LOS ANGELES INTERNATIONAL AIRPORT
CONSOLIDATED RENTAL CAR FACILITY

PROJECT DEFINITION DOCUMENT

JULY 1, 2016
CONRAC 2nd CONCEPT REFINEMENT

Prepared for:

LAX
Los Angeles World Airports

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Section 1: Executive Summary

Los Angeles World Airports (LAWA) intends to develop a Consolidated Rental Car Facility (ConRAC) at the Los Angeles International Airport (LAX). The ConRAC is one component of the overall Landside Access Modernization Program (LAMP) in which LAWA intends to construct an Automated People Mover (APM) to provide passenger connections from the ConRAC and two new Intermodal Transit Facilities (ITFs) to the Central Terminal Area (CTA). See Figure 1.2.1.

Figure 1.1.1: Airport Area Showing Proposed APM Connections (CTA, West and East ITF and ConRAC)
Source: Lea + Elliott. August 2015
Prepared by: Mia Lehrer + Associates, August 2015 and TranSystems, February 2016

This Project Definition Document (PDD) has been prepared to document the agreements and criteria that are used in the development and selection of the preferred ConRAC concept. The PDD establishes the programmatic requirements; planning standards and facility design criteria; summarizes development and evaluation of a range of alternative functional concepts for the ConRAC; and describes the selection and refinement of the preferred concept for ultimate development.

The PDD identifies the scope, schedule and budget for implementation of the ConRAC. The PDD can be used as the outline for implementation of the future design phases of the project.

1.1 BENEFITS OF THE PROPOSED CONRAC

In collaboration with the rental car industry, LAWA has identified the following benefits of the ConRAC for LAX:

- Improved Passenger Experience – the ConRAC will provide enhanced customer experience and safety with an easy-to-find consolidated location conveniently linked to the CTA by an APM. Average travel time between the terminal curb and the rental car facility will be reduced to 14 minutes or less depending on the customer's arrival or departure terminal. All rental car customer service areas will now be under cover.
- Improved Traffic Flow – the facility is projected to eliminate more than 3,200 daily rental car shuttle trips on city streets and CTA roadways. In addition, because the new facility will consolidate the main operations of each company - including idle storage - onto one site, the number of vehicle miles required to process return vehicles to be fueled and washed or sent to storage will be greatly reduced.
- Free-up CTA Curb Space – the ConRAC will open up 945 feet (20% of total) of the commercial curb zone on the lower level.
- Operational Efficiencies – there will be a reduction in operating costs due to the ability for companies to share space, resources and transportation and have the ability to accommodate entire brand family operations and projected growth within the same secure area. Operational efficiency will improve as all areas will now be under cover.
- Better Land Use – The preferred concept for the ConRAC will require approximately 68 acres for ultimate development. This is at least 46% less land compared to the estimated site inventory of 145 acres currently utilized by the rental car companies.

1.2 SITE CHARACTERISTICS

The ConRAC project site is located on a 129.6 acre site known as Manchester Square. Manchester Square is bounded by W. Century Boulevard on the south, Aviation Boulevard on the west, W. Arbor Vitae Street on the north, and S. La Cienega Boulevard on the east. The site contains scattered residential buildings, in the process of being acquired and removed, as well as a Secondary Charter School on property owned by the Los Angeles Unified School District.

The critical influences affecting the proposed development of Manchester Square include:

1. Development of 98th Street from S. La Cienega to Aviation Boulevard, as a new link to the I-405 freeway.
2. Integration of the connection of the APM to the proposed Metro rail station at 96th Street and Aviation Boulevard.
3. Preservation of portions of the site suitable for future airport-related development.
4. Accommodation of ConRAC service access to off-site rental car agencies.

The site requirements are discussed in detail in Section 6.

1.3 RENTAL CAR PROGRAM SUMMARY

The program for the new ConRAC is based on accommodating the demands of rental car customers in the future. See Table 1.3.1. This program is designed to meet the operational requirements of the current on-airport operators and to accommodate the growth of and entry into the LAX market by independent operators. The program includes ready/return; fueling; wash and light maintenance in a multi-level Quick Turn-Around (QTA) facility; idle storage; fuel storage and distribution; areas for delivery and pickup of vehicles for the fleet; and employee and visitor parking.

Heavy maintenance, which includes major repair, body and collision work, brake, exhaust, engine, air conditioning, suspension and transmission work, is not accommodated at the proposed ConRAC. It is expected that the individual companies would use off-site facilities to handle these needs.

Table 1.3.1: LAX ConRAC Summary Program

Component	Design Basis	Floor Space (Sq. Ft.)	Floor Space (Acres)
Ready/Return Area (RAC) (area where customers pick-up and return vehicles)	7,600 rental equivalent stalls	*2,311,500*	*53.1*
Quick-Turnaround Area (QTA) (facilities for multi-level fueling, wash and vehicle maintenance)	704 staging positions; 180 fuel nozzles; 37 wash bays; 64 maintenance bays	*779,700*	*17.9*
QTA Support and Additional Site Functions (fuel storage and distribution; supervisor and vendor parking; car carrier delivery; vehicle staging corrals; loading docks/service yard)	20 car carrier stalls and adjacent staging lanes; 354 stalls in dedicated secured car corrals	*215,000*	*4.9*
Customer Service Building (CSB) ("mini-mall" lobby with customer service counters, restrooms, retail amenities and other functions connected to the APM station via an open courtyard and to the Ready/Return Area via vertical circulation cores with escalators and elevators)	100,000 square feet lobby and RAC offices; 4 vertical circulation cores	*278,000*	*6.4*
Bus Plaza *(for shuttle bus operations for a potential interim shuttle bus operation and for off-airport rental car companies)*	12 bus bays; vertical circulation core connected to the CSB	*54,000*	*1.2*
Automated People Mover (APM) Station *(provides customers with convenient connection to the CTA)*	Separate load and unload platforms	*24,000*	*0.6*
Idle Storage (for overflow vehicles to meet peak demand)	10,000 storage stalls	*1,905,000*	*43.8*
Employee and Visitor's Parking (provides personal vehicle parking)	1,100 employee stalls; 100 visitor stalls	*366,000*	*8.4*
Total ConRAC Program		*5,933,200*	136.3
Airport Employee/Public Parking (Outside of ConRAC) (provides personal vehicle parking)	2,350 stalls	*752,000*	*17.3*

Source: TranSystems, December 2015
Prepared by: TranSystems, December 2015

The detailed development of the space program is included in Section 5.

1.4 PREFERRED RENTAL CAR FACILTY CONCEPTS

Through a series of planning workshops facilitated by TranSystems with LAWA and the rental car industry, a preferred ConRAC layout was selected in April 2015. Between May and December 2015, the Design Team refined development of the functional requirements, customer service needs, architectural character, customer experience and overall mass and shape of the ConRAC.

The functional values which the preferred scheme reflects include:

- Customer Service – quick and easy to use
- Operational Efficiency – minimize labor and process time
- Efficient Use of Money - optimize the utilization of all facilities
- Flexibility - accommodate growth and industry changes
- Level Competitive Playing Field - all users have an equal opportunity for efficient and profitable operations
- Safety and Security – proactively design buildings for safety and security

The characteristics of the preferred concept are as follows:

- Three levels for Ready/Return, QTA and Idle Storage
- Idle Storage located in the Center of the Site - Between the Ready/Return and the QTA Buildings
- Ground Level QTA Areas for Independent Operators
- CSB and APM Station at Level 4
- Bus Plaza at Ground Level - with vertical transportation core providing access to the CSB for interim consolidated shuttle bus operations prior to the start of operation of the APM
- A centralized QTA Support Area
- Employee and Visitor Parking on a Portion of Level 4 of the RAC Building

At LAWA's request, the Design Team studied the feasibility of incorporating between 2,000 and 2,400 airport employee or public parking spaces on the fourth level of the Idle Storage Building. Access to this parking area would be provided from 98th Street via the helix at the southwest corner of the Ready/Return Building. Egress from this parking area would be via the helix at the northwest corner of the Ready/Return Building.

The rental car companies supported the following features of the Preferred Alternative:

- Equalizes the Ready/Return area available on all three levels
- Provides maximum flexibility for future reallocation of facilities
- No level change between QTA and Idle Storage and the Ready/Return areas
- The relationship between the three major components contributes to the efficient movement of vehicles among these facilities, without crossing the boundaries into the facilities leased to other companies.
- No level change from CSB to APM
- Independent APM station for the ConRAC

The overall site plan of the preferred ConRAC concept is shown on Figure 1.4.1.

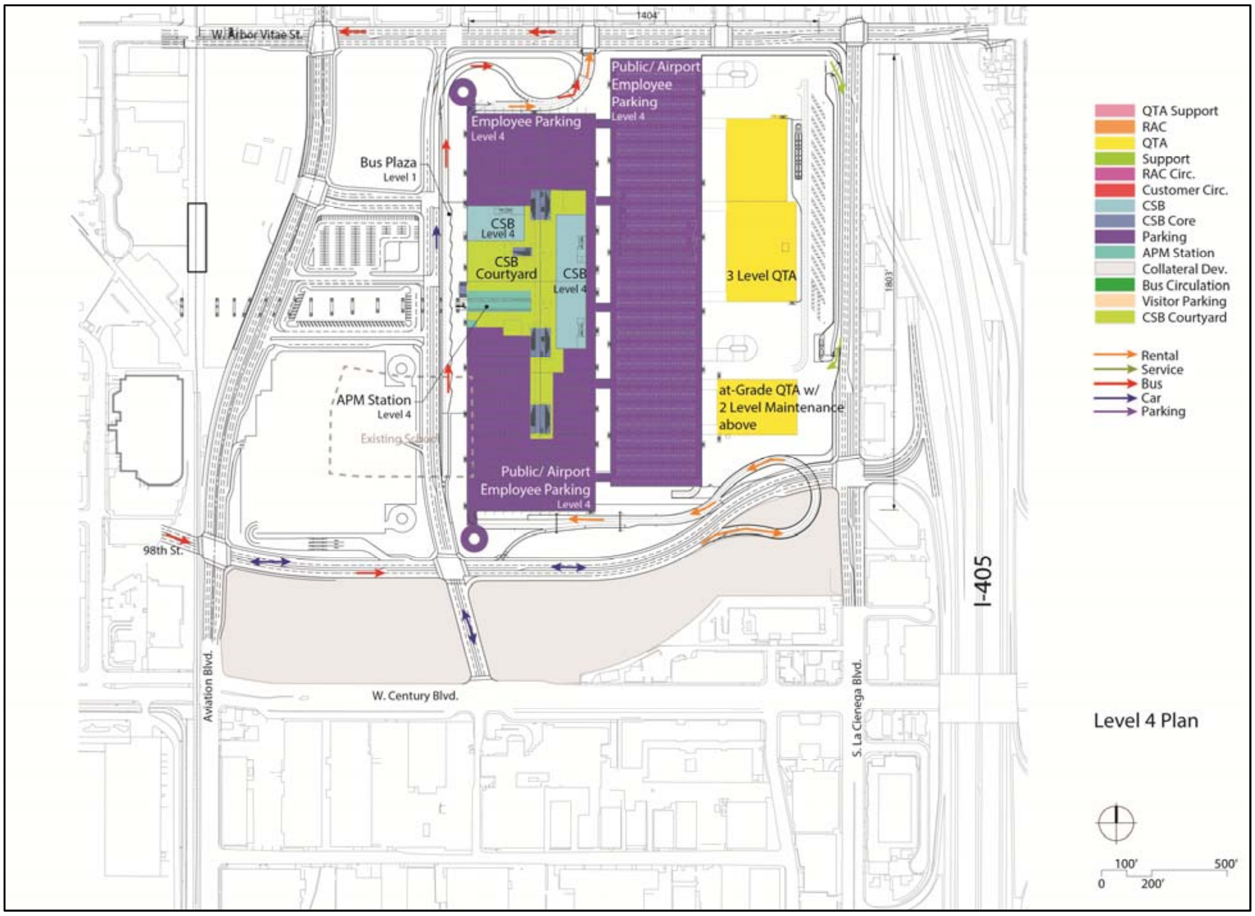


Figure 1.4.1: Preferred Alternative – Overall Plan
Source: TranSystems June 2016
Prepared by: TranSystems June 2016

Renderings depicting aerial views of the preferred concept are shown on Figure 1.4.2 and Figure 1.4.3.

Figure 1.4.2: Aerial View of ConRAC Facility from Southwest
Source: RAW International, March 2016
Prepared by: RAW International, March 2016

Figure 1.4.3: Aerial View of ConRAC Facility from Northeast
Source: RAW International, March 2016
Prepared by: RAW International, March 2016

Section 2: Data Collection

2.1 AVIATION CRITERIA

The location and height of proposed facilities on the Manchester Square site will be influenced by the aviation surfaces defined by existing Runway 6R/24L. The aviation criteria are defined in FAA Advisory Circular 150/5300-13 Airport Design and Federal Aviation Regulations (FAR) Part 77 Objections Affecting Navigable Airspace. For the Landside Access Modernization Program, the One Engine Inoperative (OEI) surface is the controlling surface. Figure 2.1.1 shows an enlarged plan of the OEI surface where it occurs over Manchester Square: This surface is longitudinally centered, on the extended centerline of the runway, beginning at the Departure End of the Runway (DER) and extending outward and upward at a slope of 62.5:1 for a horizontal distance of 50,000 feet.

Occupied buildings and any fixed objects are not allowed to penetrate the OEI surfaces. The northeast corner of the site has a maximum allowable height elevation of 265.0 Mean Sea Level (MSL) and slopes down, from east to west, to a maximum allowable height of 225.0 MSL on the east side of Aviation Boulevard, across from an existing parking garage currently operated by Wally Park. The average grade elevation of Manchester Square is below 100 MSL. This means the maximum height of a building on the site can range from approximately 165 feet, at the northeast corner near the intersection of W. Arbor Vitae Street and S. La Cienega Boulevard, down to 125 feet across from Wally Park.

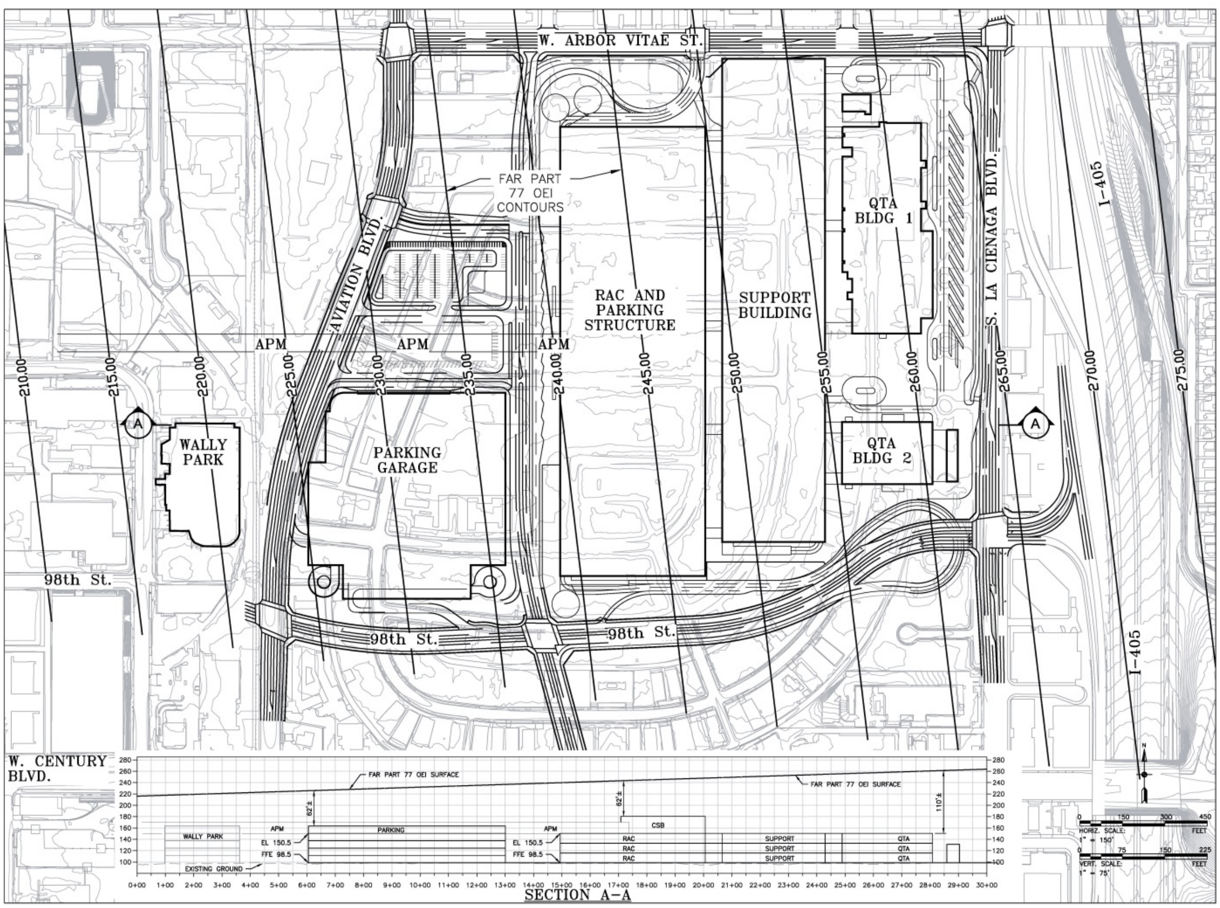


Figure 2.1.1: One Engine Inoperative (OEI) Surface Affecting the Height of Buildings on Manchester Square
Source: LAMP Team, December, 2015
Prepared by: TranSystems December, 2015

2.2 RENTAL CAR HISTORICAL TRANSACTIONS AND DEMAND

Rental car transaction data at LAX was collected from each rental car agency in the form of a survey to track hourly rental and return transaction activity for every day of the year throughout 2013. To identify the peak rental day, each current on-airport rental car company's peak rental transaction data was analyzed. The average seasonal peak transaction activity specific to each rental car brand family was recorded. Typically, the duration of the peak season is four to six months. The peak day was targeted by selecting the daily activity that fell between the 94th and 96th percentile of all daily activity. Based on available data, it was determined that the peak rental day is a Monday. Additionally, the peak return day was determined to be a Friday, which coincides with the airport's peak day. Friday is also the peak day for all rental car transactions. Table 2.2.1 summarizes the hourly transaction counts by hour for these two peak days in 2013.

Table 2.2.1 Peak Day Rental Car Transactions – All Companies - 2013

	Friday August 9, 2013 Airport Peak Day			Monday August 12, 2013 Peak Rental Day		
Hour	Rental	Return	Total	Rental	Return	Total
0	261	19	280	111	22	133
1	113	10	123	32	9	41
2	38	7	45	5	52	57
3	11	78	89	1	124	125
4	12	357	369	6	251	257
5	30	521	551	23	351	374
6	64	557	621	94	437	531
7	179	469	648	173	413	586
8	271	485	756	475	510	985
9	477	572	1,049	745	631	1,376
10	686	663	1,349	1,079	693	1,772
11	787	812	1,599	1,074	733	1,807
12	906	749	1,655	904	625	1,529
13	691	664	1,355	701	616	1,317
14	658	702	1,360	688	542	1,230
15	713	634	1,347	698	573	1,271
16	573	590	1,163	551	519	1,070
17	609	593	1,202	545	502	1,047
18	443	557	1,000	484	483	967
19	535	488	1,023	421	445	866
20	509	394	903	528	369	897
21	531	324	855	475	249	724
22	415	162	577	358	122	480
23	501	95	596	218	214	432
Daily Total	10,013	10,502	20,516	10,390	9,485	19,874

Represents Peak Hour

Source: Rental Car Survey Responses, May 2014
Prepared by: TranSystems June 2014

Using 2013 as the base year, future transaction demand for the ultimate development of the ConRAC was developed by increasing the number of transactions per hour to reflect 42% growth over 2013, as shown in **Table 2.2.2**. This projected demand is associated with approximately 95 million annual passengers.

Table 2.2.2 Peak Day Rental Car Transactions - All companies 42% growth

	Friday Airport Peak Day				Monday Peak Rental Day		
Hour	Rental	Return	Total		Rental	Return	Total
0	371	27	398		158	31	188
1	161	14	175		46	13	59
2	54	10	64		7	74	81
3	16	111	127		1	176	178
4	17	507	524		9	356	365
5	42	740	782		33	498	531
6	91	791	882		134	621	755
7	254	666	920		246	586	833
8	385	689	1,024		674	724	1,398
9	677	812	1,489		1,057	896	1,953
10	974	941	1,916		1,531	984	2,516
11	1,117	1,153	2,270		1,524	1,041	2,565
12	1,286	1,064	2,350		1,283	888	2,171
13	981	943	1,924		995	875	1,870
14	934	997	1,931		978	770	1,747
15	1,013	900	1,913		992	814	1,805
16	814	838	1,652		783	737	1,520
17	864	842	1,706		774	713	1,487
18	629	791	1,419		687	686	1,373
19	760	693	1,453		598	632	1,230
20	722	559	1,282		750	524	1,274
21	754	460	1,214		675	354	1,028
22	590	230	820		509	173	682
23	711	135	846		309	304	613
Daily Total	14,219	14,913	29,132		14,753	13,468	28,222

Represents Peak Hour

Source: Rental Car Survey Responses, May 2014

Prepared by: TranSystems June 2014

2.3 CONSOLIDATED RENTAL CAR COMPANY SURVEY RESULTS

The Design Team prepared and distributed written surveys to rental car company representatives in July and October 2015, for the purpose of collecting relevant information regarding their current and anticipated QTA operations, staffing, customer service metrics, and maintenance and storage requirements. As survey responses contain proprietary business information for specific RAC companies, responses received were treated as confidential information and were not disclosed on an individual basis. Summaries of the consolidated survey results are presented in Table 2.3.1 and Table 2.3.2.

