Long Range Terminal Expansion	5%	25% 25% 50%
7. CAPITAL COST	7.1 Order of Magnitude Costs	20%	100%
TOTAL TERMINAL ALTERNATIVE		100%	

Table 5.2-3
TERMINAL ALTERNATIVE EVALUATION CRITERIA DEFINITIONS
Lambert-St. Louis International Airport

EVALUATION CRITERIA DEFINITIONS	
CRITERIA CATEGORIES	**CRITERIA DEFINITIONS**
1.1 Meets Required Aircraft Parking Capacity	Provides required net gain in aircraft parking, gates and fleet mix size for 2028
1.2 Aircraft Gate Use Flexibility	Ability of the concept to provide flexibility of use in aircraft gates, apron and supporting taxilane system for potential fleet mix changes and airline operations
1.3 Apron/Taxilane Efficiency	Improves taxiway/taxilane flows and minimizes pushback conflicts
1.4 Taxi Distance to Runway Ends and Exits	Concept maintains reasonable taxiing distance to and from runways to terminal gates
2.1 Meets Required Terminal Capacity	Terminal footprint provides sufficient depth and width to meet future demand requirements
2.2 Maximizes Flexibility for Potential Operational Changes	Adaptability of terminal plan to accommodate Code Shares and allow changing missions of airlines throughout the planning period
2.3 Ability to Meet Primary Stakeholder Missions	Accommodates the primary airline operations and missions operating from STL
2.4 Passenger Convenience and Comfort	Improves spatial LOS, minimizes travel times, walking distances and vertical level changes
2.5 Security Efficiency	Accommodates new security procedures and technologies and minimizes the number of security screening checkpoints.
2.6 Passenger Orientation to Processing	Intuitive way finding, clarity of O&D and connecting passengers to easily find their way through the terminal
2.7 Connectivity to Other Key Facilities	The ability of the concept to provide conveniently situated support facilities to the terminal
2.8 Concessions Revenue Potential	The ability of the concept to provide passenger exposure to majority of concessions
3.1 Meets Required Curb Capacity and Adequate LOS	Concept meets or exceeds curb requirement in linear frontage (single or double level) & LOS
3.2 Effectiveness of Access/Egress Roads	Concept meets operational efficiency standards (weave distances, min radius curves, sight lines)
3.3 Ease of Passenger Orientation to Roads	Concept provides for simple roadway decisions with sufficient distances between decision points
3.4 Provides Easy Access to Future Mass Transit	Includes ability to conveniently connect to future on and off-airport transit systems
4.1 Ability to Phase Construction/Modifications	Provides a feasible approach to construction phasing while maintaining existing operational capability (no loss of gates, services or utilities)
4.2 Operational Effectiveness of Initial Phase	Concept's ability to deliver an initial stage of construction that provides needed gate and terminal capacity that can be practically achieved
5.1 Air and Water Quality	Ability of concept to minimize air and water quality impacts (also during demolition and construction)
5.2 Sustainability	Development of new buildings and rehabilitation of existing facilities that meet sustainability goals
6.1 Effective Utilization of Land for Aviation Needs	The concept demonstrates a prudent utilization of the Airport's land and facilities for future aviation needs
6.2 Potential Collateral Development Options	The utilization of land for potential non-aviation revenue development
6.3 Safeguards Future Long Range Terminal Expansion	Concept provides and ultimate Terminal Area Master Plan expansion path well beyond the 2028 Master Plan forecast horizon that is achievable with minimal impacts
7.1 Order of Magnitude Costs	Minimizes development costs relative to benefits

Table 5.2-4
TERMINAL SHORT-LIST ALTERNATIVES EVALUATION MATRIX SUMMARY
Lambert-St. Louis International Airport

Criteria Categories	Importance[1]		STL Airport Master Plan Terminal Development Concpets - Evaluation Matrix									
	Major Category Weighting	Secondary Category Weighting	Concept I-A-1 Baseline - Existing Two Terminal/ Minimal Build		Concept I-B-1b Existing Two Terminal Operating Alignment		Concept II-B-1 Consolidated Terminal @ T1		Concept II-C-1 Consolidated Terminal between T1 & T2		Concept II-C-2 Consolidated Terminal @ Air Guard Site	
			RAW	WEIGHTED	RAW	WEIGHTED	RAW	WEIGHTED	RAW	WEIGHTED	RAW	WEIGHTED
1 AIRSIDE	20%	100%	0.50	0.75	3.25	3.50	3.75	3.95	3.50	3.65	4.75	4.80
2 TERMINAL	20%	100%	1.75	2.55	3.06	3.80	4.50	4.45	3.81	3.60	4.44	4.60
3 LANDSIDE	20%	100%	2.50	2.00	2.50	2.00	3.50	3.20	4.50	4.40	5.00	5.00
4 IMPLEMENTATION FEASIBILITY	10%	100%	2.50	2.50	1.50	1.50	1.50	1.50	0.75	0.75	-0.75	-0.75
5 ENVIRONMENTAL ISSUES	5%	100%	1.00	1.00	1.00	1.00	1.50	1.50	2.00	2.00	1.50	1.50
6 LAND USE	5%	100%	0.00	0.00	2.00	2.25	4.00	4.25	3.33	3.25	4.67	4.75
7 CAPITAL COST	20%	100%	5.00	5.00	3.00	3.00	2.00	2.00	-4.00	-4.00	-5.00	-5.00
TOTAL TERMINAL CONCEPT	100%		1.89	2.36	2.33	2.77	2.96	3.16	1.99	1.87	2.09	2.12
		RANK		3		2		1		5		4

Weighted Scoring Scale:
Highest Score = 5.0
Lowest Score = -5.0
Color Scoring Scale:
Green: 5.0 to 2.0 = Good
Yellow: -1.99 to -1.99 = Average
Red: -2.0 to -5.0 = Poor

Note: 1 Each criteria category is weighted (major and secondary) based on its overall importance. Values are based on the consultant's previous project experience with input from the STL client.

Source: Landrum & Brown Analysis

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5.2.10 FINAL SHORT-LISTED TERMINAL ALTERNATIVES

Throughout the planning process, the short-listed terminal alternatives were constantly evolving and updated to address comments and concerns, which arose from the on-going stakeholder presentations and internal Team meetings.

Prior to selection of the preferred terminal plan rough order-of-magnitude costs were developed for each of the five short-listed alternatives and the two top scoring alternatives **Scenarios I-B-1b** and **II-B-1** were further delineated and conceptual phasing plans were developed. These 20-year phasing plans were developed to determine if they were feasible from a construction standpoint. The configuration of each phase was driven by the forecast gate requirements for each planning activity level. Larger layouts can be found in Appendix E.

An additional option was developed for both Scenarios I-B-1b and II-B-1 which looked at additional apron and taxi capabilities along the backside of Concourse A at T1. The intent of the planning exercise was to twofold:

1. Identify those facilities which may be lost if the pushback zone was retained and;
2. Attempt to minimize disruption to existing airside support buildings beyond the facilities that were required to make the single Group III taxilane infrastructure operate if the pushback zone were reduced.

However, further analysis showed no additional facilities would be impacted by a dual Group III taxilane system along the backside of the realigned west concourse at T1. The obstacle free area was set just north of the existing Cooling Towers and Main Power Plant. This resulted in a decreased pushback zone along taxiway Charlie limiting operations to Group III aircraft. These additional layouts are shown in **Exhibit 5.2-24, *Scenario I-B-1b – Option B***, and **Exhibit 5.2-25, *Scenario II–B-1 - Option B***.