Table 2.3.1 Consolidated Rental Car Survey Results – July 2015

July 2015 Survey Questions	Results (Based on Responses from Approximately 60% of RAC Market)
Maximum number of car carriers (in-fleet or out-fleet) on site at any one time	Ranges Between 3 to 8 for Individual RAC Company or Brand Family
Total monthly gasoline consumption	Total: 470,000 gallons
Total gasoline storage capacity (tank size)	Total: 160,000 gallons
Current monthly windshield washer fluid consumption	Total: 80 gallons
Current total windshield washer fluid storage capacity (tank size)	Total: 30 gallons
Motor oil consumed (conventional oils)	Total: 500 gallons storage, 800 gallons consumed per month
Motor oil consumed (synthetic oils)	Total: 5,100 gallons storage, 8,900 gallons consumed per month
Number of service agents (fuel positions) managed by a single supervisor	1 manager per 6 to 20 fuel positions (varies per company)
Maximum acceptable distance between supervisor's office and the most remote fuel island	Ranges between 100 to 200 feet
Number of maintenance employees (maintenance bays) managed by a single supervisor	1 manager per 8 to 15 maintenance bays (varies per company)

Source: Rental Car Survey Responses, July 2015
Prepared by: TranSystems December 2015

Table 2.3.2 Consolidated Rental Car Survey Results – October 2015

October 2015 Survey Questions	Results (Based on Responses from Approximately 95% of RAC Market)
Number of employees working at current locations	130 counter agents 79 administrative staff 275 vehicle drivers 320 vehicle service agents 227 other staff Total: 1,031 employees
Number of expected employees working at the new ConRAC during the first year of operation	173 counter agents 91 administrative staff 270 vehicle drivers 365 vehicle service agents 232 other staff Total: 1,131 employees
Total number of administrative staff expected at Level 4 Back of House Offices	Total: 53 employees during peak shift
Total number of administrative staff expected at RAC Floor Offices	Total: 61 employees during peak shift
Maximum acceptable walking distance on Level 4 CSB without assistance of moving walkways	Ranges between 100 to 400 feet
Percent of returned vehicles that require heavy maintenance work	Ranges between 3 to 5 percent
Maximum number of tires stored	Total: 855 tires
Area of parts storage cage for light maintenance operations	Total: 6,000 square feet
Area for specialized equipment for light maintenance operations	Total: 4,200 square feet
Total number of vacuum nozzles at the Idle Storage Area (for cars that do not need to be fueled or washed)	Total: 30 vacuum nozzles
Total number of electric charging stations used at one time	Total: 25 stations

Source: Rental Car Survey Responses, October 2015
Prepared by: TranSystems December 2015

2.4 TRAFFIC CHARACTERISTICS AND DEMAND

Traffic analysis of preferred concept is in progress and will be provided in future submittal.

2.5 BUS AND APM RIDERSHIP PROJECTIONS

Should the APM not be in operation on opening day, ridership estimates for the interim ConRAC shuttle bus operation are based on the results of the accumulation and forecasting of rental car transactions described in Section 2.2. To generate ridership demand for the shuttle buses, Lea+Elliott converted the 2013 transactions data shown in Table 2.2.1 into passenger movements as follows:

- The assumed average party size for leisure travelers is 2.5 passengers per transaction.
- The assumed average party size for business travelers is 1.5 passengers per transaction.

- For the Friday airport peak data, it is assumed that 75% of rentals are leisure travelers and 60% of returns are business travelers and the party size factors were applied accordingly.
- For the Monday rental peak data, it is assumed that 60% of rentals are business travelers and 75% of returns are leisure travelers and the party size factors were applied accordingly.

Figure 2.5.1 summarizes rental passenger flows by hour of day in 2013 and shows that peak demand of passengers per hour per direction (pphpd) occurs during the Friday noon hour and consists of arriving air passengers who would be traveling from the LAX CTA to the ConRAC to rent cars. Based on this data the peak demand in 2013 was estimated to be 2,049 (pphpd).

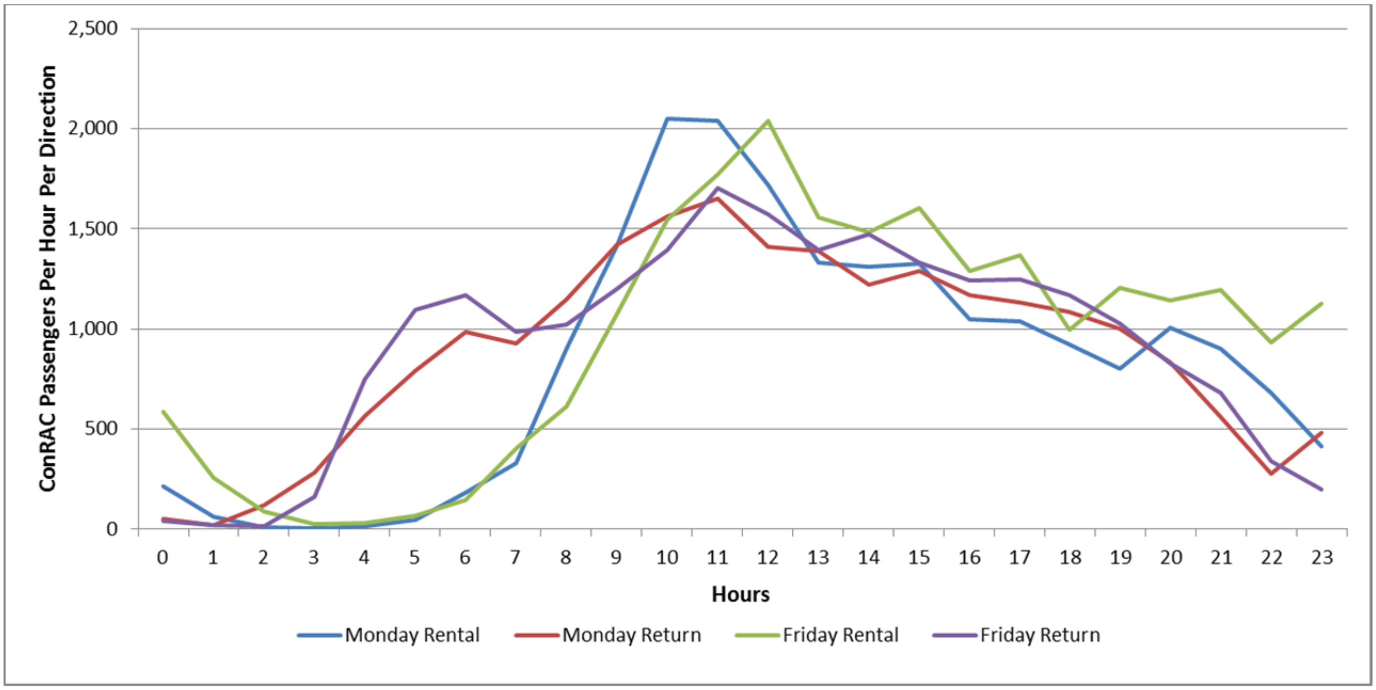


Figure 2.5.1: Estimated Rental Car Passengers by Hour - 2013
Source: 2013 Survey of Rental Car Transaction Data by TranSystems, May 2014
Prepared by: Lea + Elliott, January 2015

ConRAC Bus Ridership – Peak Passengers Per Hour Per Direction (pphpd)

To generate fleet requirements for the interim shuttle bus operation, a hypothetical demand scenario was created. Using 2013 as the base year, Lea + Elliott then estimated rental car passenger flow by hour for the ConRAC Opening (2023) as follows:

- Total airport passenger demand at LAX was projected to increase 1.21 times from the 2013 base year to ConRAC opening in 2023 based on data from the FAA Terminal Area Forecast for LAX.
- Rental Passengers by hour depicted in Figure 2.5.1 were increased 1.21 times accordingly, yielding the values shown in Figure 2.5.2.

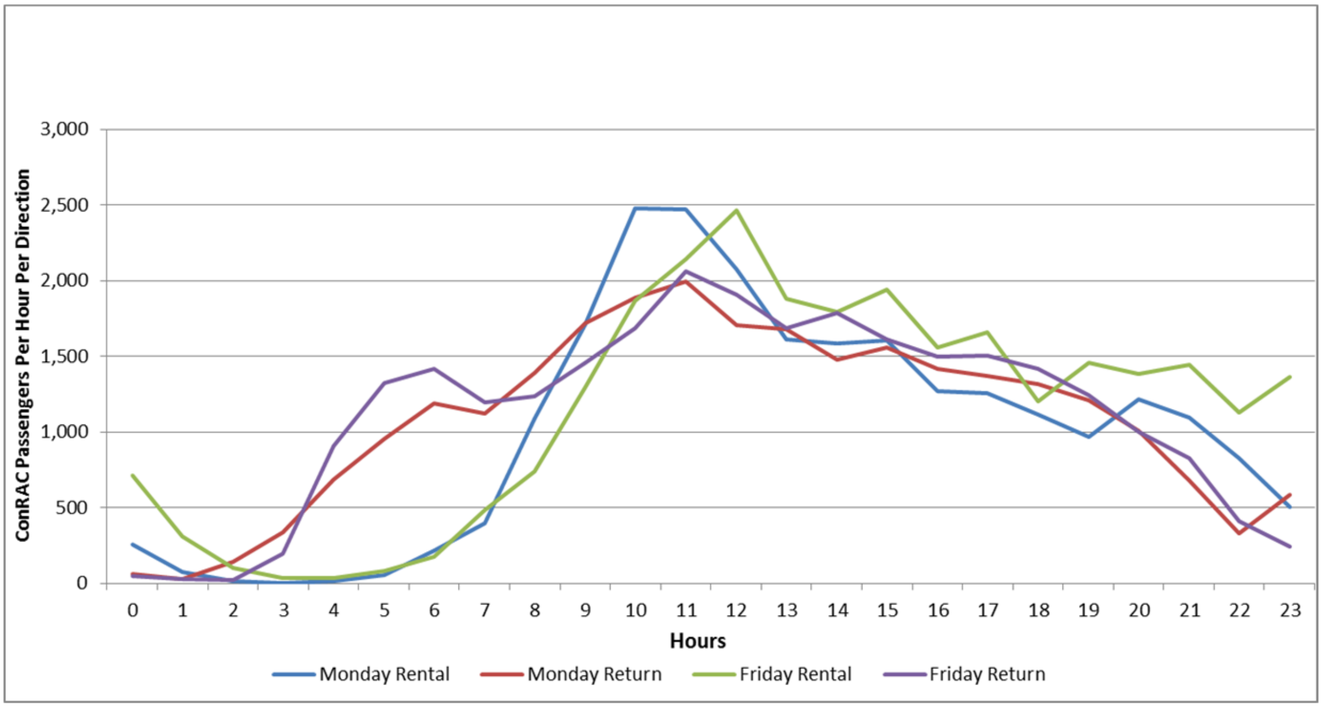


Figure 2.5.2: Estimated Rental Car Passengers by Hour – Opening of the ConRAC (2023)
Source: 2013 Survey of Rental Car Transaction Data by TranSystems, May 2014
Prepared by: Lea + Elliott, March 2015

Per the foregoing, the peak consolidated shuttle bus ridership was estimated to be 2,480 pphpd at ConRAC opening (2023).

2.6 COMPARISON TO OTHER AIRPORT CONRACS

Due to the urban nature of Manchester Square, and the surrounding site adjacencies, it is important to balance the footprint required while using the available real estate as efficiently as possible. This section provides a comparison of the scale of other recently developed ConRACs at large airports to the program proposed for the LAX ConRAC.

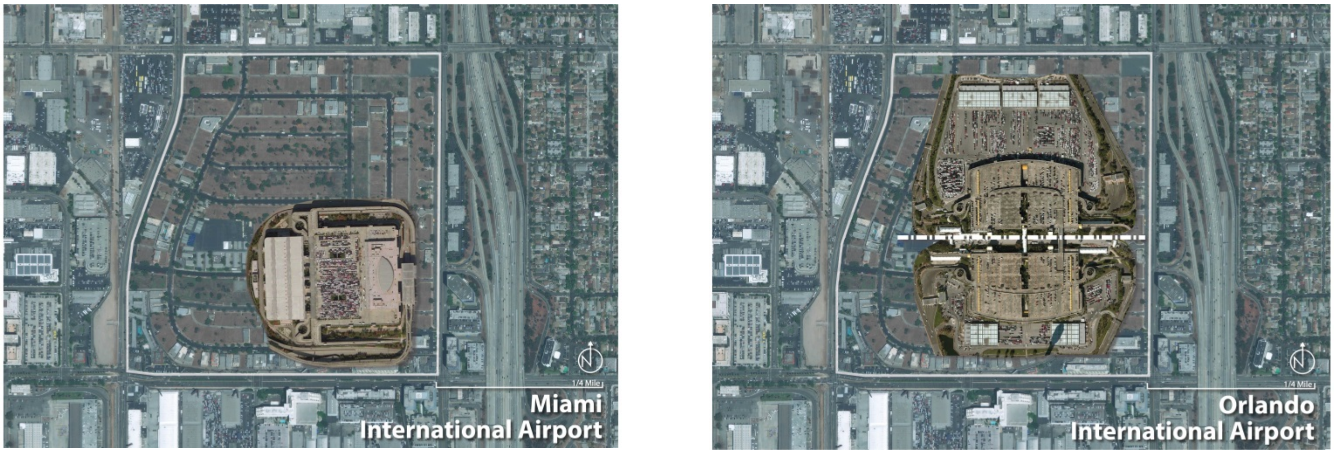


Figure 2.6.1: ConRAC Site Comparisons
Source: TranSystems, December 2014 and August 2015
Prepared by: TranSystems, December 2015

Table 2.6.2 Comparison of Airport ConRACs to the LAX ConRAC Program

Airport	Million Annual Passengers (MAP) - 2013	Ready/Return Stalls	Idle Storage / Employee Stalls
Hartsfield-Jackson Atlanta International Airport	94	5,850	3,000
Dallas Fort-Worth International Airport	61	4,200	10,400
George Bush InterContinental Airport	40	3,400	10,800
Phoenix Sky Harbor International Airport	40	5,600	11,000
Miami International Airport	41	6,500	TBD
Orlando International Airport	35	4,080	6,000 – short term only
Los Angeles International Airport – Program	95 42% growth over 2013	7,600	10,000 storage stalls and 1,100 employee stalls

2.7 *CLIMATE AND WEATHER PATTERNS*

Los Angeles is located near 34°N latitude and 118°W longitude. Its altitude is 120 feet above sea level. The city has a subtropical/Mediterranean climate, marked by dry summers and more rainy winters. Temperature transitions from winter to summer are relatively modest. July, August, and September are the warmest months, with an average high of 83.5°F. December through March are typically rainier months, with February being the wettest month with 3.8 inches of rain on average. December and January are the coldest months, with an average low of 47.6°F. Below freezing temperatures are very rare; temperatures rarely drop below 45 °F, though light frost occasionally occurs away from the coast. In the winter, occasional warm or hot spells occur due to high pressure systems in the inland desert areas, giving rise to so-called Santa Ana Winds.

The Los Angeles area exhibits microclimates, and generally summer coastal temperatures are lower than inland temperatures. The Los Angeles International Airport site is near the coast, so summer temperatures are typically lower than those mentioned above, which pertain to the overall Los Angeles area. Monthly average maximum at the Los Angeles International Airport site in July and August is 76.3 °F versus the 83.5°F noted above for the overall Los Angeles area. Winter temperatures at the Airport site are very similar to those noted above. Frost is very rare at the coastal site of the Los Angeles International Airport.

Typical wind direction for Los Angeles area is westerly/southwesterly and wind speeds are typically light. The average wind speed is between 6 and 9 miles per hour (light to gentle breeze) over the year, with an average high of 12 to 16 miles per hour. Wind speeds are typically highest in April, and lowest in January.

Figure 2.7.1 shows the fraction of time spent in various temperature bands in Los Angeles as a whole, by month. The temperature bands are defined below the figure. "Cool" and "Comfortable" clearly dominate the Los Angeles climate, with small amounts of time reaching "warm" or "cold". The more extreme temperature bands of "frigid", "freezing", "hot", and "sweltering" typically do not occur in this area. (Note the colors used here differ from the Olgyay-based figures that follow, but the temperature/comfort categories are similar).

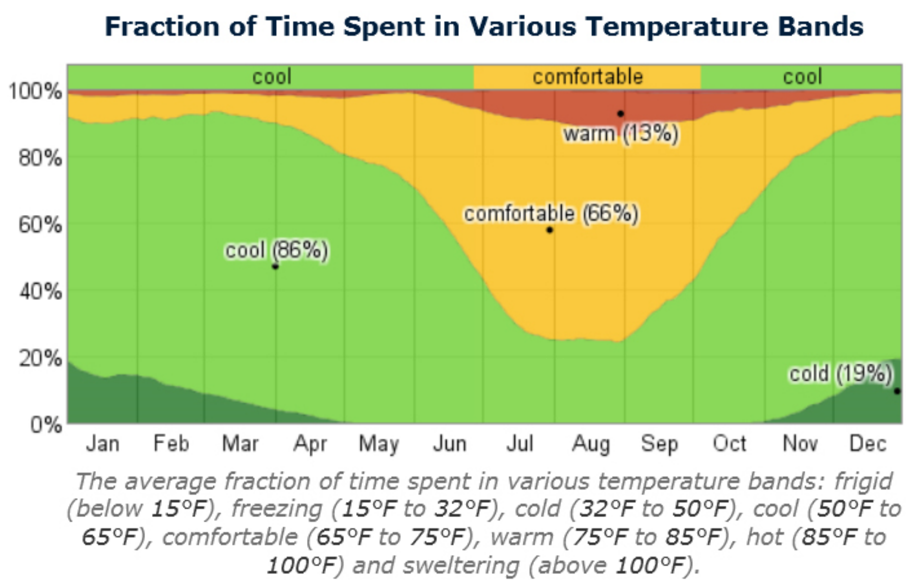


Figure 2.7.1: Temperature Bands for Los Angeles area
Source: Weatherspark.com, 2015
Prepared by: TranSystems, June 2015

Figure 2.7.2 is a graph of the Los Angeles International Airport microclimate, shown on the Olgyay chart. Temperature is shown on the vertical axis while relative humidity is shown on the horizontal axis. The slanting black lines represent the average high and low temperatures with the corresponding relative humidity, for each of the months of the year. The chart shows the combination of temperature and relative humidity that is required in order for an average person to achieve homeostasis – the preservation of core body temperature without the body having to work at it. The scientific definition of comfort is "when the human body is able to achieve homeostasis – preservation of core body temperature – without being aware that it is happening". When a person becomes aware that their body is working on achieving homeostasis (through such methods as rubbing their hands together, stamping their feet, fanning themselves or perspiring) they are, by definition, no longer comfortable. The chart shows that for the high temperatures, a person would need to be in the shade, exposed to a breeze surrounded by low radiant temperature surfaces. The lower temperatures show that a person would want to be exposed to the sun, protected from the breeze and exposed to high radiant temperature surfaces.

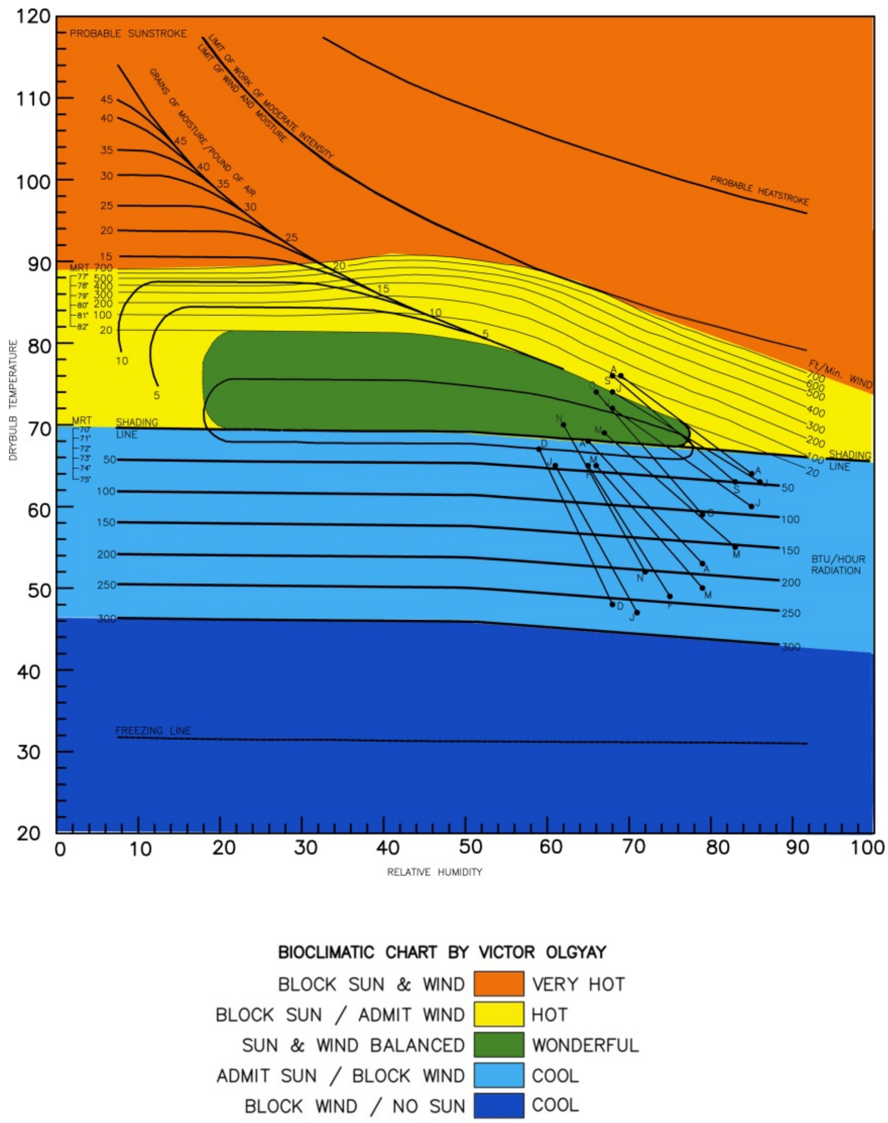


Figure 2.7.2: Comfort Diagram for Los Angeles International Airport

Source: Design with Climate, By Victor Olgyay, 1963, and Los Angeles Almanac.
Prepared by: TranSystems, June 2015

Figure 2.7.3 presents similar information by time of day and month of the year. It indicates the generally cool and even microclimate at the project site. It shows that the warm periods when a person would want to be in the shade and exposed to the breeze happen typically in August and September. The green portions of the graph represent times of the year when the sun and the wind are in balance and personal comfort is easily achieved. The light blue area of the chart shows the hours of the year when, if a person can be in the sun and protected from the breeze, they can be comfortable. Very hot and very cool conditions typically do not occur.

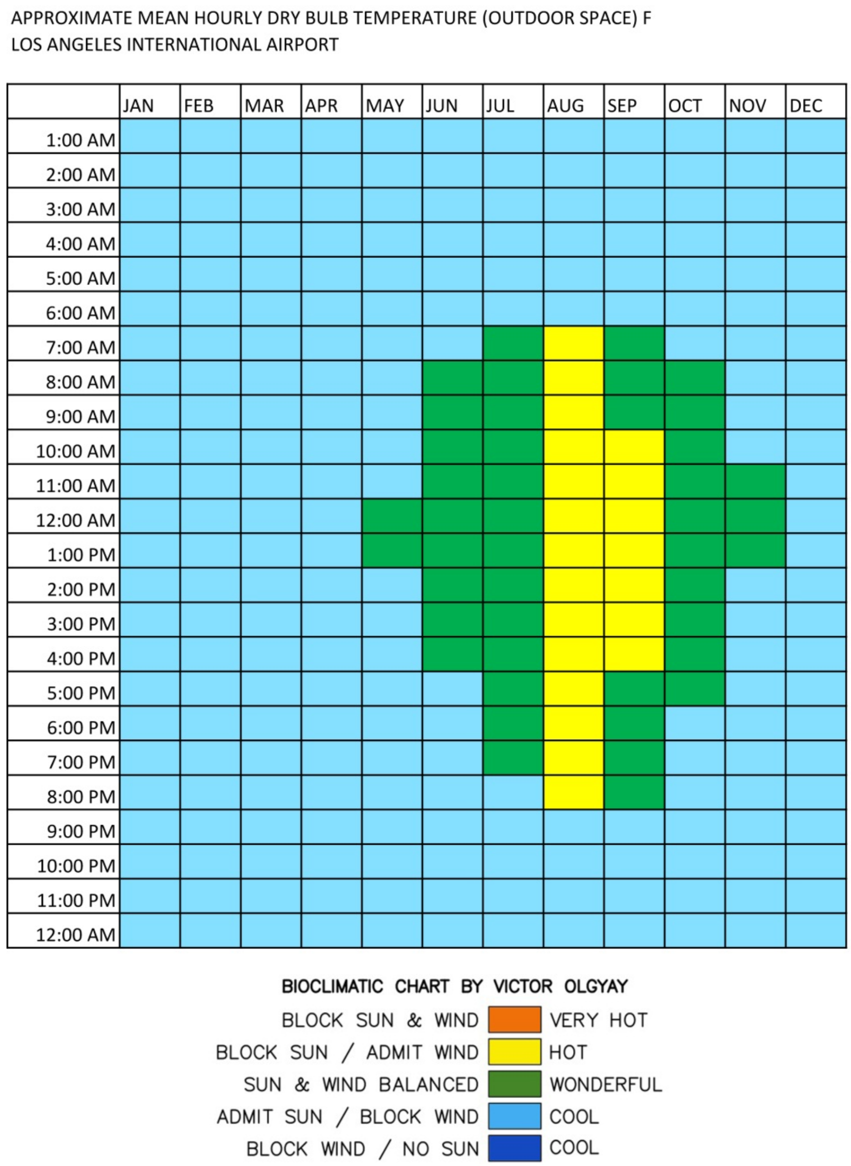


Figure 2.7.3: Comfort Diagram for Los Angeles International Airport
Source: Design with Climate, By Victor Olgyay, 1963; NOAA National Center for Environmental Information
Prepared by: TranSystems, June 2015

Figure 2.7.4 shows sun angles for Los Angeles. The graph can be used to determine the size and shape of sun shades to maximize the comfort of people outdoors. As above data indicates, sunshades likely needed only in August and September (yellow above). Protection from breezes would be desirable for much of the year (light blue above.)

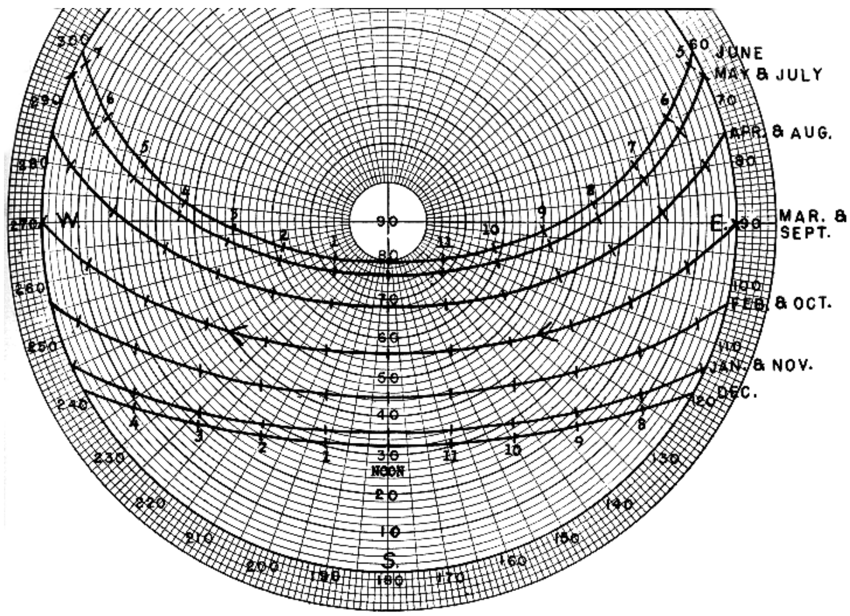


Figure 2.7.4: Solar Path, 34 degrees N, 21st each month
Source: Griffith Observatory
Prepared by: TranSystems, June 2015

Section 3: Bus and APM Systems

As depicted in Figure 3.1.1, several remote facilities are planned to be developed as part of the Landside Access Modernization Program (LAMP) at Los Angeles International Airport (LAX). The remote facilities are anticipated to include vehicle parking, two Intermodal Transportation Facilities (ITF), a connection to the Crenshaw Line being constructed by Metro at 96th Street, and a Consolidated Rental Car Center (ConRAC) at Manchester Square, all connected to the LAX Central Terminal Area (CTA) by an elevated Airport People Mover (APM). In the event the ConRAC were to open prior to the APM, planned facilities allow transport of passengers to and from the CTA via a dedicated shuttle bus system. To accommodate the shuttle bus operation, a ground-level Bus Plaza with a centralized vertical circulation core (with elevators) provides express connection to the CSB at Level 4. Such an interim shuttle bus is assumed to operate for no more than two years.

The balance of this section presents a brief overview of the operating characteristics of the bus system and reviews the related facility planning criteria supporting the definition of bus service as part of the ConRAC facility program. An overview of the corresponding operating characteristics and facility planning criteria for the APM system can be found in the LAX LAMP Program Definition Document.

Figure 3.1.1 APM Alignment for LAX Landside Access Modernization Plan
Source: MAPLAX August 2015
Prepared By: TranSystems August 2015

3.1 *SHUTTLE BUS OPERATING CHARACTERISTICS AND CRITERIA*

As indicated above, should the ConRAC begin operation before the APM, a consolidated shuttle bus fleet would be used to temporarily transport passengers between the ConRAC and the CTA. For planning purposes the consolidated busing operation is assumed to have the following general characteristics:

- 40-foot long buses with a capacity of 30 passengers per bus and assumed average peak load of 24 passengers per bus
- ConRAC passengers will be transported with their luggage/bags on board
- Dwell times based on board/de-board average time of 5 seconds per passenger

- Bus frequency per route at approximately 1.5 to 1.8 minutes
- As depicted in **Figure 3.1.2**, three separate routes would operate between the ConRAC and CTA in order to distribute the passenger load among the eight terminal stops within the CTA

	Stop Pattern
Route 1	T1, T2, T3/TBIT
Route 2	TBIT/T4, T6
Route 3	T5, T7/T8

Figure 3.1.2 Consolidated Shuttle Bus Route System
Source: Ricondo & Associates, August 2014
Prepared by: TranSystems, December 2015

Bus operations, with either dual-level drop-off and pick-up, or single-level operation, were both studied for the ConRAC opening year. The time for each bus to complete a round trip - during a Friday mid-day peak period - from the ConRAC, make the designated stops within the CTA to drop-off and pick-up passengers then return to the ConRAC was estimated to range from 47 minutes with a single-level operation to 56 minutes with a dual-level operation. Based on these projected round trips times, a single-level bussing operation during peak periods was estimated to have 84 buses in service with 28 buses per route and a total fleet of 97 buses. By contrast, during peak periods, a dual-level operation would have 99 buses in service with 33 buses per route and a total fleet of 114 buses. The details of the bus trip time analysis are included in Appendix 3.1.

To accommodate this operation, the site plan for the preferred ConRAC concept includes a bus curb with twelve stalls. The bus stalls are arranged in a saw-tooth configuration to facilitate the efficient movement of buses to and from the curb. Likewise, each ConRAC alternative includes provisions for a Bus Plaza to facilitate passenger movements between the bus curb and ConRAC Customer Service Building.

3.2 APM STATION DESIGN CRITERIA

APM Station conceptual design criteria are being developed by the Landside Program Design Team and takes place concurrently with ConRAC design development. APM Station structural criteria are described in the APM PDD and are incorporated into the design of the ConRAC structure.

Section 4: ConRAC Planning and Design Standards

The following section describes the typical passenger experience; operational parameters and functional design criteria for the ConRAC. All of this information has been used in the development and refinement of the preferred LAX ConRAC concept.

4.1 THE RENTAL CAR CUSTOMER EXPERIENCE

Current Conditions for Rental Car Customers at LAX

Arriving rental car customers for all brands are required to leave the terminal at the baggage claim level and walk to the outside curb to wait for their rental car shuttle bus for their specific company at the designated rental car loading zone. There is no sharing of busing except for National and Alamo. Passengers must cross three lanes of traffic, lift their luggage up on the sidewalk, wait for their specific rental car company bus, and then lift their luggage up into the bus.

The length of time for the shuttle to arrive at the individual rental car facility varies depending on the company. The time for various operators was modeled during this planning study. The time for an Avis bus, whose site is closest to the CTA, takes from 11.2 minutes to pick-up passengers at Terminal 7 to 24.5 minutes for a passenger to get picked-up at Terminal 1. The time for an Advantage passenger, whose site is the farthest from the CTA, can take from 19.6 minutes to pick-up a passenger at Terminal 7 to 34.6 minutes for a passenger to get picked-up at Terminal 1. The length of the trip can be affected by road congestion, the loading time, bus congestion at the rental car loading zone, construction delays, and weather conditions.

Rental car customers use the individual rental car company's shuttle where they have a reservation or the one they choose to visit to inquire about renting a vehicle. If a customer arrives at a rental car location and finds a long line at the counter or that their car is not ready, or there is some other problem, it is very difficult for that customer to visit another company which may have a shorter wait or vehicles available.

Rental car customers are delivered to their rental car sites adjacent to the customer service building or premium service building. The delivery locations are partially covered at most major company locations. The rental cars are mostly located on surface parking lots fully exposed to the weather. Signage at the rental car exit security booths indicates how to connect to the nearby freeway systems.

Since the rental car companies are spread out in various areas, LAWA has installed over 50 wayfinding signs to direct customers returning rental cars to each specific company. Returning customers leave their vehicles in return lanes that are fully exposed to the weather. Generally, customers waiting for the bus back to the terminal have an area with a canopy to wait under.

Passengers are dropped off at the terminal on the departure level, which is partially covered.

Proposed Conditions for New ConRAC

Arriving rental car customers will follow the signs directing them to the APM stations via pedestrian bridges spanning the terminal roadway to one of three stations located in the CTA. The bridges will be enclosed and ventilated. The total time for an arriving passenger to walk from any terminal to the APM station, ride the train to the ConRAC, with stops at the ITF West and ITF East, will range from 12 to 14 minutes.

The rental car facility will be designed so that the pedestrians and vehicle movement intersections are minimized. Figure 4.1.1 shows the preferred vehicle and customer flow for arriving airline passengers in the proposed ConRAC, which will provide a safe and efficient rental car operation.

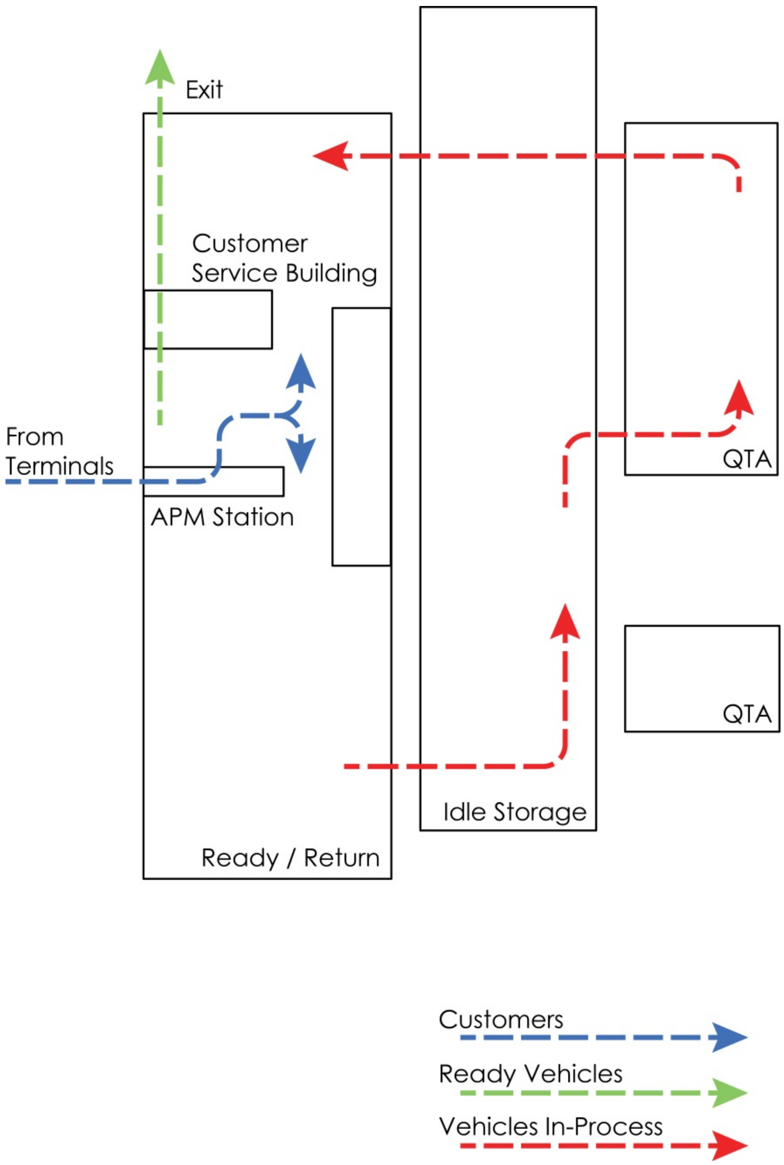


Figure 4.1.1 Arriving Rental Car Customers and Rental Vehicle Flows
Source: TranSystems, August 2015
Prepared by: TranSystems, February 2016

The APM station at the ConRAC will be directly connected to the CSB. The CSB will have vertical cores, with elevators and escalators to allow rental car customers to easily proceed to the ready vehicle area located on each of the levels of the RAC garage.

While in the CSB, customers will have the opportunity to shop for a rental car company if they arrive at the airport without a car rental reservation. A 350-foot walking distance is a commonly used industry metric for an acceptable customer walking distance, so the majority of the ready vehicles will be stored within this distance from the vertical cores.

Vehicle flow at each level of the RAC garage is designed to be direct from origin to destination with limited cross traffic within the facility. Customers will pick up their vehicles under the protective cover of the garage level or roof deck above. Drive aisles leaving the facility will also be under cover.

The flow diagram indicates that there should be separate paths for customers walking to and from the APM station, or bus curb, into the rental car customer service areas. The customer paths are separate from the dedicated paths for the vehicle entrances and exits and the shuttle route used to take vehicles to and from the QTA.

The fact that all the rental car companies will now be in the same location will simplify the signage and wayfinding both leaving the facility toward the freeways and returning to the facility.

Figure 4.1.2 shows the preferred vehicle and customer flow within the ConRAC for departing airline passengers. All vehicles will be returned to a location that is protected from the elements. After returning their cars, departing passengers may proceed to the CSB lobby, using the vertical cores, and then walk directly to the APM station. The walk from the cores to the APM station should be direct and as short a route as possible.

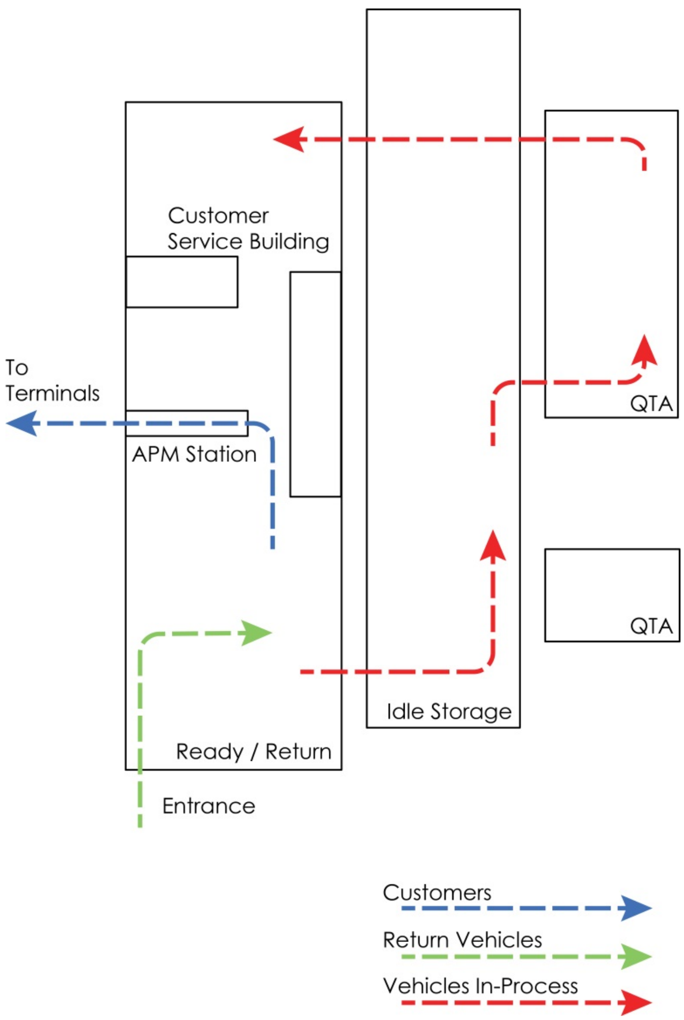


Figure 4.1.2 Departing Rental Car Customers and Return Vehicle Flows
Source: TranSystems, April 2015
Prepared by: TranSystems, February 2016

4.2 CUSTOMER SERVICE BUILDING (CSB)

The Customer Service Building (CSB) is the public hub of the ConRAC. The CSB is the area in which arriving customers complete their transactions to rent a vehicle with one of the rental car companies. Customers are provided a range of amenities such as restrooms, food and beverage services, internet access and seating areas. Recent CSBs have also provided business centers adjacent to the lobby area.

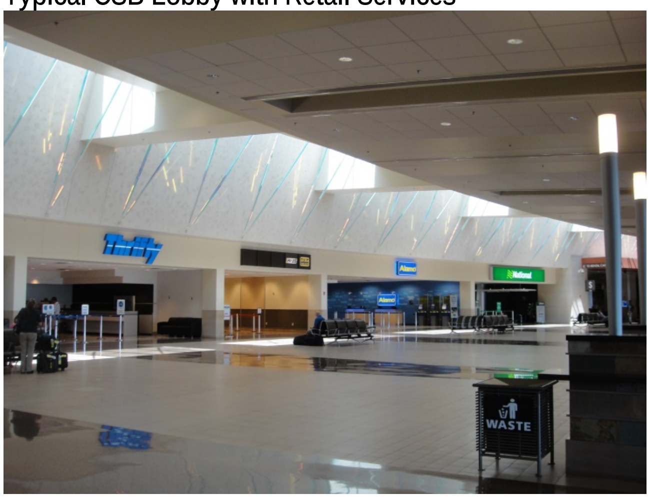
There are a variety of configurations in which the customer service counters may be accommodated. They can be arranged in a linear layout, similar to most airport passenger check-in areas, or they can be arranged in a "mini-mall" arrangement in which the customer service counters are positioned within their own distinct module that may also contain seating areas and customer travel services. Given the size of the LAX market, a mini-mall is the logical configuration. Besides reducing the walking distance to the counters, this approach provides maximum flexibility to the rental car companies in how they configure the counter, lobby and back office space.

The CSB will be designed to provide a direct connection to the ConRAC APM station. There will be two separate platforms – the north platform will be used by arriving customers on their way to pick-up a vehicle; and the center platform will be used by departing customers on their way to the terminal, or the Metro station at 96th St. There will be no level changes between the CSB and the APM platforms. Customers will be able to transition, easily and intuitively, from the CSB to the various ready/return levels in the rental car garage via multiple vertical transportation cores, containing both escalators and elevators. Figure 4.2.1 shows images of various areas within a typical CSB.