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Exhibit 5.2-24
SCENARIO I-B-1b – OPTION B
Lambert-St. Louis International Airport

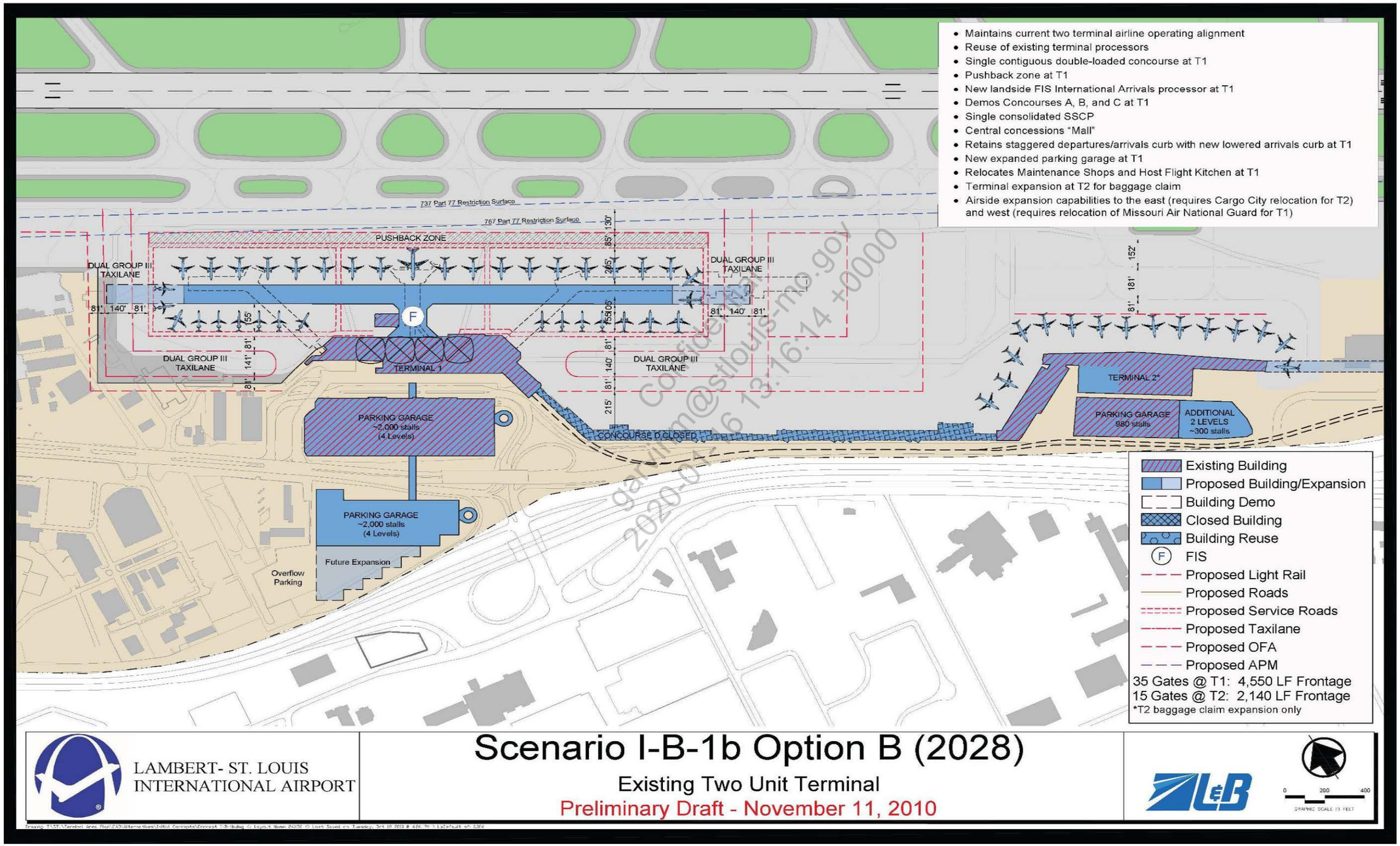

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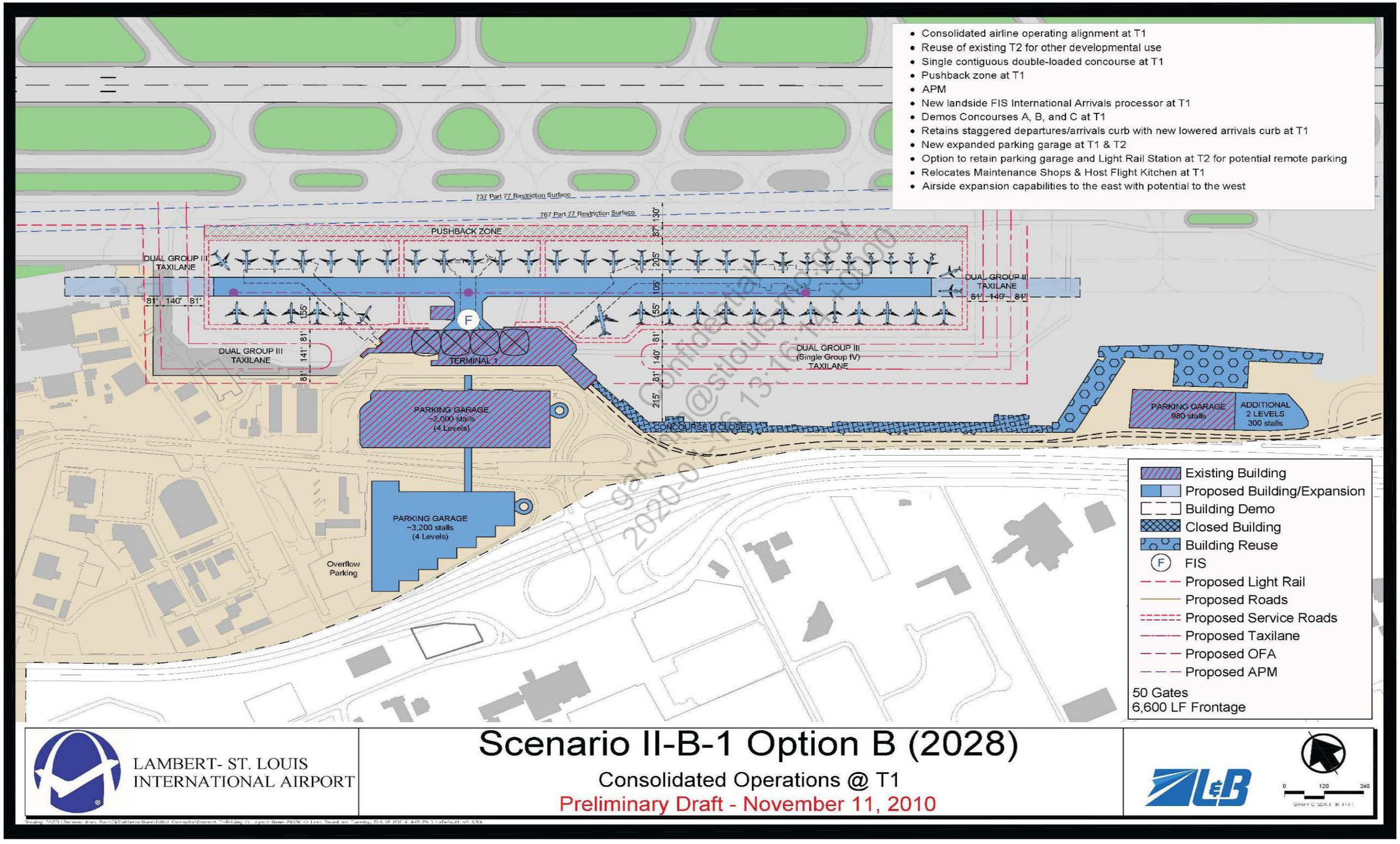
Exhibit 5.2-25
SCENARIO II-B-1 – OPTION B
Lambert-St. Louis International Airport



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5.2.11 PREFERRED TERMINAL ALTERNATIVE

The fourteen alternatives explored represent a continuous progression of refined terminal concepts that evolved throughout the planning process. The previous sections described the selection process of the short-listed alternatives, which ultimately lead to the selection of the preferred Scenario II-B-1 for the Master Plan study. The recommended plan takes advantage of existing T1 and its parking infrastructure and addresses operational challenges on the airside. Additionally, this alternative consolidates the operations into a single terminal and permits the airport to expand to the ultimate configuration or, should conditions require a less ambitious program, move toward a configuration consistent with Scenario I-B-1b, which does not include the closure of T2.