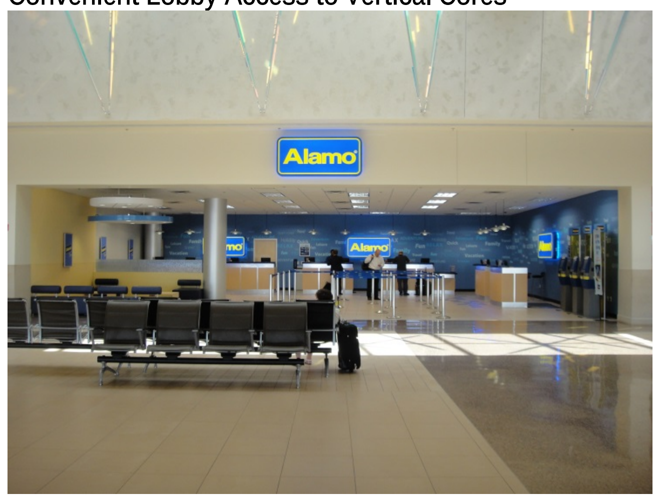
For the initial opening of the ConRAC, a grade-level Bus Plaza will be developed to accommodate an interim shuttle bus operation. A centralized vertical circulation core with elevators will be constructed to provide a convenient connection between the Bus Plaza and the CSB.

Typical CSB Lobby with Retail Services

Convenient Lobby Access to Vertical Cores



Rental Car Counters in a “Mini-mall” Arrangement



Typical Customer Service Counter and Waiting Area

Figure 4.2.1: Components of a Customer Service Building (CSB)
Source: TranSystems April 2015
Prepared by: TranSystems April 2015

4.3 PEDESTRIAN CIRCULATION AND PATHS

Pedestrian circulation within the facility and pedestrian paths within various areas of the site should follow these design parameters:

- 12-foot sidewalk widths to accommodate two people with luggage passing each other
- Weather protection should be provided in open areas, such as wind screens, canopies and sun shades
- Site lighting to meet security requirements
- Limit the amount of street crossings for pedestrians
- To comply with federal Americans with Disabilities Act (ADA) requirements, pedestrian paths shall have a maximum 2% cross slope and a maximum 5% directional slope

4.4 MAXIMUM CUSTOMER WALKING DISTANCES

The maximum customer walking distance should be between 300 feet (preferred) and 350 feet (maximum). The average assumed unassisted walking speed for a pedestrian is 3.5 feet/second (National Committee on Uniform Traffic Control Devices).

- 300 feet at 3.5 feet/second = 1 minute 26 seconds
- 350 feet at 3.5 feet/second = 1 minute 40 seconds

4.5 READY/RETURN AREA

The ready return area is the flexible hub of the rental car operation. It is used for customer vehicle pickup and return and vehicle storage.

Figure 4.5.1 shows the conceptual diagram for the ground level of the ready/return area. The maintenance expressway, along the perimeter of the east side of the ready/return area, provides a dedicated route for transferring return vehicles to the QTA and ready vehicles (which have been cleaned, fueled and washed) to the ready stalls. Note that the customer traffic stays segregated from the shuttle vehicle traffic using the maintenance expressway.

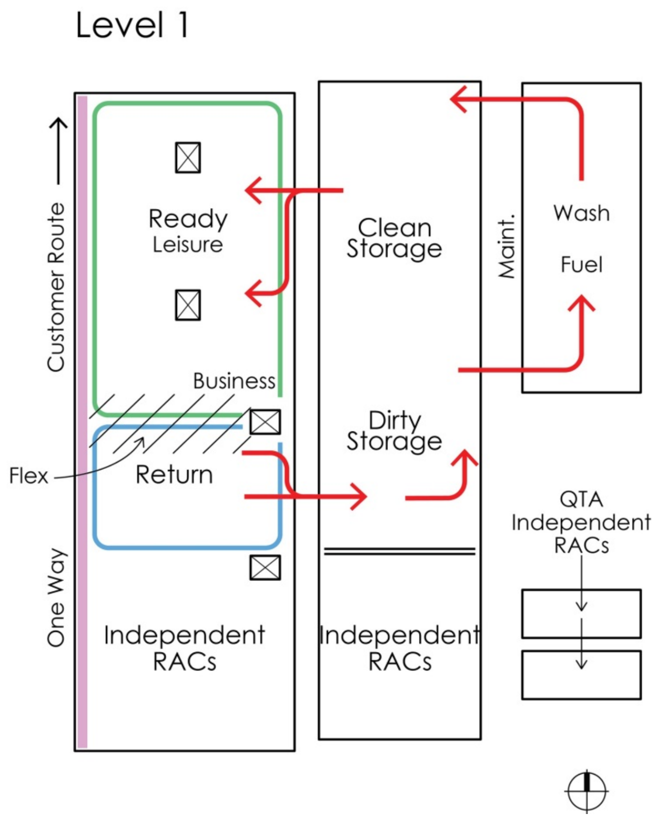


Figure 4.5.1: Ground Floor Layout for Rental Car Facility
Source: TranSystems, March 2015
Prepared by: TranSystems, December 2015

Each level of the ready/return facility will be designed to accommodate a rental car brand family operator combined with existing and future independent operators. In **Figure 4.5.1**, the northern two-thirds of the ground level of the deck is shown as being allocated for use by a brand family operator. All companies in the brand family would have access to the vertical cores which will connect the CSB to the ready/return deck. The brand family operator will have the flexibility to organize its area of the deck to accommodate ready or return vehicles depending of the peak day and peak period customer demand requirements. The independent operators assigned to the ground floor will be located at the south third of the deck. This will allow their customers to use the south core for transferring from the CSB to the ready/return floor. The independent operator's vehicles will be able to move safely from the ready/return area, through the idle storage facility and into the QTA and back without encroaching on the exclusive use facilities of the brand family operator.

Figure 4.5.2 shows the conceptual diagram for the upper levels of the ready/return area. The brand family operators at Levels 2 and 3 will operate on the majority of the deck. Similar to the ground level layout, the brand family operators on Levels 2 and 3 will have connectivity to all four vertical cores. At Level 2, a small area will be available to accommodate the independent operators. Access to the grade-level QTA will be provided via a ramp to the ground level.

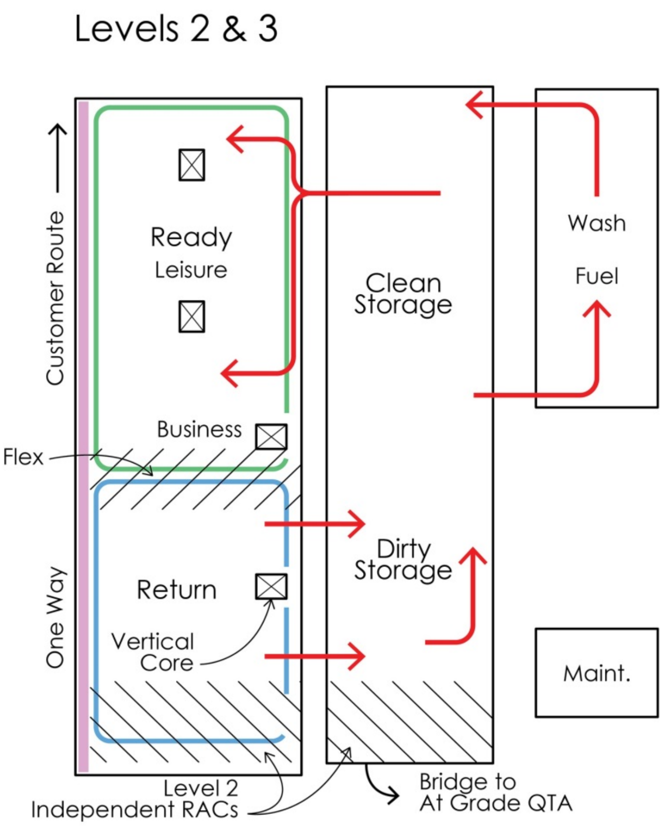
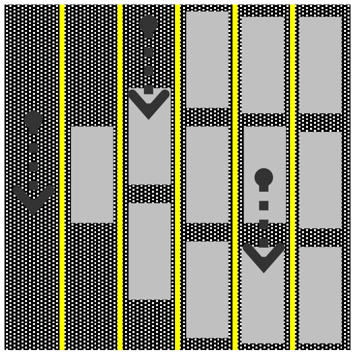
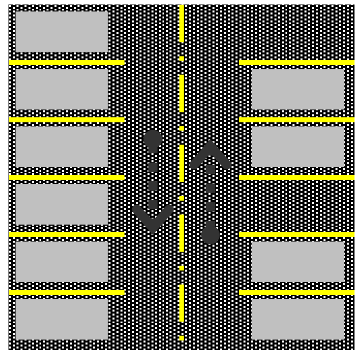


Figure 4.5.2: Typical Layout for Rental Car Facility above Grade Floor
Source: TranSystems, March 2015
Prepared by: TranSystems, December 2015

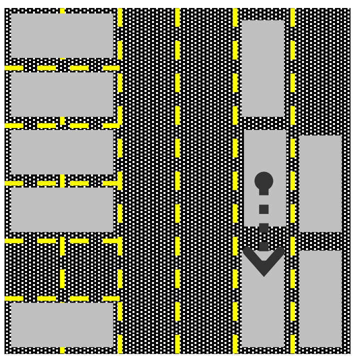
Figure 4.5.3 shows the typical layout of each zone of the rental car facility for rental, return and storage. Typical widths for the parking and between lane stalls shall be approximately 10 feet. The typical length of individual stalls shall be 18 feet. The length of return and stacking stalls will be dictated by each rental car company's specifications.



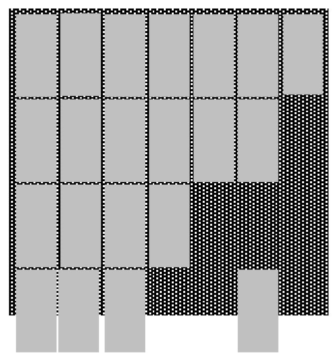
Return Block



Rental Block



Flex Block



Storage Block

Figure 4.5.3: Various Layouts for Flex/Onsite, Return/On-site, Rental/On-Site, Storage On/Off Site
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

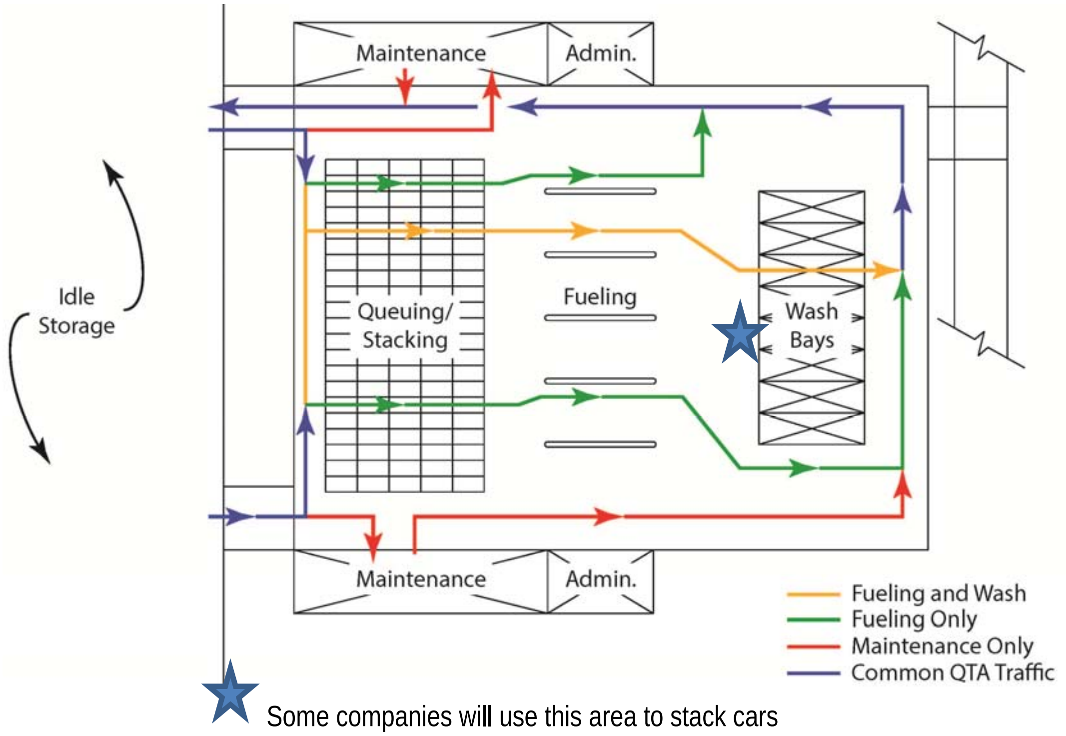
Ready Vehicle Pick-up Area

Return Vehicle Area

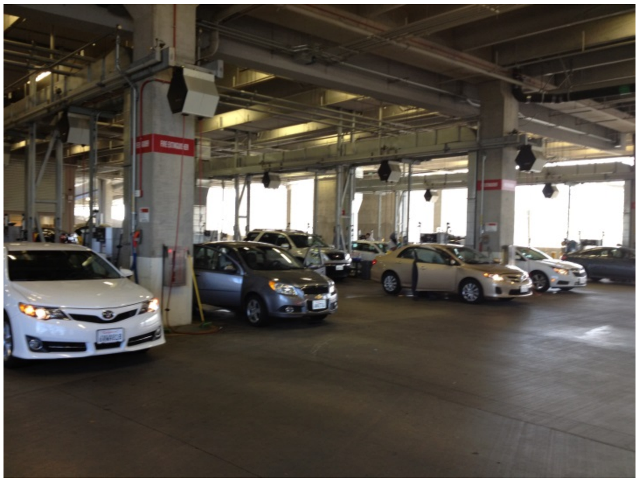
Figure 4.5.4: Components of the Ready/Return Area
Source: TranSystems April 2015
Prepared by: TranSystems April 2015

4.6 QUICK TURN-AROUND (QTA) BUILDING

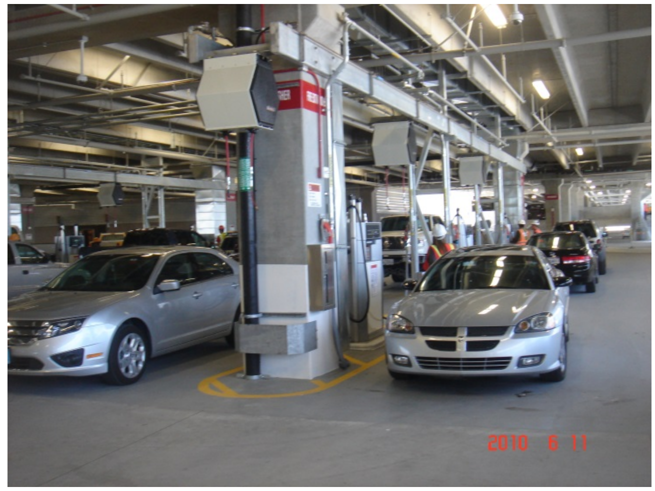
The QTA building is a multi-level building custom designed to accommodate the processing of returned vehicles in a highly efficient operation. The QTA consists of three major service components – fueling, car wash and vehicle maintenance - plus administration areas which will also accommodate employee lockers, restrooms and break rooms. Figure 4.6.1 shows a typical QTA Layout.



4.6.1: Typical QTA Layout
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015



Fueling Area



Typical Fuel Island

Fueling and Cleaning Station

Wash Bays

Figure 4.6.2: Components of a Quick Turn-Around Area (QTA)
Source: TranSystems April 2015
Prepared by: TranSystems April 2015

Due to the number of vehicles required to be processed in a peak period, two separate QTA facilities are planned for operational efficiency, code compliance and building safety reasons. **Figure 4.6.2** shows images of a typical three-story stacked QTA.

4.7 IDLE STORAGE

A unique component of the LAX ConRAC is that a facility providing for standby vehicle storage for peak demand periods will be provided on the same site along with the CSB, ready return area and the QTA. It will be located between the ready/return area and the QTA to act as a buffer for the staging of vehicles moving between those two buildings. The idle storage area is planned to accommodate 10,000 vehicles.

4.8 RAMP SLOPES, WIDTHS AND TRANSITIONS

Ramps and helices are proposed to be used for customer, employee and visitor entry and exit to the RAC garages. They are also required for access and egress to the multi-level QTA. The following is a summary of design criteria for these components.

Rental Car Ramps

- Helix
  - Slopes – 10% or less, up to 15% maximum.
  - Width – 14 feet-6 inches lane width and 22 feet-6 inches structure width.
  - Transitions – Ramp breakover angle no less than 10 degrees; angle of departure no less than 10 degrees; angle of approach no less than 15 degrees.
- Straight Ramp (internal/external)
  - Slopes 10% to 15% with no parking on ramp.
  - 4% to 5% slope for parking on ramp or 5% to 6% when parking is 70 to 90 degrees. Up to 8% for special situations.
  - Width – Min width ranges from 11 feet to 14 feet one-way. 22 feet to 24 feet wide for two-way.
  - Ramp Transitions – Ramp breakover angle no less than 10 degrees; Angle of departure no less than 10 degrees, angle of approach no less than 15 degrees.

4.9 PHYSICAL VEHICLE CONTROL

The following Physical Security Elements are required within the rental car ready/return facilities to provide secure control of their vehicles between public areas and RAC operational areas, or between individual tenant areas:

Pop Up Barriers (Figure 4.9.1)

Pop-up barriers provide a level of security for the RAC. Pop-up barriers are typically used in the exiting conditions of the RAC and the exiting of the secured area to provide access to the QTA. Pop-up barriers can also be placed after the first exit to provide a quick return to the secured area. This would be controlled by the security booth.

Tiger Teeth (Figure 4.9.2)

Tiger teeth provide a required level of security for the RAC. Typical locations for the placement of tiger teeth are as follows: Main entrance to RAC, exiting RAC after security booth, entrance to the secured area and exiting for the secured area to the QTA. Two sets of tiger teeth can be provided in succession, at an entrance or exit, to provide a greater level of security. Tiger teeth should be placed to insure the flow of traffic is constrained to its direction. Tiger teeth should be perpendicular to the direction of travel.

Bollards (Figure 4.9.3)

Precast concrete bollards can be used to provide floor separation if multiple companies are operating on the same floor. Typically the bollards are spaced 5 feet on center and should be provided with a chain connection that the rental car companies can use to limit access to their tenant areas. The bollards are not recommended for a sloping floor. Typical dimensions are 3 feet in height and 2 feet in diameter.

Jersey Barriers (Figure 4.9.4)

Jersey barriers can be used to provide floor separation if multiple companies are operating on the same floor. Spacing may vary but it should not allow vehicles to be able to pass through to separate secured areas. Barriers need to be attached to each other to form a continuous line of security.

Figure 4.9.1: Security Booth w/ Pop-up *Barrier*
Source: TranSystems, October 2010
Prepared by: TranSystems, April 2015

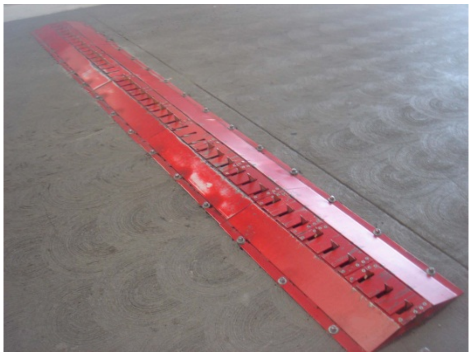


Figure 4.9.2: Tiger Teeth

Source: TranSystems, October 2010
Prepared by: TranSystems, April 2015

Figure 4.9.3: Bollards with Steel Cable
Source: TranSystems, October 2010
Prepared by: TranSystems, April 2015

Figure 4.9.4: Jersey Barrier
Source: TranSystems, October 2010
Prepared by: TranSystems, April 2015

Security Booth (Figure 4.9.5)

A security booth is typically added to the exit condition of the rental car facility to provide a final level of security. They are combined with a either the tiger teeth or the pop up barrier, along with a gate arm. A security booth can also be added in each individual secured space exit before arrival upon the final exit out of the RAC.

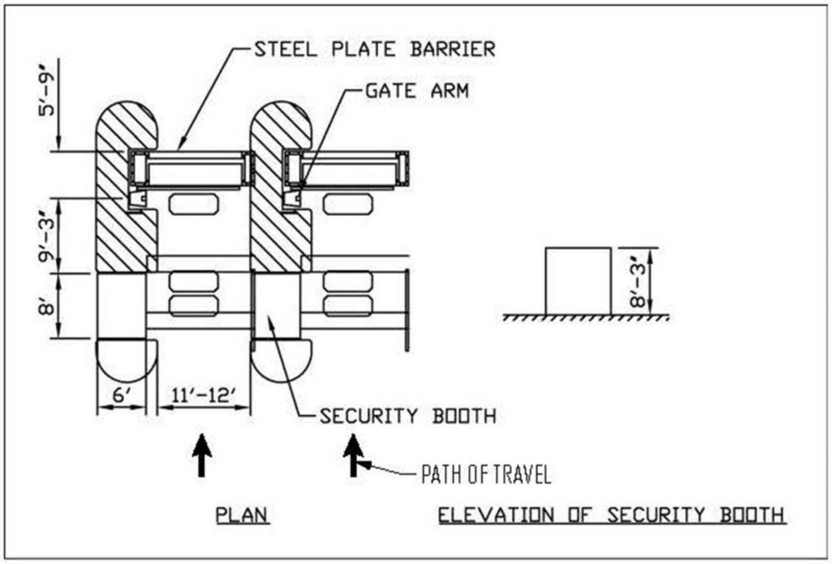


Figure 4.9.5: Typical RAC Exit

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

4.10 QTA SERVICE AREA OPERATIONS

This section describes the facilities to be included in the QTA service area. Specific vehicle movement diagrams associated with each function have been provided.

Fuel Farm (Figure 4.10.1)

Gasoline to support QTA fueling operations will be stored in double-walled underground storage tanks in close proximity to the QTA building. The preliminary estimated 10-day supply is approximately 300,000 gallons. A total of six (6) 45,000-gallon tanks and two (2) 20,000-gallon tanks are planned to be provided. Dedicated pull-off areas will be provided for the articulated fuel tanker vehicle to deliver fuel while separated from main travel ways or ramps.

The tanks will be covered with concrete pads designed for HS-20 loading, and the direct fill ports will be located to facilitate delivery from the center, right-hand side of the fuel tanker.

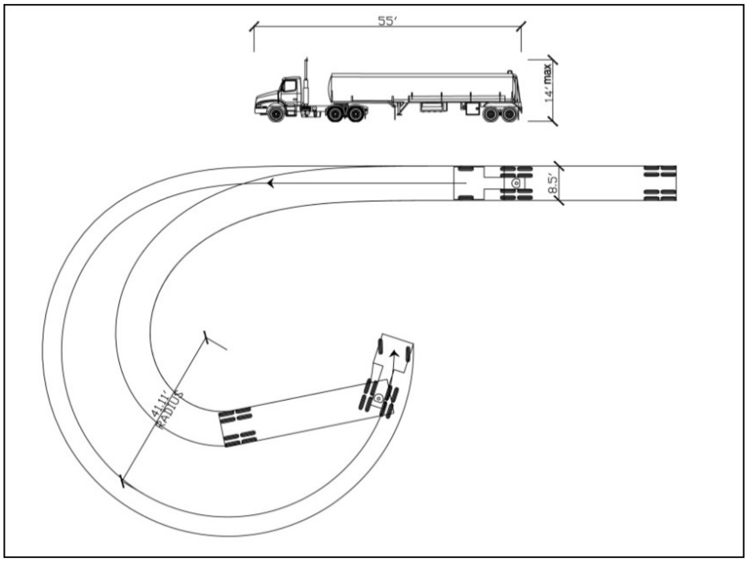


Figure 4.10.1: Fuel Tanker Dimensions & Turning Radius
Source: TranSystems, November 2011
Prepared by: TranSystems, April 2015

Refuse/Recycle (Figure 4.10.2)

- Trash bins will be located in an area to allow maneuverability for the garbage truck to enter/exit area where bins are located and to load/unload. Protection will be provided for building or site elements that could be damaged.
- Baler/compactor space will be required with accessibility for a recycling truck.
- A separate trash/recycle area will be provided for the rental car facility and the QTA.

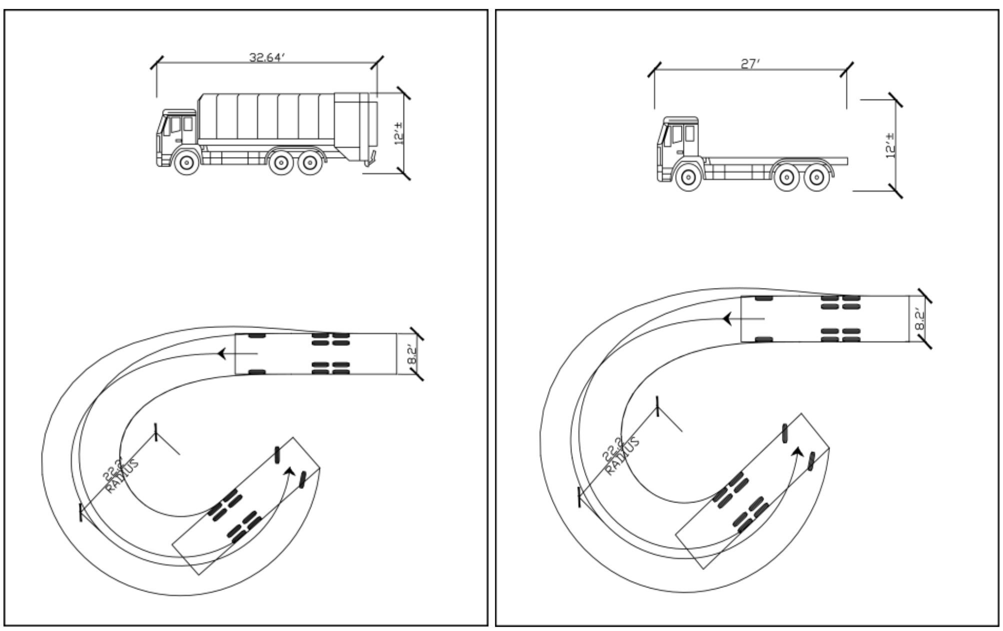


Figure 4.10.2: Garbage/Recycle Truck Dimensions & Turning Radius
Source: TranSystems, November 2011
Prepared by: TranSystems, April 2015

Oil/Water Separator/Automotive Fluids/Emergency Generator (Figure 4.10.3)

- Commercial truck service accessibility will be required to the QTA to pick up waste oil and other fluids.

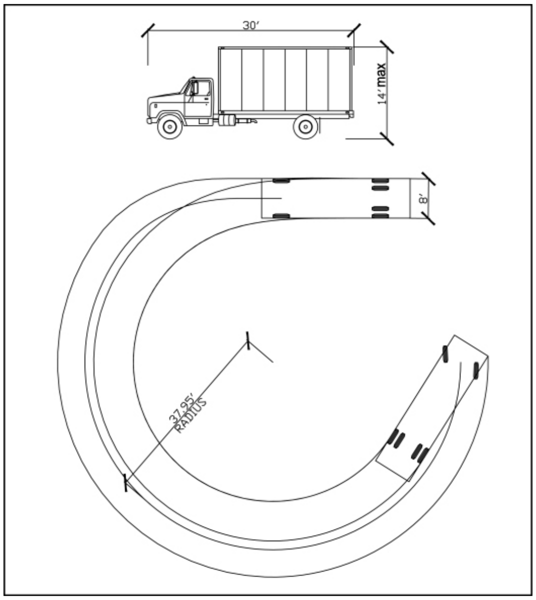


Figure 4.10.3: Commercial Truck Dimensions & Turning Radius
Source: TranSystems, November 2011
Prepared by: TranSystems, April 2015

Fire Truck Accessibility (Figure 4.10.4)

- Fire truck accessibility to the ConRAC and the QTA will need to follow the Los Angeles City Fire Code requirements. Fire department connections and hydrants will need to be located around the buildings and accessible per City Fire Code.
- Fire lanes shall be constructed of asphalt, concrete, or other approved material capable of supporting fire apparatus.

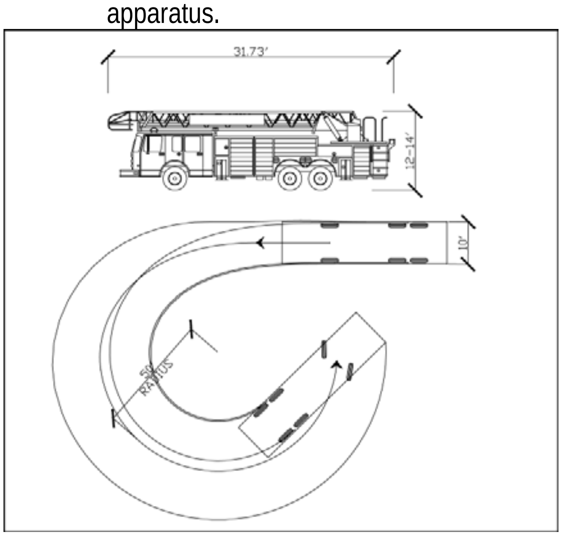


Figure 4.10.4: Fire Truck Dimensions & Turning Radius
Source: TranSystems, November 2011
Prepared by: TranSystems, April 2015

Tow Truck Accessibility to the RAC Garage

- 6 feet-8 inches minimum height clearance will be provided for tow trucks. Daily service is typically required.

Loading Dock/Service Elevator (Figure 4.10.5)

- Depending on RAC tenant and facility requirements, a raised loading dock may be required for this facility for materials and supplies delivery.
- At least one service elevator is required for each stacked QTA. A location in proximity to the delivery area preferable.

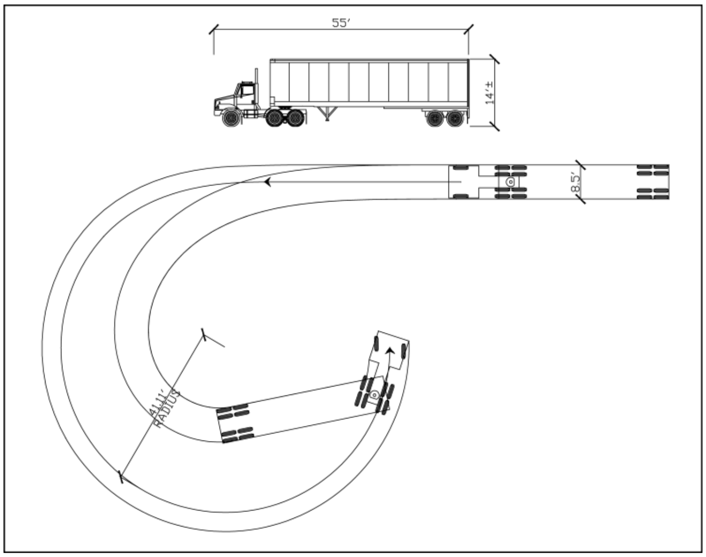


Figure 4.10.5: Semi Tractor Trailer Dimensions & Turning Radius
Source: TranSystems, November 2011
Prepared by: TranSystems, April 2015

4.11 CODE COMPLIANCE FOR MULTI-LEVEL FUELING FACILITIES

The purpose of this section is to summarize the requirements related to the building and fire protection code requirements for a multi-level fueling facility as a part of the LAX ConRAC project.

Two separate multi-level QTA Buildings are anticipated to be provided for this project and will be connected to the Idle Storage Building via bridges. ConRACs with multi-level QTAs are a relatively new building type with nine other such facilities having been built or are in various stages of development in the United States (San Jose, Miami, Providence, Burbank, Austin and San Diego are operating, and Tampa, Chicago O'Hare and San Antonio are in construction). While ConRAC designs vary by location, their associated QTAs all require the fueling of large numbers of vehicles inside buildings. Most of these other locations have required appeals from fire and building codes that limit the location and quantity of indoor fueling positions.

Applicable Code

- 2014 Los Angeles Fire Code - based on 2013 California Fire Code (based on 2012 International Fire Code)
- 2014 Los Angeles Building Code (LABC) - based on 2013 California Building Code (based on 2012 International Building Code)
- 2012 NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages

Code Issue

QTAs house indoor motor fuel dispensing operations with flammable/combustible liquids in closed piping systems and liquid storage in aboveground protected tanks or underground tanks. Gasoline will be enclosed within closed piping systems and fire-rated shafts. These piping systems will include the mitigating factors proposed in the Request for Modification (RFM) of Fire Code Ordinance to provide safe conditions to dispense the flammable and combustible liquids.

NFPA 30A Provision for Indoor Fueling

The Los Angeles Fire Code, Section 2301.4 requires indoor motor fuel dispensing facilities to comply with NFPA 30A, the "Code for Motor Fuel Dispensing Facilities and Repair Garages."

NFPA 30A permits indoor fueling, but Sections 7.3.6.5 and 7.3.6.6 limit motor fuel dispensing operations to:

- The street level of a building,
- Not more than that required to serve four vehicles at one time, and
- Fuel dispensers to be within 50 feet of a vehicle exit or entrance to the building.

Operations inside of the planned QTA buildings require a greater number of fueling positions than allowed by code and fueling on floors higher than street level.

The restrictions on indoor fueling from NFPA 30A were considered and adopted by the first NFPA Technical Committee in the early 1980's. The restrictions were believed to have been put in place to address public retail service stations located inside buildings and not related to non-public, fleet facilities. Although the intention of NFPA 30A may not have been to address this type of QTA facilities where the public is not present, the restrictions on indoor fueling exist.

From June 2015 through April 2016, TranSystems, in collaboration with LAWA, participated in a number of informational sessions with the Los Angeles Department of Building and Safety (LADBS) and the Los Angeles Fire Department (LAFD), to provide a briefing of the project development, unique features of the QTA, and code considerations.

The following meetings were held (description of agenda items included):

- June 3, 2015 – Informational Meeting No. 1 (project background, ConRAC functionality, QTA facility briefing, other code considerations and project development, and project approval process)
- July 10, 2015 – Informational Meeting No. 2 (project background, ConRAC and QTA facility updates, indoor fueling/code mitigating features, building and fire code considerations, and project approval process)

- September 16, 2015 – Informational Meeting No. 3 (ConRAC site and QTA facility updates, relevant project examples, proposed QTA mitigating features, and anticipated project schedule)
- November 18, 2015 – Informational Meeting No. 4 (review of draft RFM)
- April 7, 2016 – Informational Meeting No. 5 (review of submitted RFM)
- May 4, 2016 - Informational Meeting No. 6 (follow-up on submittal of RFM and design development of QTA Buildings)

The minutes, attendance sheet and presentation materials for each meeting are included as Appendix 4.1 to this document.

Request for Modification of Fire Code Ordinance

A Request for Modification (RFM) of fire code ordinance was prepared and submitted to Los Angeles Fire Department in April 2016. The purpose of this RFM is:

1. To identify the code basis as to why the code limits fuel dispensing operations to street level with a limitation of four motor fuel dispensing operations and a location within 50 feet of the vehicle entrance or exit to the building.
2. To provide mitigating safety factors above and beyond the minimum code requirements to safely permit motor fuel dispensing operations at levels above street level, above the limit of four motor fuel dispensing operations, and at a location greater than 50 feet from a vehicle entrance or exit to the building.

It is the project team's opinion that the proposed performance-based mitigating factors and code mandated fire protection and life safety features proposed provide a level of equivalency equal to or greater than specified by the code.

Section 5: Space Programming

From April 2014 through March 2015, TranSystems, in collaboration with LAWA, led a series of planning workshops with representatives from the rental car industry to: develop the facility requirements for the new ConRAC; create and evaluate a range of alternative facility concepts which met the facility requirements; and select a preferred ConRAC concept for detailed design. The initial meetings focused on the development of operational metrics to ensure the "right-sizing" of the facility, while later meetings focused on analysis and refinement of multiple facility concepts.

Programming Goals

The new ConRAC facility programmatic requirements consider the needs of the rental car industry, accommodating the operational patterns, either individually by brand or collectively by brand family, as applicable. The ConRAC will preserve the ability of each company within a brand family to operate from their exclusive use areas at the counter and in the vehicle ready and return, while sharing storage and QTA functions and fleet storage with all members of a brand family.

Accommodation for Future Growth:

• Total airport demand in 2013 – million annual airline passengers (MAP)	67	MAP
• Planned growth over 2013 demand for ultimate development	42	%
• Projected airport demand at ultimate development	95	MAP

Although rental car transactions are used as a programmatic basis, with an allocation for the number of people connected to each transaction depending on whether business or leisure, for this purpose the growth in airline passengers is proportional to the growth in rental car transactions.

The methodology and results of the space programming efforts for each component of the ConRAC, developed through this process, are described in this section.

5.1 RENTAL CAR INDUSTRY MEETING DISCUSSIONS

After the selection of a preferred concept, TranSystems and LAWA engaged with representatives from the rental car industry in a series of facility design workshops held between June 2015 and January 2016 to refine program requirements of the ConRAC project and collaborate on design development of various project components.

The following in-person meetings and web conferences were held (description of topics covered included):

- June 16, 2015 – Facility Industry Meeting (functional values, scope, schedule, site, QTA and CSB).
- July 21, 2015 – Facility Industry Meeting (site, deck drainage, QTA, CSB, and agency review).
- August 18, 2015 – Facility Industry Web Conference (site, QTA and CSB).
- September 15, 2015 – Facility Industry Meeting (site, hypothetical allocation, maintenance, QTA, dynamic model and CSB).
- October 20, 2015 – Facility Industry Web Conference (QTA, maintenance, walking distances, RAC floor deck and vertical circulation cores)
- November 17, 2015 – Facility Industry Meeting (LAX passenger survey, RAC survey, CSB, QTA site, maintenance, agency review and RAC garage entrance)
- January 19, 2016 – Facility Industry Meeting (CSB, customer experience, level 4 parking, bus curb, RAC garage and vertical circulation cores and QTA site)
- March 15, 2016 – Facility Industry Meeting (RAC Level 4 / CSB concept, circulation core configurations, RAC garage layout, site emergency access plan, service yard and QTA configurations, helix design studies, DBFOM procurement timeline)

A copy of the minutes, attendance sheet, and presentation materials for each meeting and web conference is included as Appendix 5.1 to this document.

5.2 DYNAMIC MODELING

As a part of the conceptual design effort, the project team developed a dynamic model to simulate the functional flow of the overall facility in order to “test” the proposed program, generally applying the following steps:

1. Create model based on the most current proposed layout of the facility with rental, return, storage, fuel and wash areas defined.
2. Apply “real-world” data received from the rental car companies, including: volume and timing of daily rental and return transactions; their customer service model; speed of service agents at the QTA; staff availability; vehicles’ routine maintenance requirements; and other rental car company procedures.
3. Assign random timing and grouping of customers renting and returning vehicles to account for variations in the rental car process.
4. Design certain “what if?” scenarios to test the facility under extreme operating conditions to determine at what transaction level the system begins to fail and to show how it fails.

Results from the dynamic modeling were then shared with each rental car company or brand family individually to illustrate how the proposed design addresses operating conditions unique to their own processes and transaction data. In some instances, refinements to the layout were made and the dynamic model was run through additional iterations to test the new conditions.

5.3 RENTAL, RETURN AND STORAGE SPACE REQUIREMENTS

Rental Requirements

• Average peak season rental day is the determining factor for the overall size of the facility		
• 2013 peak hour rentals (sum of all current operators' peak hour)	1,313	transactions
• Design rental capacity is established at 2 times the current rental transaction demand	2,700	spaces
• Future rental capacity required to accommodate 42% growth	3,900	spaces
• Equivalent rental stalls per each rental stall required (see Figure 5.3.1)	1.0	per space
• **Number of equivalent rental stalls required for rental demand**	**3,900**	**spaces**

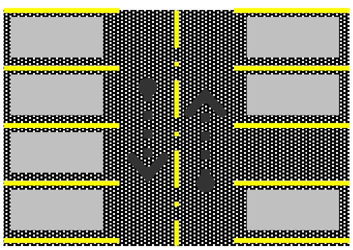


Figure 5.3.1: Rental Stall Conversion - 1.0 = 8 Stalls Per Block
Source: TranSystems, November 2015
Prepared by: TranSystems, November 2015

Return Requirements

• 2013 peak hour returns during the peak season rental hour (sum of all current operators' peak hour)	655	transactions
• Design return capacity is established at 1.5 times the current peak rental transaction demand	1,000	spaces
• Future return capacity required to accommodate 42% growth	1,500	spaces
• Equivalent rental stalls per each return stall required (see Figure 5.3.2)	0.67	per space
• Number of equivalent rental stalls required for return demand	1,010	spaces

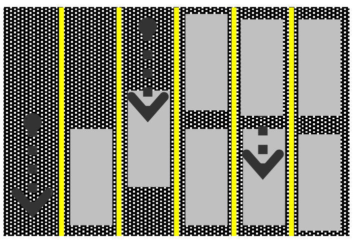


Figure 5.3.2: Return Stall Conversion – 0.67 = 12 Stalls Per Block
Source: TranSystems, November 2015
Prepared by: TranSystems, November 2015

Storage Requirements in the Ready/Return Area

- The calculations assume that 90% of returned vehicles will go directly to the QTA to be prepared to be put back in service or, in other words, 10% of the returned vehicles will be pulled out of service for maintenance, resell, repairs, etc.
- The difference between the total daily peak rental demand for all companies and 90% of the corresponding daily peak return demand equals the standby storage required in the ready/return area to back-fill the rental stalls.
- The calculations reflect that storage stalls may be shared among brands within a family.

• 2013 peak day rentals (sum of all current operators' peak day)	12,760	transactions
• 2013 returns on the peak rental day	7,886	transactions
• 90% of returns on the peak rental day	(7,097)	transactions
• 2013 peak day rentals less 90% returns on the peak day (12,760 - 7,097)	5,700	spaces
• 2013 rental stalls required	(2,700)	spaces
• 2013 return stalls required	(1,000)	spaces
• 2013 storage stalls required (5,700 - 2,700 - 1,000)	2,000	spaces
• Future storage capacity required to accommodate 42% growth (2,000 x 1.42)	2,900	spaces
• Equivalent rental stalls per each storage stall required (see Figure 5.3.3)	0.57	per space
• **Number of equivalent rental stalls required for storage** (2,900 x .06)	**1,650**	**spaces**

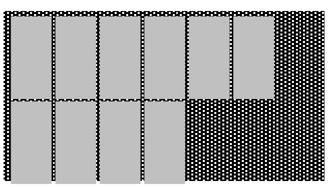


Figure 5.3.3: Storage Stall Conversion – 0.57 = 14 Stalls Per Block
Source: TranSystems, November 2015
Prepared by: TranSystems, November 2015

Total Ready/Return Requirements (equivalent rental stalls)

• Rental Stalls	3,900	spaces
• Return Stalls	1,010	spaces
• Storage Stalls	1,650	spaces
• Subtotal Net Capacity for Current Operators	6,560	spaces
• Contingency (5%)	300	spaces
• Allowance for potential Independent Operators (5% of Net Capacity for Current Operators + Contingency)	340	spaces
• Subtotal Net Capacity for All Operators	7,200	spaces
• Add area for vehicle circulation, pedestrian circulation, customer service booths and exit booth plazas - 16.7% of other areas	1,100	spaces
• Allocate 8.6% of the Net Capacity + Circulation for stacking and queuing in the QTA [(7,200 + 1,100) x 8.6%]	(710)	spaces
• **Total Number of Stalls in the Ready/Return Garage**	**7,590**	**spaces**
➢ Proportion of Total Stalls for Current Operators (95%)	7,210	spaces
➢ Proportion of Total Stalls for Independent Operators (5%)	380	spaces
• *Area Per Ready/Return Space*	*300*	*sq. ft.*
• **Net Operational Area for the Ready/Return Facility**	**2,227,000**	**sq. ft.**
• Vertical Cores (allowance for escalator/elevator lobbies and exit stairs)	52,000	sq. ft.
• Back Offices	10,500	sq. ft.
• Support Space (allowance for mechanical, electrical, fire protection and communications rooms)	22,000	sq. ft.
• **Gross Area for the Ready/Return Facility**	**2,311,500**	**sq. ft.**

Idle Storage

For the LAX ConRAC, 100% of the requirement for standby vehicle storage is intended to be accommodated on site. Based on the rental car survey responses, the requirement for idle storage is based on accommodating 27% of the projected fleet requirements less the number of ready, return and storage spaces being provided in the RAC garage and the QTA.