5.2.11.1 Transition Phasing

While the preferred scenario is II-B-1 (see Exhibit 5.2-21), the Airport recognizes that Scenario I-B-1b (see Exhibit 5.2-20) will be the interim path, with airline expansion happening at T2 during the interim years. Thereafter, the terminal area will transform into Scenario II-B-1. Refer to Appendix E for an understanding of how Scenario II-B-1B could evolve into Scenario II-B-1.

In the short-term horizon, both existing T1 and T2 would remain in operation until the point at which additional infrastructure and gates could be constructed to accommodate the existing gate capacity at T2. Initially T1 gate expansion would be phased in such a manner that would provide minimal disruption to existing operations as possible. With the closure of Concourse B and the existing gate capacity at Concourse C, an initial nine-gate linear concourse in-fill would be constructed between existing Concourses A and C. This would require the relocation of three gates each at Concourses A and C. This initial gate expansion creates a new centrally located security screening area, concessions mall, and three gate FIS international arrivals processing facility. Subsequent airside phasing could happen to the east or west along the backside of existing Concourses A and C. On the landside the existing T1 arrivals curb would need to be lowered from its original configuration in order to address its life expectancy issues. This would require the relocation of the existing rental car and baggage claim offices from their current locations under the existing arrivals curb. A temporary arrivals pick-up area would need to be constructed while the new arrivals curb is being constructed.

5.2.11.2 Terminal Processor

Throughout the planning process, it became apparent that the terminal alternatives that based processing passengers through a single terminal processor performed much better than alternatives with multiple terminal processors. The centralized security process, way-finding, and convenience factors for connecting and O&D passengers along with their visitors are greatly simplified when all passengers are directed to a single terminal building. Accommodating all airlines into a single processing building provides the operational flexibility for the ever-changing alliances of airlines. Code-sharing airlines typically prefer to occupy facilities in close proximity to one another.

Multiple terminals require the replication of many of the terminal functions typically associated under a single terminal design. Creating a single terminal processor eliminates the need for this duplication thereby reducing the total required area. This makes for a more efficient operation and reduces the costs for the Airport and airlines, particularly in a time when cost reductions are essential in maintaining a viable airport operation.

This single terminal processor also provides the capacity to meet future demand by providing the ability to incrementally expand the terminal and concourses in a phased approach. These expansions can be triggered, as future demand will start to exceed capacity. Protecting areas for expansion allows this incremental phased approach to occur.

The existing T1 ticketing level has additional check-in capacity that would allow for the consolidation of the passenger activity and preferential use airlines from T2. Building on the Airport Experience Program and the original vision of the architect the south side central ticketing would be removed and the existing stand-a-alone Explosive Detection System (EDS) machines are being relocated to the bag makeup area to allow for increased passenger circulation and views to the outside. New vertical circulation cores are planned with additional void space to allow natural light to flood the baggage claim level below. Additional space would become available by relocating the current American Airlines Admirals Club to the secure airside concourse location should American decide to maintain such a passenger amenity. This would free up approximately 12,000 square feet of additional space for other potential use such as area for the relocated USO. This additional capacity is shown in **Exhibit 5.2-26, *Scenario II-B-1 – Consolidated Ticketing Level***.

In order to accommodate the consolidation of the T2 claim requirements the T1 departures/claim level would require renovation and expansion. An additional two claim devices would be required to meet future demand. This area would be configured where the existing US Post Office, City Space, and USO currently reside. Additionally the existing baggage services offices (BSO) and rental car counters would require relocation in order for the existing arrivals curb to be lowered. Potential areas for relocation are depicted in **Exhibit 5.2-27, *Scenario II-B-1 – Consolidated Departures/Claim Level***.

A consolidated baggage make-up area also requires some renovation of existing areas and expansion for new construction in order to meet future demand. An additional 10,200 square feet of new space accommodates two input devices and its associated circulation along with approximately 19,100 square feet of additional baggage make-up area. This area also includes the new planned two-zone in-line baggage screening area. These areas are depicted in **Exhibit 5.2-28, *Scenario II-B-1 – Consolidated Apron Level***.

Exhibit 5.2-26
SCENARIO II-B-1 – CONSOLIDATED TICKETING LEVEL
Lambert-St. Louis International Airport

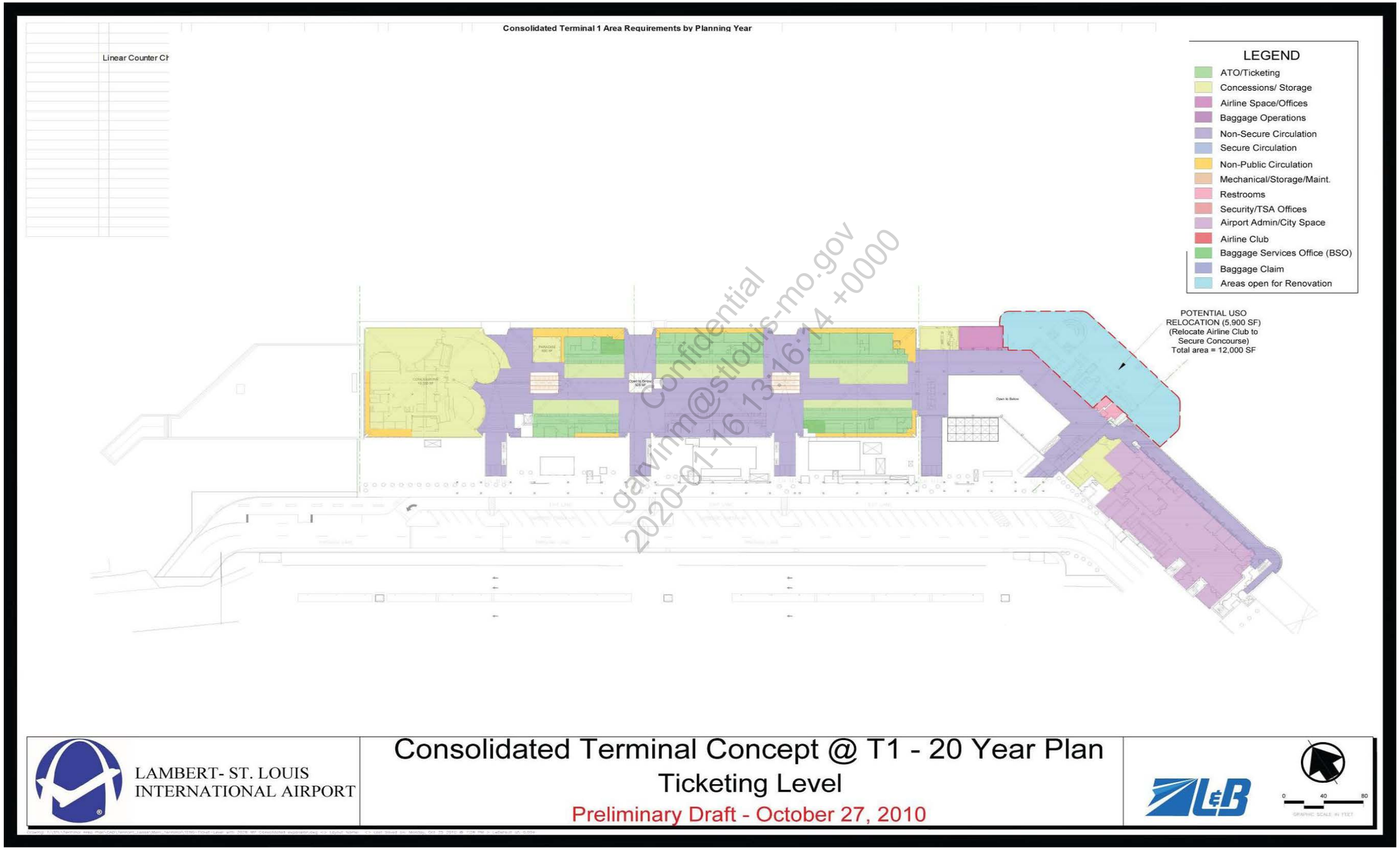

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Exhibit 5.2-27
SCENARIO II-B-1 – CONSOLIDATED DEPARTURES/CLAIM LEVEL
Lambert-St. Louis International Airport