• 2013 estimated fleet	46,400	vehicles
• Future estimated fleet projected to accommodate 42% growth	65,900	vehicles
• Ultimate requirement for idle fleet storage capacity – 27%	17,800	vehicles
• Total Required Stalls for Ready/Return Operations	(8,300)	spaces
• **Idle Storage for Current Operators** (17,800 – 8,300)	**9,500**	**spaces**
• Allowance for Independent Operators (5%)	475	spaces
• **Total Idle Storage for all operators**	**9,975**	**spaces**
• *Area per Idle Storage Space*	*191*	*sq. ft.*
Total Idle Storage Area	**1,905,000**	**sq. ft.**

5.4 QUICK TURN-AROUND AREA (QTA) SPACE REQUIREMENTS

The QTA is sized based on the goal of enabling 90% of the fleet returned during the peak rental period to go back into service. The program shows the requirements for a QTA for the current operators and independent operators, which will be accommodated in two multi-level facilities.

QTA for Current Operators		
Fueling Requirements		
• 2013 peak hour returns during the peak season rental hour	655	transactions
• Future return capacity required to accommodate 42% growth	930	transactions
• 90% of returns required to be processed in the peak hour	840	vehicles
• Process rate for fueling and cleaning	5	vehicles per hour
• Total Number of Fuel Nozzles for Current Operators	170	nozzles
• *Area Per Fuel Nozzle*	*360*	*sq. ft.*
Total Area for Fueling	61,200	sq. ft.
Wash Bay Requirements		
• 90% of returns required to be processed in the peak hour	836	vehicles
• Process rate for washing	26	vehicles per hour
• Total Number of Wash Bays	36	wash bays
• *Area Per Wash Bay*	*1,650*	*sq. ft.*
Total Area for Wash Bays	59,400	sq. ft.
Maintenance Bay Requirements		
• 90% of the returns on the peak rental day	7,097	transactions
• Future return capacity required to accommodate 42% growth	10,063	vehicles
• Ratio of daily returns to the number of maintenance bays	170	vehicles per bay
• Total Number of Maintenance Bays for Current Operators	60	bays
• *Area Per Maintenance Bay*	*720*	*sq. ft.*
Total Area for Maintenance Bays for Current Operators	43,200	sq. ft.
Stacking/Queuing Requirements		
• Portion of Total Required Ready/Return Stalls allocated to QTA (95% of stacking/queuing for the QTA)	680	spaces
• *Area Per Stacking/Queuing Space*	*300*	*sq. ft.*
Total Area for Stacking/Queuing for current operators	204,000	sq. ft.
Net QTA Area for Current Operators	367,800	sq. ft.
• Offices/breakrooms/lockers (allowance)	48,000	sq. ft.
• Circulation and Support Facilities 79% of the net area + area for offices/breakrooms/lockers to be added for vehicle and employee circulation, mechanical, electrical, fire protection and the special QTA systems equipment rooms	326,100	sq. ft.
Total QTA Area for Current Operators	741,900	sq. ft.

QTA for Independent Operators (5% of facilities provided to current operators)		
Fueling Requirements		
• Total Number of Fuel Nozzles	12	nozzles
• *Area Per Fuel Nozzle*	*360*	*sq. ft.*
Total Area for Fueling for Independent Operators	4,300	sq. ft.
Wash Bay Requirements		
• Total Number of Wash Bays	2	wash bays
• *Area Per Wash Bay*	*1,650*	*sq. ft.*
Total Area for Wash Bays for Independent Operators	3,300	sq. ft.
Maintenance Bay Requirements		
• Total Number of Maintenance Bays	3	bays
• *Area Per Maintenance Bay*	*720*	*sq. ft.*
Total Area for Maint Bays for Independent Operators	2,200	sq. ft.
Stacking/Queuing Requirements		
• Portion of Total Required Ready/Return Stalls allocated to QTA (5% of stacking/queuing for the QTA)	30	spaces
• *Area Per Stacking/Queuing Space*	*300*	*sq. ft.*
Total Area for Stacking/Queuing for Independent Operators	9,000	sq. ft.
Net QTA Area for Independent Operators	18,800	sq. ft.
• Offices/breakrooms/lockers (allowance)	2,300	sq. ft.
• Circulation and Support Facilities 79% of the net area + area for offices/breakrooms/lockers to be added for vehicle and employee circulation, mechanical, electrical, fire protection, and the special QTA systems equipment rooms	16,600	sq. ft.
Total QTA Area for Independent Operators	37,700	sq. ft.
Gross Area for QTA for All Operators	779,600	sq. ft.

QTA SUPPORT AND ADDITIONAL SITE FUNCTION

• QTA Support Area		allowance			19,800	sq. ft.
• Electric/Fire Command Building		allowance			6,100	sq. ft.
• Supervisor and Vendor Parking	50	spaces	320	sq. ft.	16,000	sq. ft.
• Fuel Farm Storage/Drop Area	7	tanks	1,500	sq. ft.	10,500	sq. ft.
• Loading Dock/Service Yard		allowance			88,000	sq. ft.
• Car Carrier Load/Unload Area	20	carriers	720	sq. ft.	14,400	sq. ft.
• Car Corral Stalls	354	stalls	170	sq. ft.	60,200	sq. ft.
Gross Area for QTA Support and Additional Site Functions					215,000	sq. ft.

5.5 CUSTOMER SERVICE BUILDING (CSB) SPACE REQUIREMENTS

Customer Service Counter Requirements

• 2013 peak hour rentals (sum of all current operators' peak hour)	1,313	transactions
• Future capacity required to accommodate 42% growth	1,862	transactions
• Process rate – transactions per hour		
Leisure Customers – 10 minutes per transaction	6	per hour
Premium Customers – 3 minutes per transaction	20	per hour
• Number of Customer Service Counters		
Leisure Customers	208	counter positions
Premium Customers	31	counter positions
Allowance for independent operators (5%)	15	counter positions
• **Total Number of Customer Service Counters**	**254**	**counter positions**
Subtotal CSB Area for All Operators	**100,000**	**sq. ft.**
• Number of Vertical Cores for Escalators/Elevators/Exit Stairs	4	cores
Area Per Vertical Core	*13,000*	*sq. ft./core*
Vertical Core Area in CSB	52,000	sq. ft.
• Support Space (14% of CSB Area + Vertical Cores for mechanical, electrical, fire protection and communication equipment rooms)	22,000	sq. ft.
Enclosed CSB Area for All Operators	**174,000**	**sq. ft.**
• Unenclosed Courtyard (between APM Station/Bus Plaza Core and RAC Lobby)	100,000	sq. ft.
Gross Area for the Customer Service Building	**274,000**	**sq. ft.**
• RAC Back Offices at the Ready-Return Levels (3,500 sq. ft. per level x 3 levels for ready/return)	10,500	sq. ft.

5.6 *SITE (BUS PLAZA, APM STATION AND PARKING) REQUIREMENTS*

Bus Plaza

• Number of Bays (for interim shuttle bus operation)	12	bays
• Number of Vertical Cores for Bus Plaza	1	core
Area Per Vertical Core	1,000	sq. ft./core
Vertical Core Area for the Bus Plaza	1,000	sq. ft.
Gross Area for Bus Plaza Vertical Core	**1,000**	**sq. ft.**

APM Station

• Platforms (2 tracks with one unload and one load platform)	22,800	sq. ft.
• Vertical Core (to connect west end of station with ITF mezzanine)	1,200	sq. ft.
Total APM Station	**24,000**	**sq. ft.**

Employee Parking and Visitor Parking

Calculation of Processing Rate for Transporters to Transfer Return Vehicles from Ready/Return to QTA

• Projected peak hour returns at ultimate development	930	vehicles
• Average roundtrip distance between ready/return and QTA	2,400	feet
• Total travel distance for all vehicles in the return peak hour	2,232,240	feet
• Average vehicle speed	15	miles per hour
• Estimated drive time for each transporter roundtrip	1.82	minutes
• Time for transporter to walk to first car, wash time, park car and walk to next car	4.18	minutes
• Total Roundtrip Time per Transporter	6.00	minutes
• Average Processing Rate per Transporter	10	vehicles/hour

Staff Parking Requirements for Peak Shift of Activity

• Transporters (930 peak hour returns/10 vehicles/hour processing rate)	93	transporters
• Service Attendants in the QTA (1 per each fueling positions)	170	service attendants
• Mechanics in the QTA (1 per maintenance bay)	63	mechanics
• Customer service agents in the CSB (1 per counter)	253	agents
• Idle storage staff	40	employees
• *Number of brands*	*15*	*companies*
• Customer service booths in ready/return area (3 staff per brand average)	45	employees
• Return staff (2 per brand average)	30	employees
• Exit booth staff (3 per brand average)	45	employees
• Subtotal Operations Staff	754	employees
• Administrative and Support Staff (16% of Operations Staff)	121	employees
• Total Rental Car Staff	875	employees
• Third Party Manager	8	employees
• Total Rental Car + Third Party Management Staff	883	employees
• Peak Shift Parking (90% of total - assumes 10% use transit or car pool)	795	employees
• Second Shift Parking (assumes 40% of peak shift)	318	employees
• Total Employee Parking	1,113	spaces
• *Area Per Employee Parking Space*	*300*	*sq. ft.*
Total Area for Employee Parking	334,000	sq. ft.

Visitor Parking

Number of Stalls	100	stalls
Area Per Visitor Parking Space	*320*	*sq. ft.*
Total Area for Visitor Parking	32,000	sq. ft.
Total Minimum Area for Employee and Visitor Parking	362,000	sq. ft.

5.7 REMOTE BAGGAGE CHECK-IN REQUIREMENTS

Remote Baggage Check-in Requirements

• Check-in Lobby	800	sq. ft.
• *Loading/Unloading Area*	*3,200*	*sq. ft.*
Remote Baggage Check-in	4,000	sq. ft.

5.8 SUMMARY OF REQUIREMENTS

Table 5.8.1 Rental Car Facility Program

	Design Basis						
	Current Operators	*Independent Operators*	*Total All Companies*			*Sq. Ft.*	*Acres*
Ready/Return Area	7,210	380	7,590	equivalent ready stalls		2,227,000	51.1
Vertical Cores						52,000	1.2
Support Space						22,000	0.5
Subtotal Ready/Return Area						2,301,000	52.8
RAC Back Offices – at the ready/return levels						10,500	0.2
Gross Ready/Return Area						**2,311,500**	**53.1**
QTA							
(allocated between two multi-level facilities)							
fuel nozzles	170	12	182	360	sq. ft./nozzle	65,600	1.5
wash bays	36	2	38	1,650	sq. ft./bay	62,700	1.5
maintenance bays	60	3	63	720	sq. ft./bay	45,400	1.0
stacking/queuing stalls for vehicles	680	30	710	300	sq. ft./stall	213,000	4.9
Subtotal QTA Area						386,700	8.9
Office/Breakrooms/Lockers	48,000	2,300				50,300	1.2
Circulation and Support Facilities	326,100	16,600				342,700	7.9
Gross QTA Area						**779,700**	**17.9**
QTA Support and Additional Site Functions							
QTA Support Area		allowance				19,800	0.5
Electric/Fire Command Building		allowance				6,100	0.1
Supervisor and Vendor Parking		spaces	50	320	sq. ft./stall	16,000	0.4
Supervisor and Vendor Parking		spaces	50	320	sq. ft./stall	16,000	0.4
Supervisor and Vendor Parking		spaces	50	320	sq. ft./stall	16,000	0.4
Fuel Farm and Drop Area						10,500	0.2
Loading Dock/Service Yard						88,000	2.0
Car Carriers Load and Unload			20	720	sq. ft./carrier	14,400	0.3
Car Corral Stalls		stalls	354	170	sq. ft./stall	60,200	1.4
Gross Area for QTA Support and Additional Site Functions						**215,000**	**4.9**

Table 5.8.1 Rental Car Facility Program (continued)

	Design Basis						
	Current Operators	*Independent Operators*	*Total All Companies*				
CSB	Counter Positions						
Leisure Counters	208	15	223				
Premium Counters	31		31				
RAC Lobby Area			254				
CSB Lobby and RAC Offices						100,000	2.3
Vertical Cores						52,000	1.2
Support Space						22,000	0.5
Subtotal Enclosed CSB Area						174,000	4.0
Unenclosed Courtyard (between APM Station/Bus Plaza Core and RAC Lobby)						100,000	2.3
Remote Check-in Baggage						4,000	0.1
Gross Area for the Customer Service Building						278,000	6.4
Bus Plaza							
Bus Bays (12 Bays)						53,000	1.2
Vertical Circulation Core						1,000	
Gross Area for Bus Plaza						54,000	1.2
APM Station							
Platforms and Vertical Circulation Core						24,000	0.6
Gross Area for APM Station						24,000	0.6
Idle Storage							
Idle Storage	9,500	475	9,975	191	sq. ft./stall	1,905,000	43.8
Gross Area for Idle Storage						1,905,000	43.8
Employee and Visitors' Parking							
Employee Parking			1,114	300	sq. ft./stall	334,000	7.7
Visitors' Parking			100	320	sq. ft./stall	32,000	0.7
Gross Area for Employee and Visitors' Parking						366,000	8.4
Total ConRAC Project						5,933,200	136.3
Airport Employee or Public Parking (Outside of ConRAC)			2,350	320	sq. ft./stall	752,000	17.3

Source: TranSystems, December 2015
Prepared by: TranSystems, December 2015

5.9 ADJACENCY MATRICES

The adjacency matrices included in this section show the functional relationship that is required between the various components of the ConRAC buildings. These adjacencies will be important for the design team to use in the detailed layout in future phases of the ConRAC. **Figure 5.9.1** shows the legend that should be followed for the matrices in this section indicating the level of importance among the various project components.

REQUIRED ADJACENCY	–	●
PREFERRED ADJACENCY	–	◒
UNNECESSARY ADJACENCY	–	○
RESTRICTED ADJACENCY	–	✖

Figure 5.9.1: Matrix Legend

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Site

Figure 5.9.2 shows the relationships between the major functions that are included in the design of the LAX ConRAC. The major functions are:

- Rental Car Garage (RAC) – The garage is composed of five major components: the cores for the CSB (consisting of the customer service kiosk areas and vertical transportation areas), ready/return areas, the customer express way and maintenance express way.
- Quick Turn Around (QTA) – This facility provides quick turn-around services for the rental car fleets. It is controlled by the administration area and includes car wash and light lubrication maintenance services.
- Customer Service Building (CSB) – This is composed of three major spaces for customer service, RAC administration office area, customer service counter/queuing area, and concourse lobby.
- Bus Plaza and APM Station – ConRAC passengers will be transported from the Central Terminal Area (CTA) to the new facility by a common transit system. On opening day, a common busing operation will require a plaza with several bus bays for dropping-off and picking up rental car customers. Ultimately, the APM will provide convenient and quick transportation for the customers. In either case, the bus plaza or APM will require direct access to the CSB.
- Idle Storage – This is the facility used by the rental car operators for staging of vehicles in their fleets that are on standby to be transferred into ready vehicles as dictated by customer demand. The Idle Storage area can also be used as overflow staging/queuing for the QTA in peak return periods.
- Employee Parking – This is the area that is available for all rental car operations and management staff plus the people working for the building manager. The parking area needs to be accessible from the RAC, CSB and QTA.
- Visitor Parking – This area is dedicated to short term parking for visitors who are dropping off a customer to rent a vehicle at the ConRAC or picking up someone who has just returned a vehicle. This parking area needs to be close to the CSB.

- Airport Employee or Public Parking – This is the area that is available for airport employee or public parking. The parking area needs to be accessible to the APM.

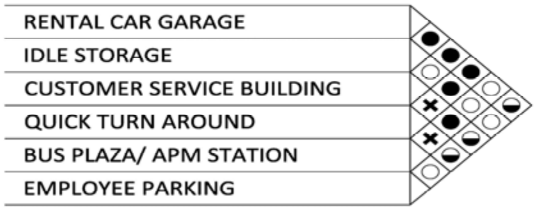


Figure 5.9.2: Site Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Rental Car Garage (RAC)

The RAC is a parking garage for rental car companies to store their vehicles. **Figure 5.9.3** shows the ground floor and upper level diagrams for the rental car facility presented in Figures 4.4A and 4.4B in the previous section.

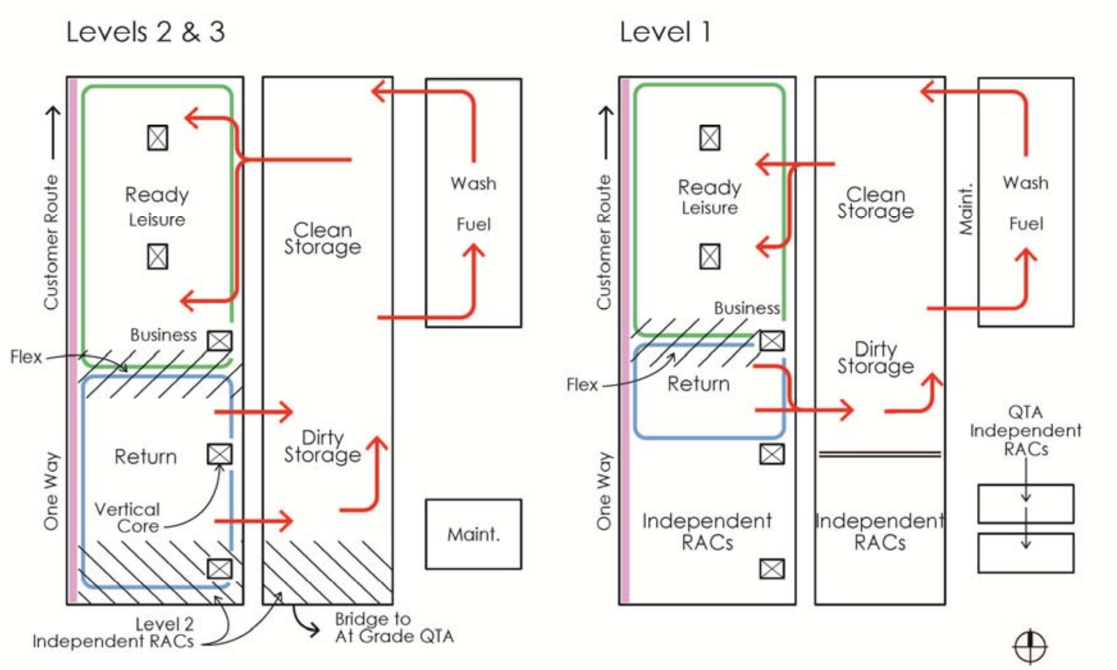


Figure 5.9.3: Typical Rental Car Layout
Source: TranSystems, August 2015
Prepared by: August 2015

The RAC serves as the convenient pick-up and drop-off area for rental car vehicles. For rental car companies, a typical garage is composed with five major components:

- CSB Core – this space contains the customer service kiosk and vertical transportation (elevators, escalators and stairs) to serve customers between CSB and rental car garage. For the LAX ConRAC, the CSB will be located on the roof of the RAC Garage – Level 4. Level 4 will also include employee, public and visitor parking.

- Ready Spaces – this area is used to park ready to rent vehicles for customer pick up. Ready spaces will be required on each level of the RAC garage.
- Return Spaces – this area is used to receive returned vehicles from customers. Return spaces will be required on each level of the RAC Garage. The area allocated to ready or return spaces may fluctuate based on rental customer demand.
- Customer Express Way – the customer express way is provided for customers renting vehicles to exit and returning vehicles to enter the garage. It provides the link between the entrance plaza and exit plaza.
- Maintenance Express Way – this is the operations express way which serves as the backbone linkage between the garage, the idle storage building and the QTA. It is used only for internal operation to provide quick turn-around of the rental car vehicles from returned to ready to rent. Customers will not use this express way.

See **Figure 5.9.4** for the RAC adjacency matrix.

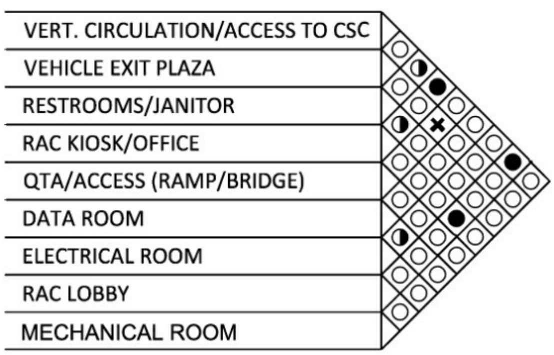


Figure 5.9.4: Rental Garage Matrix

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Quick Turn-Around (QTA) Building

Two QTA buildings will be provided to accommodate the total program requirements. To comply with building and fire code requirements, the QTAs must be physically separated from the other ConRAC buildings.

The operation sequences for the QTA are listed as follows, but not limited to:

- RAC Return – Fueling – Car Wash – RAC Ready (these are the most typical operations for the QTA)
- RAC Return – Car Wash – RAC Ready
- RAC Return – Fueling – RAC Ready
- RAC Return – Maintenance Bay – Car Wash – RAC Ready
- RAC Return – Maintenance Bay – Fueling - Car Wash – RAC Ready

See **Figure 5.9.5** for the QTA building matrix.

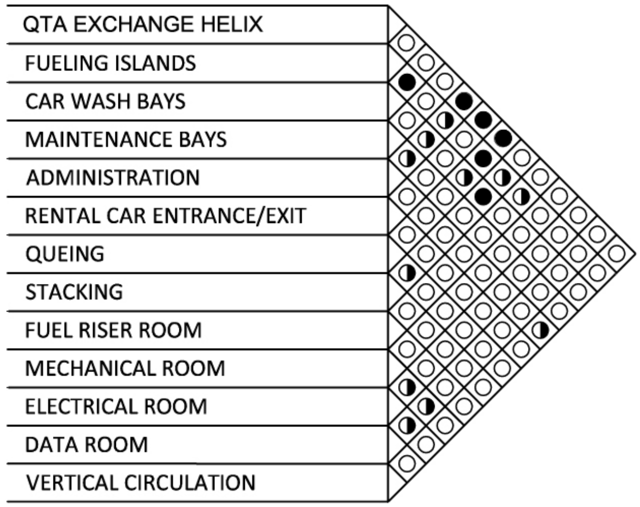


Figure 5.9.5: Quick Turn-Around Matrix

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Fueling Island Area

The first step in the preparation of a returned vehicle is to clean the interior and ensure the fuel tank is full. See Figure 5.9.6 for the fueling island adjacency matrix. The main components for fueling islands are listed as follows:

- Fueling Area – This is usually the first stop of the turn-around process. Fueling, checking tire air inflation levels and if needed adding air, vacuuming, interior cleaning, windshield washer fluid replenishing, and general interior cleanup are performed in this area. See Figures 5.9.7 and 5.9.8 for the typical layout for the fueling islands and fuel dispenser, respectively.
- Fueling Riser Room – The fueling riser room contains the main vertical fueling piping. It links the fuel dispensers at the QTA floor to the underground fuel storage tanks.
- Vacuum/Compressor Room – Each fuel island will have multiple vacuum stations for cleaning the interior of the vehicles. A remotely located room will contain the air compressor and vacuum equipment. See Figures 5.9.9 and 5.9.10 for the typical dimensions of the vacuum system and the compressed air system, respectively.
- Mechanical Fuel Exhaust System – a mechanical fuel exhaust system will be located at each fuel island to remove gasoline evaporation away from the area to prevent the accumulation of hazardous vapors.
- Fire Suppression System – this enhanced fire protection system will be incorporated into the fuel area design, as a fire risk mitigation, to provide automatic suppression in the fueling area in the event of a fire.

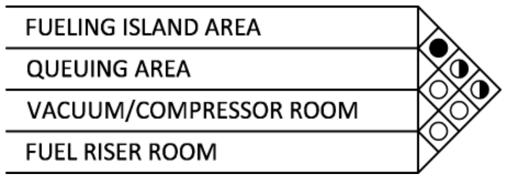


Figure 5.9.6 Fueling Island Matrix

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

The Fueling Island is the most critical fire safety concern of the entire ConRAC complex. Space separation and vertical clearances will be important design considerations in the design development of the fuel islands.

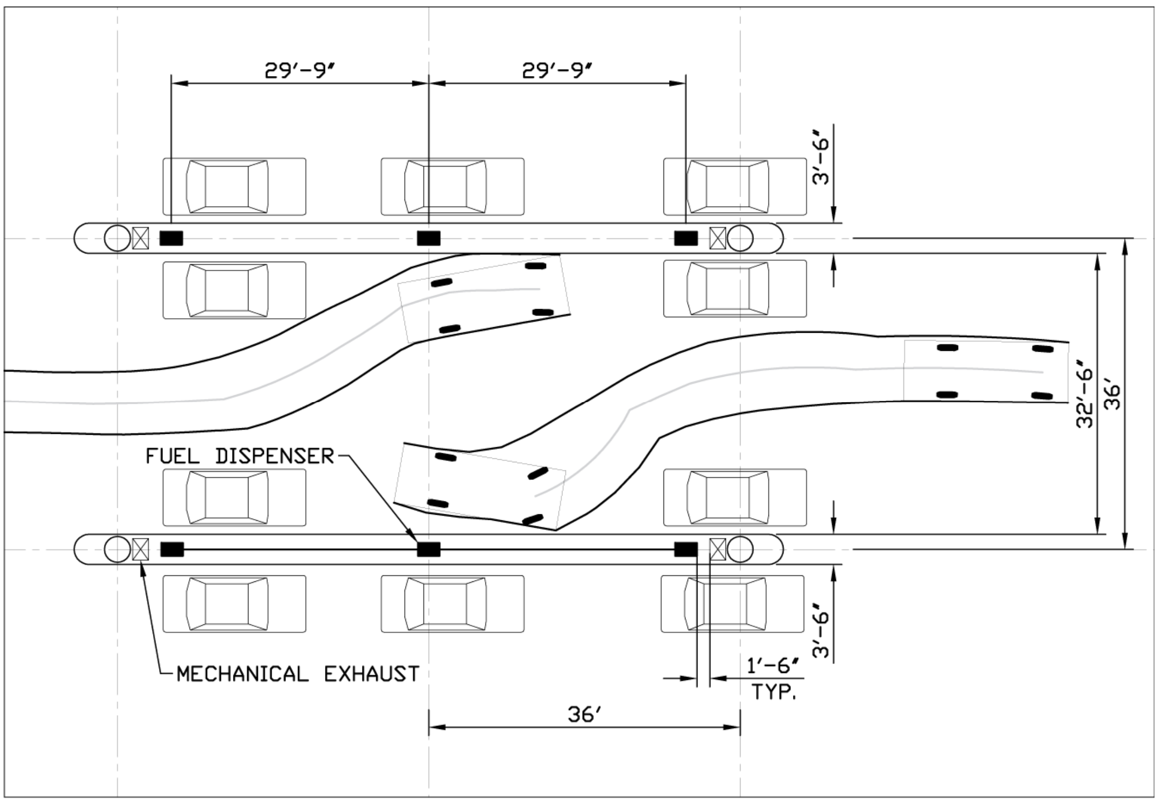


Figure 5.9.7: Fueling Islands

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

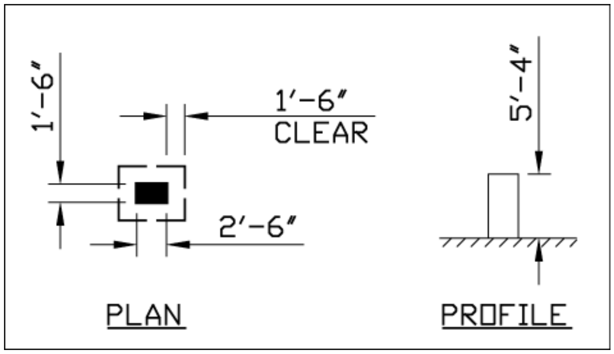


Figure 5.9.8: Fuel Dispenser

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

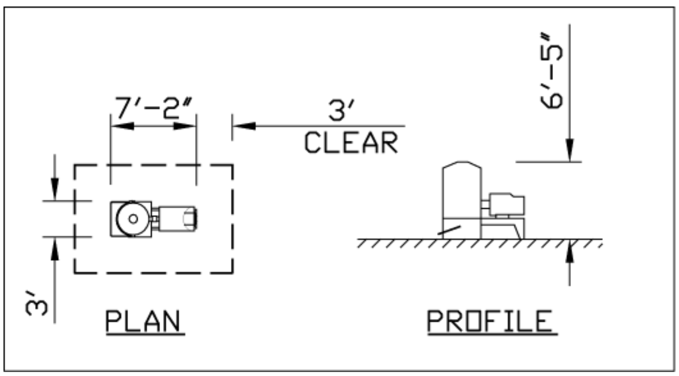


Figure 5.9.9: Vacuum

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

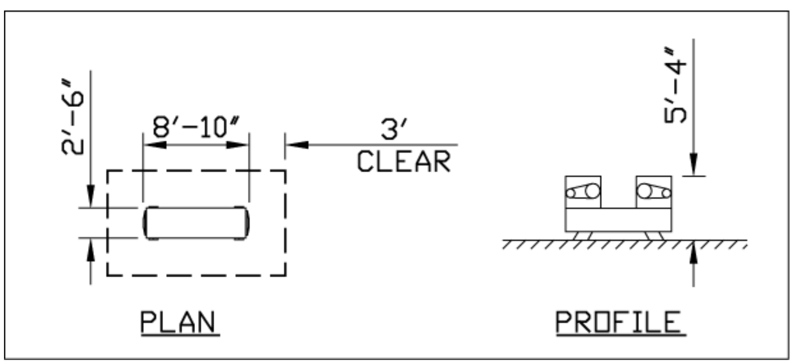


Figure 5.9.10: Air Compressor

Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Car Wash Area

After vehicles are fueled, they are then transferred to the car wash bays. In some cases, vehicles may by-pass the fueling and vacuum process and go straight to the wash bay. See Figure 5.9.11 for the car wash adjacency matrix. The car wash area is composed of the following:

- Car Wash Bay – this contains the car wash equipment.
- Car Wash Reverse Osmosis System – this potable water purification system will be located in a remote room on the first floor of QTA support area. The equipment softens the water used in the rinse process.
- Car Wash Reclamation System – this system reclaims the drainage water from the car wash, processes that water, and then re-uses it in the wash cycle. The reclaim tanks will be located in a remote room on the first level in the QTA support area.

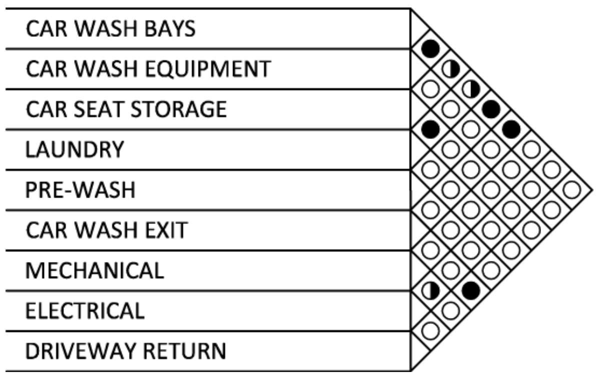


Figure 5.9.11: Car Wash Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Figure 5.9.12 shows the layout for a typical wash area with four bays

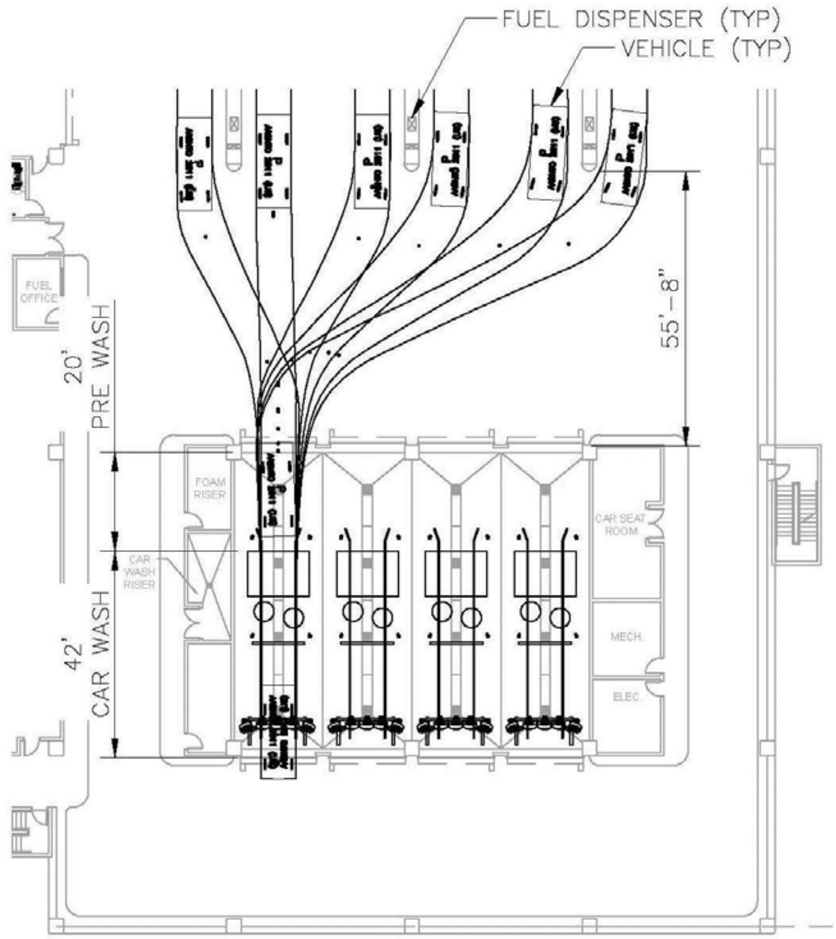


Figure 5.9.12: Typical Car Wash Systems
Source: Stantec, March 2015
Prepared by TranSystems: March 2015

Maintenance Bay Area

See Figure 5.9.13 for the adjacency matrix for the maintenance bay.

- Maintenance Bay Area – the maintenance bay provides the opportunity for light maintenance activities, including oil changes, tire changes, tire repairs and wheel alignments. A variety of equipment will be included in the maintenance bay, such as: motor oil hose reels for new oil; compressed air hose reels; used motor oil collection stations; power and light reels; and fixed vehicle lifts. In addition, provisions will be included for tenant installed equipment such as tire changers and balancers. See Figure 5.9.15 for a typical layout of a maintenance bay.
- Parts/Tire Storage Room – this space is typically used to store parts and tools for light lubrication service.

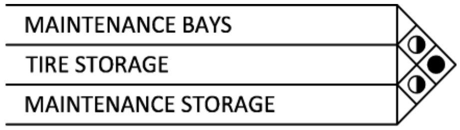


Figure 5.9.13: Maintenance Bay Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

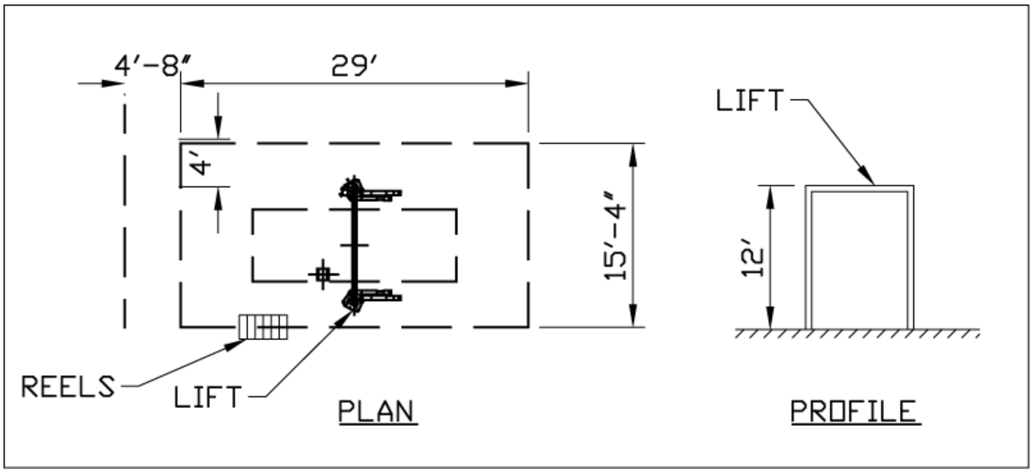


Figure 5.9.14: Typical Maintenance Bay Layout
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

QTA Administration

The QTA Administration area is the QTA operations control center. Each QTA will require its own Administration area. This location should be oriented so supervisors are able to observe the fuel and wash activities. Ideally, it needs to be near the vehicle connection of the QTA with the idle storage building. See Figures 5.9.15 and 5.9.16 for the adjacency matrices. The components of the QTA Administration area consist mainly of the following spaces:

- Manager's Office – this room is for the QTA manager. Ideally, the manager's office and workroom need to be able to observe the entire QTA operation.
- Workroom – this is the RAC administration employee working space. The workroom and manager's office need to be separated from the break room. A slide window may be required for communication purposes.
- Break Room – the break room is provided for QTA employees. It may or may not be needed for small RAC companies. The conceptual planning for the QTA will include a break room for all operators.
- Lost and Found Room – this space is used to provide secure storage for items that customers have left behind from rental vehicles. This room is optional for all the rental car companies.
- Uniform Room – this room is used to store uniforms for QTA staff. It is not required for small RAC operators.

The QTA administration space is typically supported by the following:

- Restrooms
- Janitor/utility/plumbing chase room
- Locker room
- Intermediate Distribution Facility (IDF) data communication rooms
- Electrical rooms

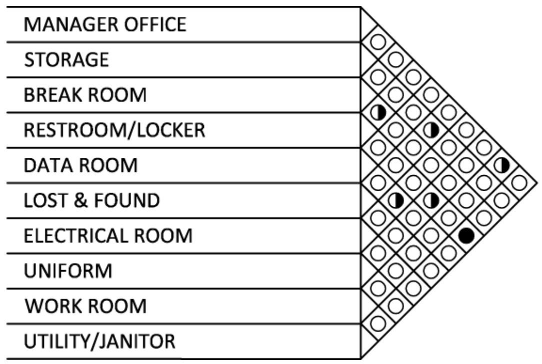


Figure 5.9.15: Administration Large Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

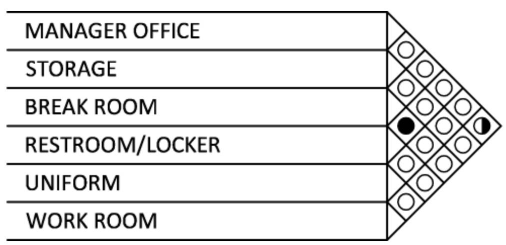


Figure 5.9.16: Administration Small Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

QTA Support Facility

The QTA contains equipment and systems to support the operation of the various components of the QTA described in the previous section. The QTA Support Facility is a common use building ideally located in close proximity to the other main QTA buildings. The equipment and distribution systems for the three major operations contained in the QTA Support Facility include: Car Wash Systems, Fueling Systems and Maintenance Systems. See Figure 5.9.17 for the building matrix.

- Car Wash Systems – an oil/water separator, water reclaim system and reverse osmosis purified potable water system will be required to support the elevated car wash bays to work properly and efficiently. These systems are typically located in independent rooms at the ground floor with high density power cables/conduits and plumbing piping loops to provide the required link between floors.

- Fueling Systems – the fueling riser rooms are a necessary support for the elevated fueling to route the fuel piping vertically through the building. Additionally, dedicated support space will be necessary to house the installed centrifugal vacuum producers and the windshield washer fluid day tanks and piping risers.
- Maintenance Systems – the maintenance bays at the various levels of the QTA will be served by piping from ground level equipment rooms for the storage and distribution of window washing fluid, new oil and retrieval and storage tanks for waste oil.

Other important spaces required to be included in the common QTA Support area are:

- Service Elevator – to move supplies and waste among the stacked QTAs and QTA Support Facility.
- Loading Dock – shall be large enough for commercial trucks and semi-trailers to load and unload. Some staging spaces/cages/rooms should be arranged and located near the loading dock area.
- Recycle Equipment Zone – the size of this space depends on the sustainable program requirements. It may include a bailer, recycle bins, recycle material compactors and related maintenance vehicle maneuver spaces.
- Emergency Generator Room – the size of this room will be dictated by the size of the generator required to provide back-up power for the various components of the ConRAC.
- Foam System Room – this is the space, if required by the Fire Marshall, for the storage of the fire suppression material for the fuel Islands.
- Fire Control Center – consists of the fire control room and fire equipment room. This is the most important component for a fire emergency.
- Main System and Equipment Support Rooms – includes the mechanical room, plumbing room, water pump room, main electrical room and data room.

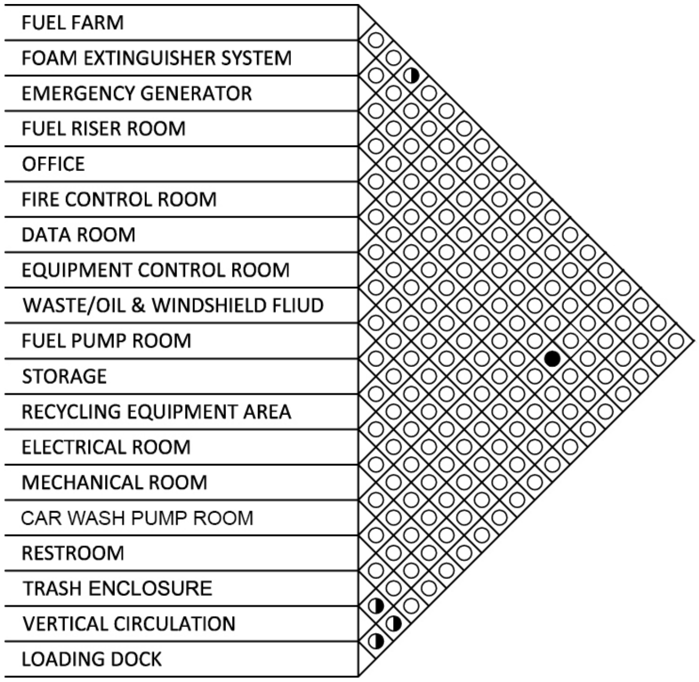


Figure 5.9.17: Quick Turn Around – Secondary Support Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

Customer Service Building (CSB)

The CSB serves as the entrance to the consolidated rental car facility to receive customers from the terminals arriving via shuttle bus or the APM. Refer to Figures 5.9.18, 5.9.19, 5.9.20, and 5.9.21 for the building matrices for the CSB. The Type A, B and C matrices reflect the number of rooms required depending on the size of the company, the number of customer transactions and the number of vehicles they are required to manage. The Type A matrix reflects the facilities required by a large company with many employees, Type B matrix reflects a medium size company with a large enough staff to require a break room area as compared to the Type C matrix which reflects a very small company with only a handful of employees.

The main components for the CSB are:

- Rental Car Service Counter and Queuing Area – this space is used for conducting rental car customer business transactions.
- Rental Car Administration Office Area – this space is the overall rental car daily operations center for the consolidated rental car facility.
- Vertical Transportation Areas – These areas are composed of elevators, escalators and stairs to link the rental car and public parking floors.