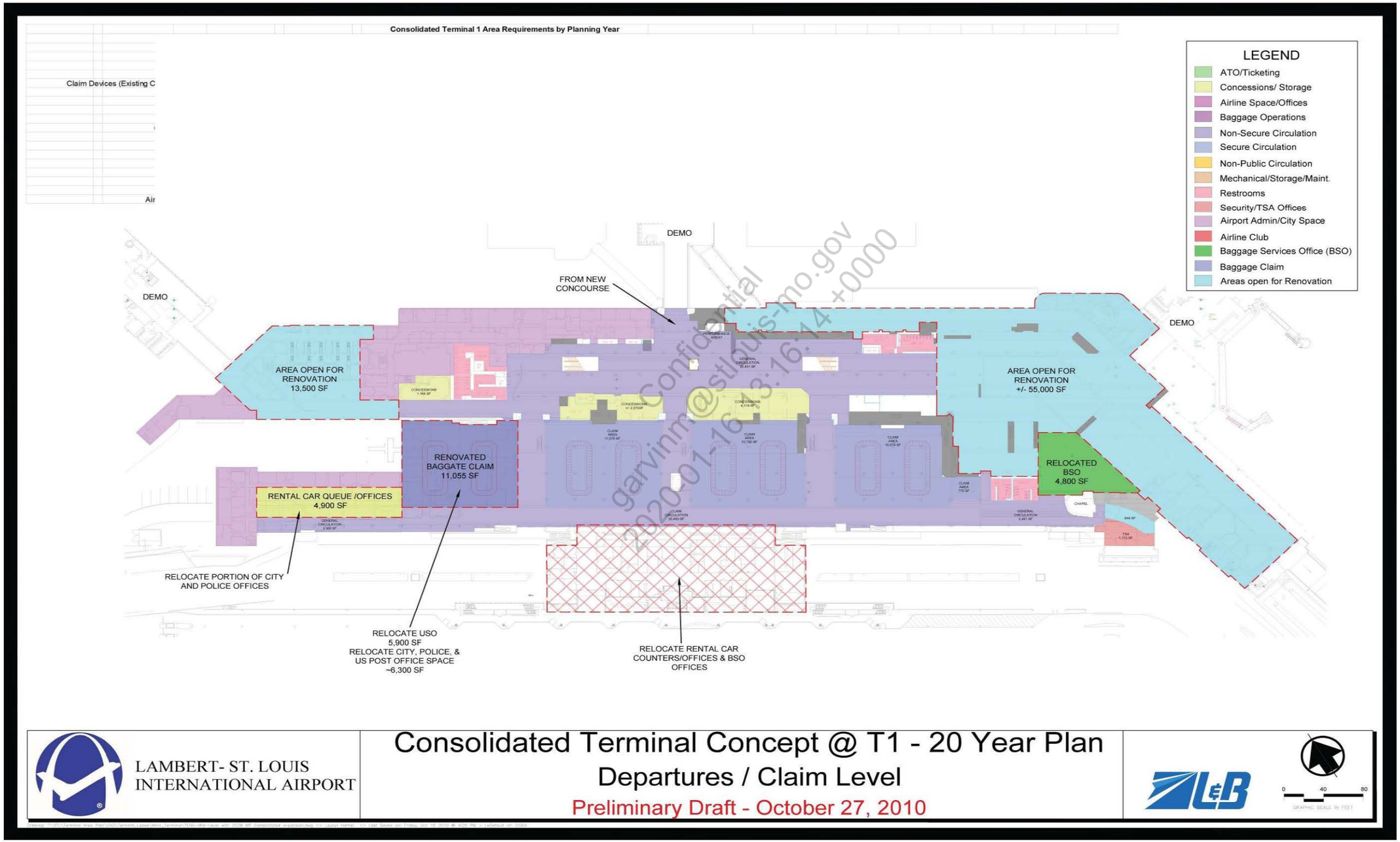

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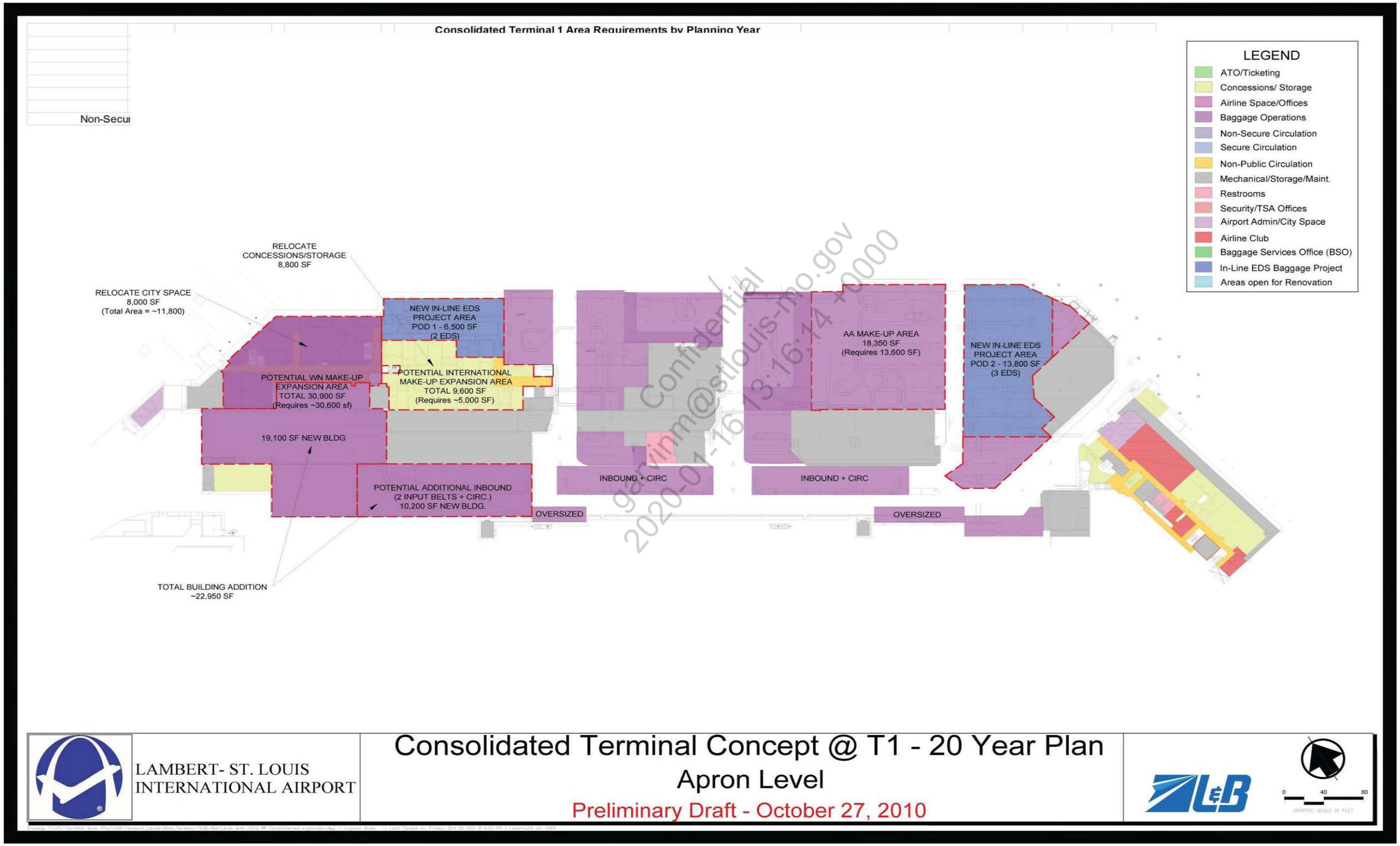
Exhibit 5.2-28
SCENARIO II-B-1 – CONSOLIDATED APRON LEVEL
Lambert-St. Louis International Airport



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In order to improve passenger accessibility, convenience and operational efficiencies, a long-range planning objective relocates the existing international FIS arriving processing functions to a landside three-gate configuration at T1 shown in **Exhibit 5.2-29**, ***Location of International Gates***. This location is conveniently located near the majority of domestic airline activity with potential passenger connections to and from international flights. Efficient, direct domestic connections to and from international operations can assist in spurring both domestic and international flight services. The central location also allows for short "walk-in" direct access from the international gates to the arrival processing functions. This area can either be configured as a single level processing function on the third (ticketing) level or apron level. An alternative layout could process all passengers on the third level just above what would become the security screening and concessions area and escalate them down to the apron/claim level for baggage claim and secondary processing functions. This would conveniently place the FIS exit out into a new meter/greeter lobby located in the area that is now the landside concessions and circulation area in T1. These potential FIS locations are illustrated in **Exhibit 5.2-30, *FIS International Arrivals Processing***.

Exhibit 5.2-29
LOCATION OF INTERNATIONAL GATES
Lambert-St. Louis International Airport

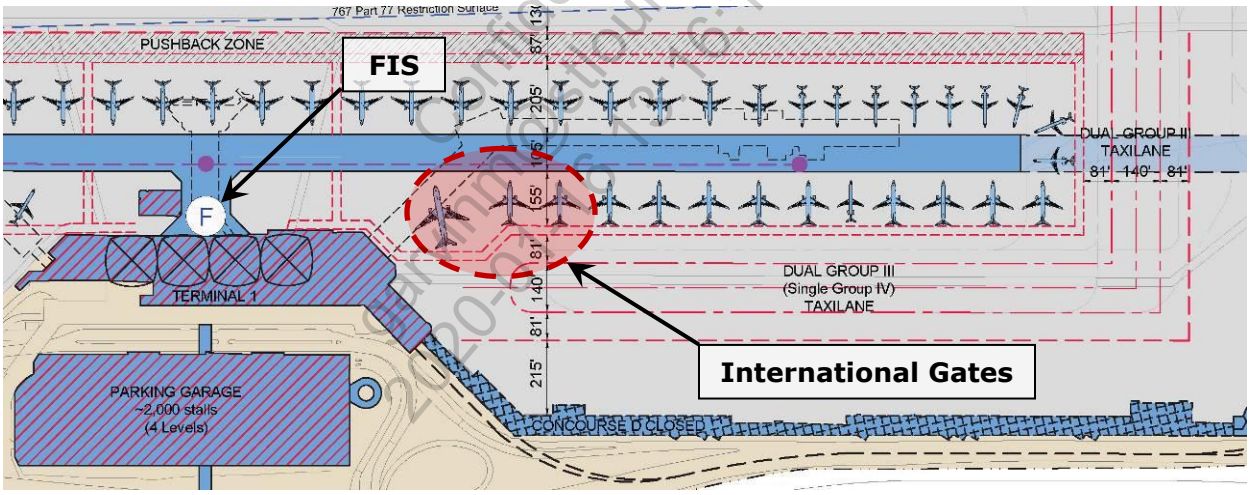
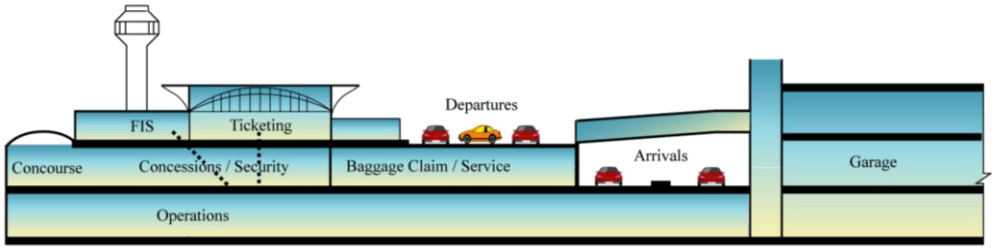
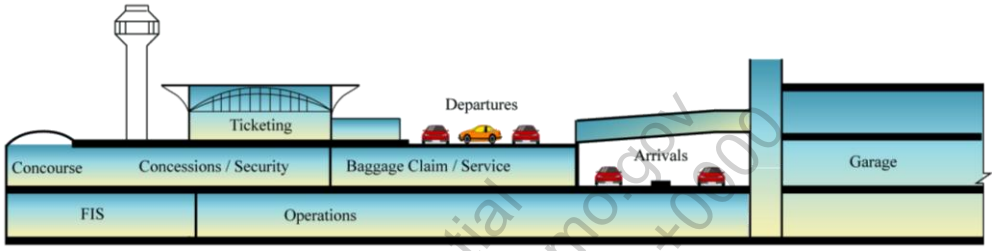


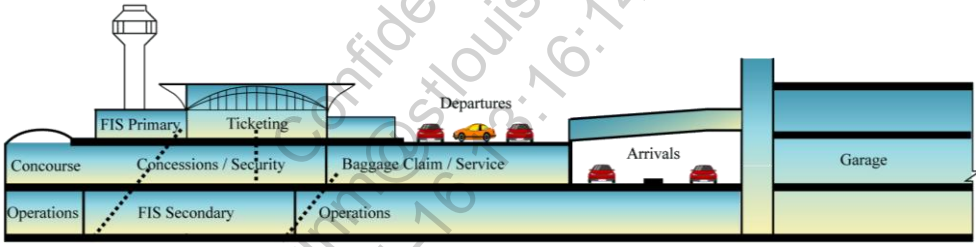
Exhibit 5.2-30
FIS INTERNATIONAL ARRIVALS PROCESSING
Lambert-St. Louis International Airport



Single Level FIS @ Ticketing Level



Single Level FIS @ Apron Level

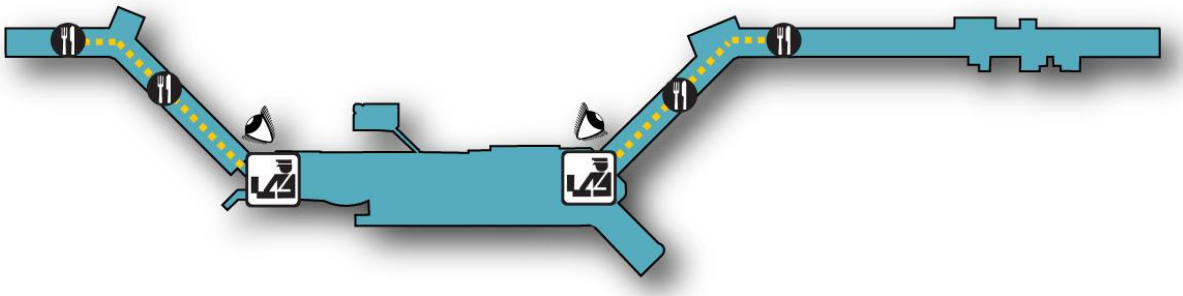


Split FIS @ Ticketing and Apron Levels

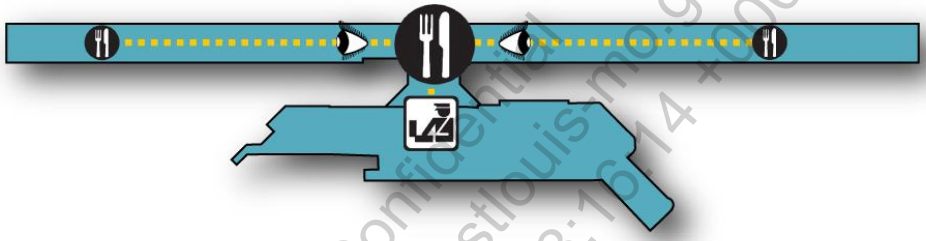
5.2.11.3 Concessions

The existing gull-wing geometry of T1 Concourses A and C create line-of-sight issues concerning passengers being aware of and locating the concessions areas. Creating a single concourse plan that flows all outbound passengers past a primary concession mall provides enhanced concession revenue performance (see **Exhibit 5.2-31, *Central Versus Multiple SSCP & Concessions***). This large concession area also enables the potential reduction of some hold room requirements adjacent to this space by placing some of the seating capacity requirements within this area. The existing generous T1 landside concessions areas on the ticketing and baggage claim levels remain for the ticketed passengers and their meters and greeters.

Exhibit 5.2-31
CENTRAL VERSUS MULTIPLE SSCP & CONCESSIONS
Lambert-St. Louis International Airport



Existing T1 Configuration



Proposed T1 Configuration

5.2.11.4 Passenger Connectivity and Security Screening

One of the critical factors in facilitating the connectivity of passengers between the and the terminal and aircraft parking positions is the security screening check points (SSCP) currently operating in a de-centralized arrangement amongst the two operating concourse at T1. This is the primary point of flow from the terminal to all aircraft gate positions. In order to meet the changing security dynamics that are requiring larger footprints, the preferred terminal alternative provides a single centralized security portal thereby improving security functions and efficiency.

Patterns of usage have also changed due to post 9/11; only air travelers with valid boarding passes can pass the security screening points. This operational change has created the need for areas before security where meeters/greeters can gather in anticipation of arriving passengers. The exit points from the current security screening areas typically serve as the point at which the meter/greeter functions reside. The consolidation of the new SSCP screening functions on either the existing ticketing level or the departures/claim level frees up the area that currently serves the SSCP functions for increased passenger circulation and other terminal or tenant functions. A large central meet and greet area could potentially be integrated near the existing landside concession areas.

5.2.11.5 Airside

In order to meet the ultimate 50 gate or approximate 6,600 lineal feet of frontage for 2028, a linear double loaded concourse with increased hold room depth and passenger circulation is constructed just south of the existing Concourse A and C alignments. This new layout shown in Exhibit 5.2-25 allows second-level loading of passengers through jet bridges from typical individual or shared hold rooms. This flexibility enables the building to adapt to potential changes in aircraft gauge. Small commuter aircraft operations which are typically ground loaded can either be served from second-level hold room areas or located on the apron level served via escalators from the main concourse level much like what exists today in Concourse C for Cape Air. International capable gates are allocated along the backside of the east concourse conveniently located near the Customs and Boarder Protection (CBP) or FIS area as illustrated in Exhibit 5.2-29. This minimizes the length of the sterile corridors required for separating international arriving passengers from the general traveling public.

Should the Missouri Air National Guard decide to relocate additional gate expansion could be accommodated to the west thereby balancing walking distances from the terminal processor. However, additional gate expansion would be available to the east as well. This increased gate expansion would allow for an additional 21 gates, for a total of 71, to meet the high forecast gate scenario as described in Chapter 4, *Demand/Capacity and Facility Requirements*.

Additionally a future mezzanine level APM system could be constructed along the south face of the linear spine offering shorter walking distances and improving the passengers travel experience and level of service.

Dual Group III Taxilane capable flow and increased aircraft apron parking depth and pushback zone will provide greater operational capacity and efficiency. A single group IV taxilane running between the Dual Group III taxilanes on the backside of the east concourse is also provided for increased aircraft taxi capabilities shown in Exhibit 5.2-29. This would allow for the single Group IV international capable gate.

5.3 AIRPORT SUPPORT FACILITY DEVELOPMENT

5.3.1 INTRODUCTION

This section investigates alternatives for providing capacity and capability enhancement of the support facilities as they relate to the long-term development plan for STL. As discussed in Chapter 4, many of the airport support facilities at Lambert provide sufficient capacity and capability to meet the demands of the forecast operations owing to the significant growth that occurred at the airport in the 1980s and 1990s. Much of this analysis is therefore focuses on refinement of the existing support facilities and, where necessary, replacement.

The following sections present an overview of the airport support facilities identified for expansion and or replacement through the inventory and demand capacity analysis previously presented.

5.3.2 AIR CARGO

Using the planning ratios found in IATA's Airport Development Reference Manual, 9th edition, the cargo facilities were found to be of adequate size to meet forecast demand. However as noted the facilities are not optimally configured to meet the needs of potential cargo tenants. There are three general areas on the airfield that are suitable for future on-airport aviation related expansion including the land area north of Runway 11-29, the Northern Tract, and the Brownleigh Site. Of these three areas, the latter two are appropriate for future cargo development. **Exhibit 5.3-1, *Cargo Concept on Brownleigh Site***, and **Exhibit 5.3-2, *Northern Tract Development Site***, illustrate potential layouts for cargo facilities on each of these sites. Expansion would likely require relocation of James S. McDonnell Blvd. As shown in Exhibit 5.3-2, a cargo development on the Brownleigh site could be accomplished in two phases. The second phase requires the extension of Taxiway Foxtrot.

Exhibit 5.3-1
CARGO CONCEPT ON BROWNLEIGH SITE
Lambert-St. Louis International Airport

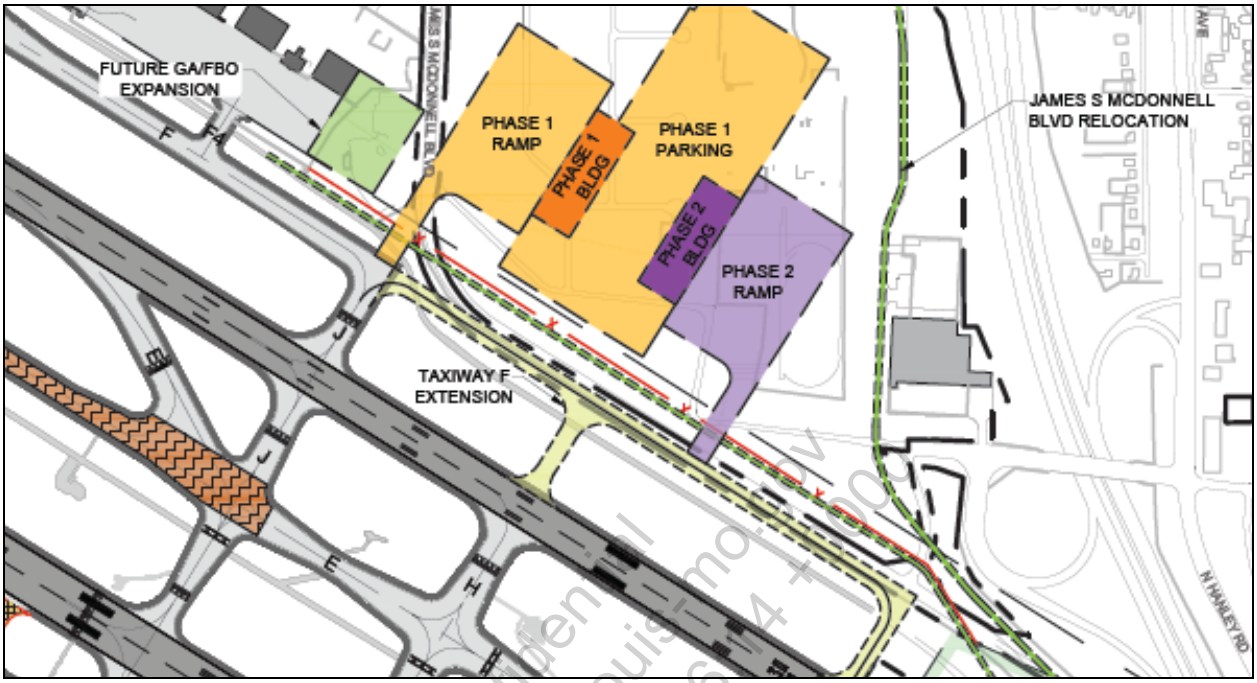
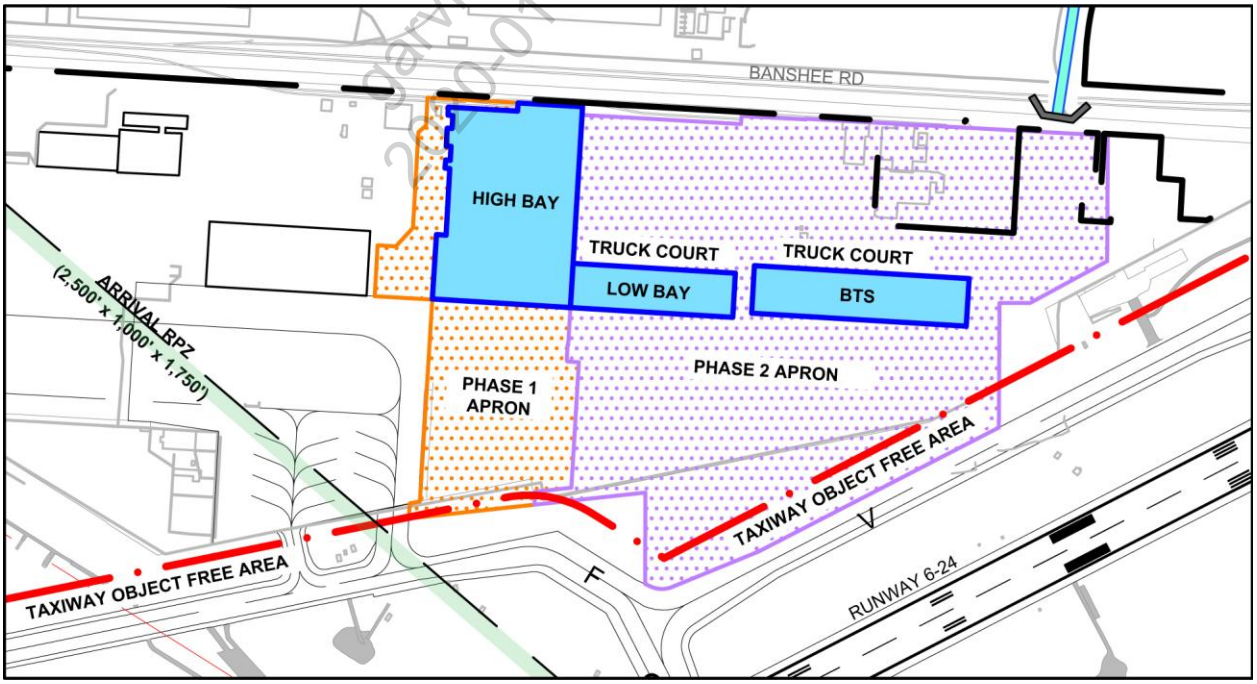


Exhibit 5.3-2
NORTHERN TRACT DEVELOPMENT SITE
Lambert-St. Louis International Airport



5.3.3 GENERAL AVIATION (GA)

The existing General Aviation (GA) complex operated by Signature Flight support was found to have sufficient total land area but split between hangars, ramp, administration and parking is not allocated correctly. The demand for hangar space outpaces supply over the planning horizon and additional facilities are required. It is possible for Signature to expand to the East as shown on Exhibit 5.3-1; however, any future FBO would need to be located along the north side of Runway 11-29 and land in that area should continue to be protected for aviation uses.

5.3.4 FUEL STORAGE

The Commercial Aviation Fuel Storage Facility currently has a total capacity of 1.3 million gallons of Jet A. A standard inventory of commercial aviation fuel is a three to four-day supply based on peak day activity levels. Using this range as a standard, the storage capacity at the airport will be nearing but not exceeding the demand by the end of the planning. Sufficient land does not exist within the existing fuel farm lease boundaries to accommodate expansion of the Commercial Fuel Storage Facility and efforts should be made to acquire adjacent lands to accommodate long-term expansion. Should the expansion and decking of Lot C proceed at indicated in Section 5.2.10, relocation of the fuel storage facility would be required. The preferred location for a replacement facility is on the MOANG airside property. Without access to this site, suitable space is available in the area currently occupied by Concourse D. A replacement facility design should accommodate a four-day supply of fuel for the 2028 demand level, 1.6 million gallons, with expansion capabilities and the ability to accommodate hybrid fuels.

5.3.5 FUELING SERVICES MAINTENANCE

Development of terminal alternative II-B-1 would require the relocation of the fueling services maintenance buildings located west of Terminal 1. As discussed in Chapter 4, Demand/Capacity and Facility Requirements, the existing facilities are appropriately sized to meet current and future demand. Both buildings and associated parking areas, which consist of 7,090 square feet of maintenance space, 3,240 square feet of office an administration space and approximately 75,000 square feet of parking, would need to be relocated within close proximity to the new facility. Assuming the inability to utilize space in the MOANG facility or the current American Airlines Maintenance property, relocation to an area near Terminal 2 or Cargo City would be preferred. However, further consideration should be given to the location of these facilities at a future date when the decision to move forward with terminal expansion is considered as opportunities to develop the facilities at the MOANG may be available.

5.3.6 FLIGHT KITCHENS

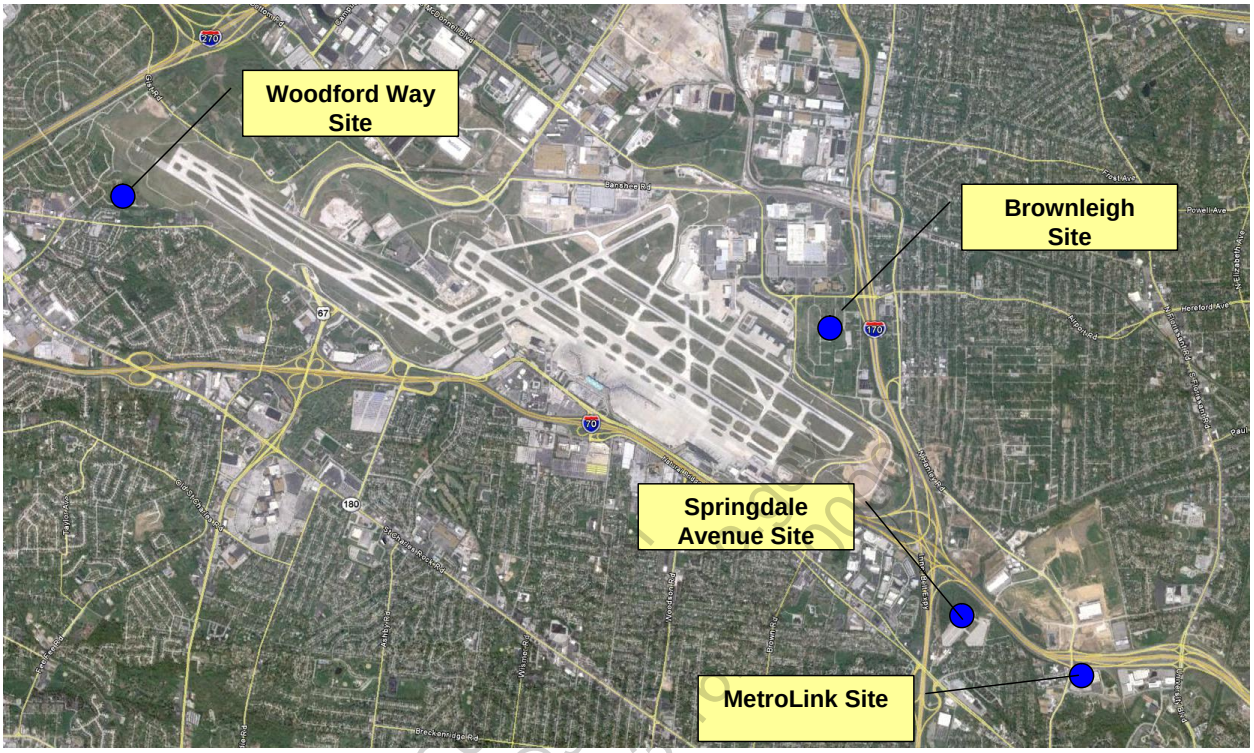
In addition to the loss of the fueling service maintenance facility, the development of terminal alternative II-B-1 would eliminate the HMS Host flight kitchen. A replacement facility is not needed due to the lack of utilization of the current facility and the ability of HMS Host to accommodate any in-flight meal requirements in the other concession facilities in the terminal.

5.3.7 RENTAL CAR FACILITIES

Although the existing rental car facilities supporting the airport are located in separate off-site facilities, consideration for an on-airport or off-airport consolidated rental car facility in the long term development of the airport is necessary. With increasing recognition of environmental impacts and the inefficiency associated with separate parking shuttles serving each rental car provider, airports have increasingly looked to consolidated rental car facilities to provide a higher level of service. The advantages of the consolidated rental car facility include reduction in traffic on roadways due to fewer shuttle bus operations, customer convenience, reduction in terminal space requirements, improved way-finding and reduced curb-front demand. There are also disadvantages with providing a consolidated rental car facility, for the airport there is an additional capital demand that may pull monies from other projects and the local communities would lose tax revenues associated with the rental car operations.

The location of a consolidated rental car facility should be within close proximity to the terminal and sufficient land area should be available for surface or preferably a structured parking facility. Transportation from terminal to the consolidated rental car facility can be accomplished through shuttle busing operations or light rail. For many airports, the light rail option is not feasible due to significant infrastructure cost; however, the existing light rail stations at the Airport provide STL with the option to explore this potential connection. Although many sites were evaluated, four sites, as shown on **Exhibit 5.3-3, *Potential Consolidated Rental Car Facility Sites***, were identified as potential areas for a CONRAC facility. These four sites included: the vacant property southwest of Runway 11-29 on Woodford Way, the Brownleigh site north of Runway 12L-30R, the former parking lot on Springdale Avenue, and, finally, a facility collocated with and existing Metrolink property.

Exhibit 5.3-3
POTENTIAL CONSOLIDATED RENTAL CAR FACILITY SITES
Lambert-St. Louis International Airport



5.3.8 TERMINAL 2 AUTOMOBILE PARKING

In addition to the expansion of the Terminal 2 Parking Garage identified in the terminal concepts, three additional surface parking options are available as shown in **Exhibit 5.3-4, *Automobile Parking***. One option is to provide a small surface lot east of Cargo City with relatively close access to Terminal 2 although limited in size to approximately 200 spaces. The second option is in the Brownleigh area. While not providing the same level of convenience as the other parking options, the Brownleigh site does provide a significant area for parking in relatively close proximity to Terminal 2 that would be competitive with other off-airport parking providers. In total, the Brownleigh site can accommodate up to 10,000 surface spaces and can be developed in phases at minimal cost and easily modified, should demand for property with direct airfield access materialize in the future. The third option is the Concourse D apron parking facility. Additional consideration will be necessary with regard to Security, FOD containment and blast deflection. Traffic routing would consist of an at grade signalized intersection providing in/out access to Lambert International Boulevard through an access point created by cutting through the existing Concourse D structure. Passenger movement could be routed through Concourse D or a shuttle bus may be utilized. Portions of the Concourse D Apron were reconstructed with AIP proceeds issued in 1989 and 1990, respectively, which should be fully amortized.

Exhibit 5.3-4
AUTOMOBILE PARKING
Lambert-St. Louis International Airport

5.3.9 AIRFIELD MAINTENANCE

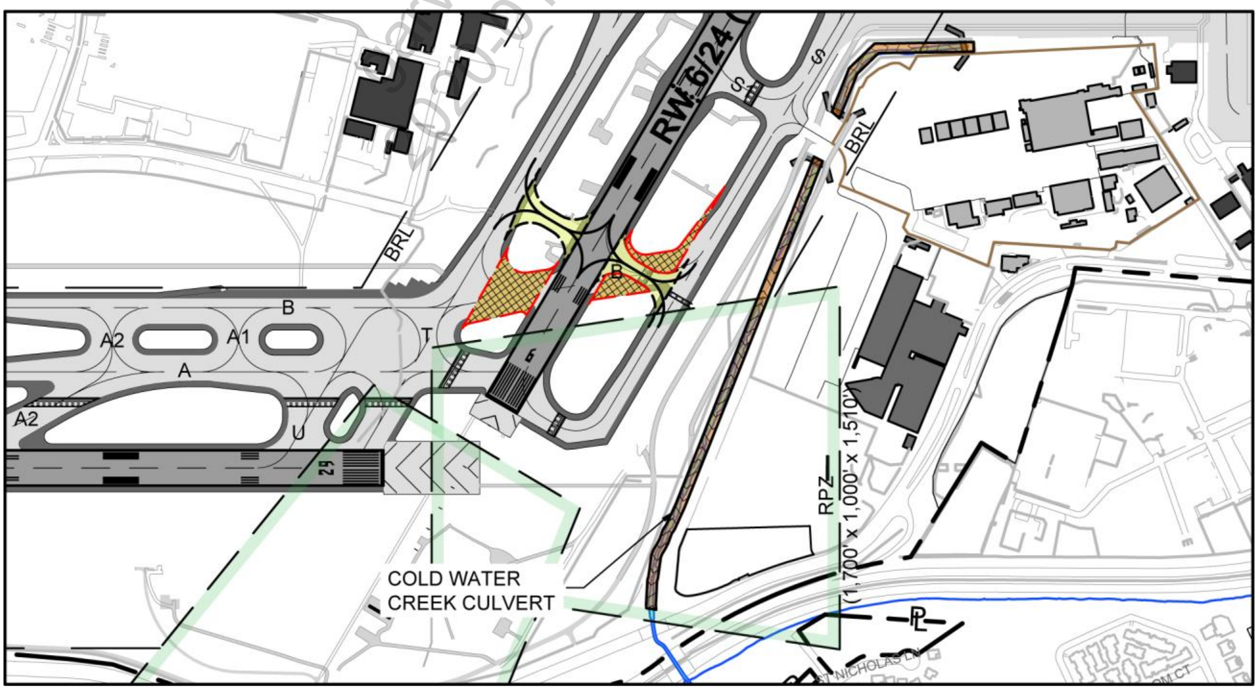
The existing airfield maintenance facility and central stores have exceeded useful life and are less than adequate to function properly. Prior to the initiation of this Master Plan, a replacement facility was designed and put on the CIP. The project has been pushed back and the existing facilities are repaired as necessary to maintain functionality. The plan should remain in the CIP and efforts should be made toward completing the project in a timely manner.

5.3.10 COLDWATER CREEK INLET RECONFIGURATION

Coldwater Creek is a critical component of the airfield drainage and efficient flowage is critical. The course of the creek on the south side of the airfield, south of Taxiway Charlie and East of Taxiway Sierra, places it within the taxiway safety area for Taxiway Sierra. To mitigate grading issues associated with the creek location adjacent to the taxiways, it is recommended that the Cold Water Creek culvert, which currently extends from South of Taxiway C to the outfall west of Banshee Road near the Runway 6 Approach be extended to the south. Extending the culvert permits grading of the ground to provide an appropriate taxiway safety area and further permits the relocation of fences and other structures outside the safety area above the culvert.

In addition to the penetration of the taxiway safety area, the creek is prone to overflows during extreme weather events with significant precipitation over short periods of time. The Metropolitan Sewer District has plans to install a detention tank upstream from the Airport, on the south side of I-70. The 6.0 million gallon tank, which will be in place by 2014, will reduce the frequency of overflows by accommodating high volumes of water and slowly discharging after the peak flow. While it is anticipated that the detention tank will alleviate the overflow problems it is recommended that the culvert be extended to the south to a point at the south end of the Runway 29 approach RPZ as illustrated in **Exhibit 5.3.5, *Coldwater Creek Culvert Extension***. Close coordination with local jurisdictions will be necessary to ensure effective control of storm run off.

Exhibit 5.3-5
COLDWATER CREEK CULVERT EXTENSION
Lambert-St. Louis International Airport



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