The CSB is typically supported by the following areas:

- Restrooms
- Janitor/utility/plumbing chase room
- Mechanical rooms

- Intermediate Distribution Facility (IDF) rooms
- Electrical rooms

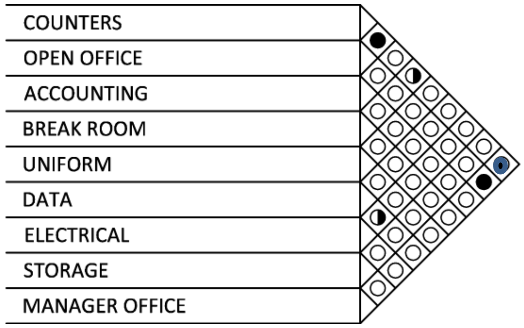


Figure 5.9.18: Customer Service Building Administration – Type A Matrix (Large Operator)
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

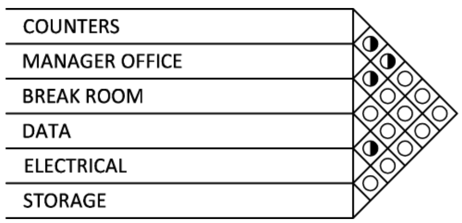


Figure 5.9.19: Customer Service Building Administration – Type B Matrix (Medium Operator)
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

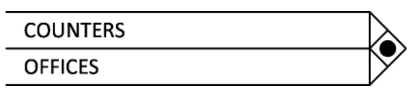


Figure 5.9.20: Customer Service Building Administration – Type C Matrix (Small Operator)
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

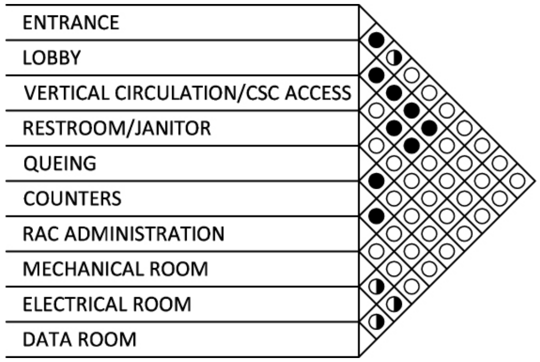


Figure 5.9.21: Customer Service Building Matrix
Source: TranSystems, March 2015
Prepared by: TranSystems, March 2015

CSB Support

The CSB support area includes:

- Mechanical Room – this room is used to contain mechanical equipment for the CSB service center and administration areas.
- Electrical Room – this room will include the electrical transformer and panels.
- Data room – this room serves as the data center for the CSB.
- Signage/Security Control Room- this room is used for the signage display control room and security system control room functions. It could be integrated into part of the data room.
- Water/Plumbing Room – this room is for the plumbing and water distribution equipment. The supply water compressor may be installed in this room to separate or serve as the water pressure reliever from the carwash water demands.

Section 6: Site Development Requirements

This section describes the site development requirements for the planning of the ConRAC.

6.1 EXISTING CONDITIONS

The area proposed for the LAX ConRAC is known as Manchester Square and is bounded by W. Century Boulevard on the south, Aviation Boulevard on the west, W. Arbor Vitae Street on the north, and S. La Cienega Boulevard on the east. The site is a former residential neighborhood originally planned in the 1940s. For the past several years, LAWA has been purchasing property under a voluntary acquisition program. LAWA currently owns the majority of the Manchester Square Property. However, the site does include a school (Bright Star Secondary Charter School). LAWA is in discussion with the Los Angeles Unified School District and charter school officials to develop a plan to relocate the school. On the periphery of the site, at the northwest corner of Century and La Cienega Boulevards, are two hotels and a few commercial retail businesses. LAWA has no plans to purchase these properties; they are not needed for the development of the ConRAC. The existing residential structures and school will be acquired to complete the acquisition program as these areas are subject to significant levels of aircraft noise.

Figure 6.1.1: Existing Manchester Square

Source: Mia Lehrer + Associates. June 2014

Prepared by: Mia Lehrer + Associates, June 2014

The site is located within 1.7 miles of the Central Terminal Area (CTA) of the Airport. The major north/south expressway, I-405, is located just to the east of the site, parallel to La Cienega Boulevard.

6.2 EXISTING RENTAL CAR SITES

Figure 6.2.1 shows the location of the approximately 107.4 acres in existing rental car sites spread around the Airport area. In addition there is 32.2 acres of land the rental car companies use for overflow vehicle staging and storage or off-site maintenance. One of the major goals of the ConRAC is to provide a more efficient utilization of the available land, accommodating all rental car functions, with convenient access and egress for rental car customers.

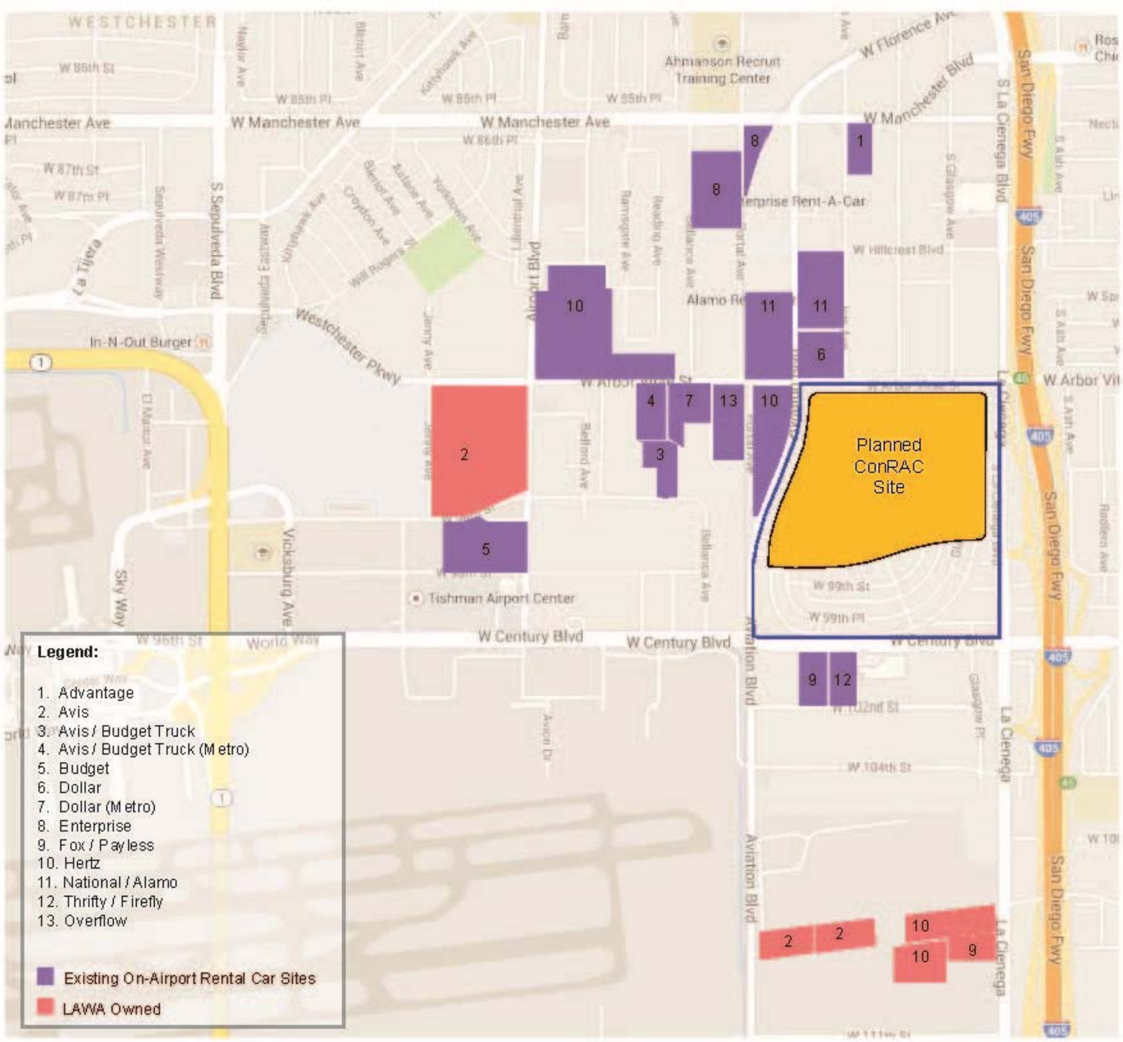


Figure 6.2.1: Existing Rental Car Sites
Source: LAWA and TranSystems. June 2014
Prepared by: TranSystems, February 2015

As passenger traffic continues to grow at LAX, it will be paramount to provide clear and easily navigable ways to access cross-county destinations (and beyond) like downtown Los Angeles, Long Beach, the San Gabriel and Fernando Valley, etc. It is important that the development of Manchester Square be integrated with public transit options, most notably the Crenshaw Airport Metro Connector at 96th St. and Aviation Boulevard.

6.3 *AIRPORT LANDSIDE ACCESS MODERNIZATION PLANNING*

The ConRAC is one component of an overall landside access modernization program in which LAWA intends to construct an Automated People Mover (APM) to provide passenger connections from the ConRAC and new Intermodal Transit Facilities (ITFs) to the CTA. Future development opportunities in the area of Manchester Square are expected to recognize the influences of the major transportation facilities, and the roadway network, which will be integrated within and in proximity to the site.

Figure 6.3.1: Airport Area Showing Proposed APM Connections (CTA, West and East ITFs and ConRAC) and Existing Rental Car Facilities
Source: Mia Lehrer + Associates. June 2014
Prepared by: Mia Lehrer + Associates, June 2014 and TranSystems, February 2016

Due to its proximity to the airport runways, audible noise levels pose constraints on the potential future development in Manchester Square.

6.4 ROADWAY IMPROVEMENTS

A number of roadway improvements are planned under LAWA's Landside Access Modernization Program, which will accommodate the efficient operation of the ConRAC. These improvements include, but not necessarily limited to, the following:

1. 98th Street – Because the main rental car return entrance will be accessed from 98th Street, as well as the private vehicle entrance into the East ITF, this new roadway is proposed to be constructed from La Cienega Boulevard to Aviation Boulevard.
2. Concourse Way – This road is proposed to be extended from Century Boulevard to Arbor Vitae Street. This roadway improvement serves multiple functions:
   a. It provides a means for ConRAC shuttle buses to get into and exit the Bus Plaza;
   b. It will also be used by rental car customers who are not coming from I-405 to enter the ConRAC from 98th Street; and
   c. It will provide for flexible and efficient circulation of commercial vehicle traffic staging at the East ITF.
3. Roadway widening along Arbor Vitae Street, La Cienega Boulevard, Century Boulevard and Aviation Boulevard is proposed. The ConRAC rental car exit to Arbor Vitae Street will require a new traffic signal. Improvements are proposed to the southbound I-405 off-ramp and its intersection with La Cienega Boulevard to interface with the new 98th Street. La Cienega Boulevard is proposed to be widened to accommodate additional traffic and to provide safe truck and other vehicle access to the ConRAC's QTA service yard.
4. New guide signs, directing drivers to the ConRAC rental car return entrance, will be installed on I-405, I-105 and a number of local roadways. Similarly, new signs will be installed to direct drivers exiting the ConRAC to the regional arterial and freeway network. This will result in significantly reducing the number of vehicle movements and vehicle miles traveled by rental customers compared to the magnitude of movements associated with multiple and complex pathways customers must follow to and from the existing rental car sites. Although not critical to the project, improvements to how northbound traffic exits the I-405 freeway at Imperial Highway and Century Boulevard could assist in balancing the distribution of traffic on a number of surrounding streets.

Automated People Mover (APM) – Although the ConRAC can function without the APM, the airport will recognize the full potential benefit of the ConRAC when the APM is in service. For example, a main benefit to consolidating the rental car companies at one facility, and transporting customers to and from the CTA via the APM, will be the reduction of traffic at the CTA.

Section 7: Development of Alternative ConRAC Concepts

7.1 KEY CRITERIA FOR DEVELOPMENT OF CONRAC ALTERNATIVES

At the June 26, 2014 planning workshop with the rental car industry, the following parameters were agreed to as the criteria by which various alternatives would be evaluated:

- Customer Service – quick and easy to use
- Operational Efficiency– minimize labor and process time
- Efficient Use of Money - optimize the utilization of all facilities
- Flexibility - accommodate growth and industry changes
- Equitable Opportunity - all users have equal ability for efficient and profitable operations

The rental car industry suggested these values also be incorporated as part of the evaluation of alternatives:

- Time – use current window of opportunity
- Maximize Use of Available Site Area
- Split Garage and QTA – Similar to Atlanta ConRAC
- Option to Locate Customer Service Counters at Each Ready/Return Level

7.2 GUIDELINES ASSOCIATED WITH A SUCCESSFUL CONRAC FACILITY

At the same workshop, TranSystems indicated the following criteria would be incorporated into the development of all alternatives:

- Intersection Management – separate the different types of traffic
- One Way Traffic for Customers – arriving and departing customers and vehicles do not cross paths
- Customers Always Move Toward Their Destination - no “doubling back”
- Minimize Walking Distance from Vertical Core – 350-foot maximum walk to/from vehicle

7.3 INITIAL RANGE OF ALTERNATIVES – RENTAL CAR INDUSTRY DIRECTION

From June through September 2014, LAWA and TranSystems developed a series of functional ConRAC alternatives for review and comment from the rental car industry. These functional alternatives fall into three basic categories:

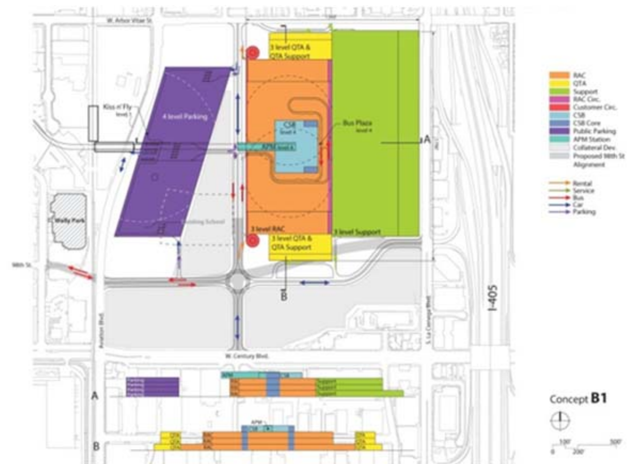
2 – Level Ready/Return and QTA

3 – Level Ready/Return and QTA

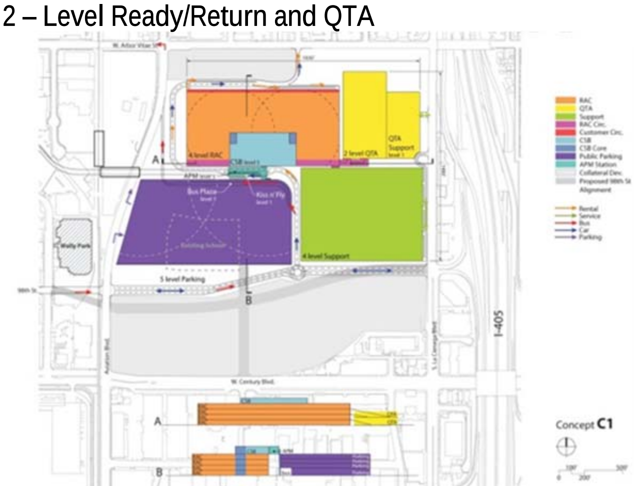
4 – Level Ready/Return with a three-level QTA

Diagrams of each of these three functional alternatives are shown in Figure 7.3.1.

2 – Level Ready/Return and QTA



3 – Level Ready/Return and QTA



4 – Level Ready/Return with 3 – Level QTA

Figure 7.3.1: Range of Initial Alternatives Considered
Source: TranSystems September 2014
Prepared by: TranSystems September 2014

At the September 4, 2014 workshop, the rental car companies reviewed the range of alternatives and requested that the ConRAC options should be refined to reflect the following characteristics:

- *Maximize the Available Site Area* – accommodating collateral development on the site is secondary to ensuring the ConRAC can be operated efficiently and meet future growth requirements
- *Minimize Level Changes* – no four-level schemes requiring a level change between the ready/return area and the QTA would be acceptable
- *Provide a Direct Connection* from the RAC Garage to QTA to the Idle Storage
- *Brand Family Allocation* – the relationship of all components should accommodate the synergy in shared fleet and cross-utilization of facilities
- *Minimize Initial Costs* – the proposed design should be able to be constructed within the limits of the available funds.

7.4 REFINED CONRAC ALTERNATIVES

Subsequent to the September 4, 2014 workshop, TranSystems worked with LAWA and the rental car industry from September 2014 through January 2015 in the development and refinement of three ConRAC alternatives. Conceptual cost estimates were developed for each of these alternatives. The description of each of these alternatives and the advantages and disadvantages of each are as follows:

Alternative 1:

- 2 Levels for Ready/Return, the QTA and Idle Storage at Levels 1 and 2
- QTA Located between the Ready/Return and the Idle Storage
- CSB and Future APM Station at Level 4
- Interim Bus Plaza at Level 1- with an Independent Vertical Transportation Core to the CSB
- Employee Parking on a Portion of Level 4 above the Level 3 Idle Storage
- Public Parking at Levels 4 and 5 – above the Ready Return

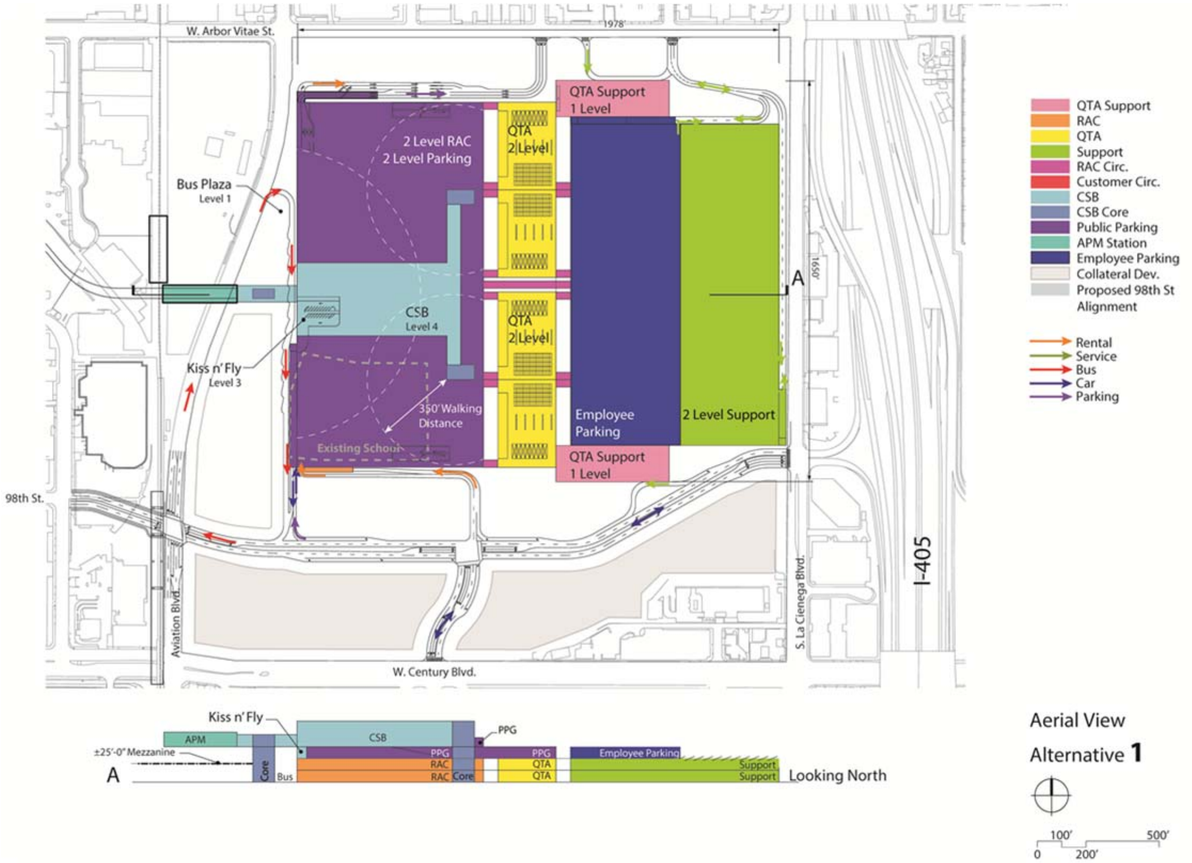


Figure 7.4.1: Refined Alternative 1
Source: TranSystems November 2014
Prepared by: TranSystems November 2014

Evaluation of Alternative 1

Advantages:

- One APM station
- No level change from CSB to APM
- Shuttle curb at grade
- Economical construction
- No building more than 4 levels
- QTA & Support on the same level as ready/return
- Least expensive ultimate development option

Disadvantages:

- 52% of walking distances to ready/return from the CSB are beyond 350 feet.
- Vehicles in idle storage have to cross through the QTA to get to ready/return
- Does not allow for each of the brand families to be located completely on a single floor
- Requires 56% of the site development area – the most of any alternative
- Only one entry and exit for rental customers
- Parking is integrated with the ConRAC

Alternative 2:

- 2 Levels for Ready/Return and the QTA at Levels 2 and 3
- Idle Storage at Levels 1 and 2 –space below and above the Ready/Return
- CSB and Future APM at Level 4
- Interim Bus Plaza at Level 1 - using the Ready/Return Cores to the CSB
- Employee Parking on a Portion Level 5 above the Level 4 Idle Storage
- Public Parking in a Separate Structure - Future ITF East

Figure 7.4.2: Refined Alternative 2

Source: TranSystems January 2015

Prepared by: TranSystems January 2015

Evaluation of Alternative 2

Advantages:

- No level change from CSB to APM
- Independent APM station for the ConRAC
- Similar to Atlanta ConRAC but with a single level CSB
- Shuttle curb at grade
- 2 entries and exits for rental customers
- Shortest walking distances for rental customers
- Parking is in separate structure
- Requires only 38% of site area for ConRAC and Parking – the lowest area required of all options

Disadvantages:

- Both RAC levels are above grade
- Does not allow for flexibility in reallocation of facilities
- Ramping required between ready/return levels to support levels
- Cost of 2nd APM station
- Employee parking at Level 5
- Not all brand families can be accommodated on a single floor.

Alternative 3:

- 3 Levels for Ready/Return, the QTA and Idle Storage (Levels 1, 2 and 3).
- QTA Located on the Center of the Site – Between Ready/Return and the Idle Storage Building
- CSB and Future APM at Level 4
- Interim Bus Plaza at Level 4 with Direct Access to the CSB
- Employee Parking on a Portion of Level 4 above the Level 3 Idle Storage
- Split QTA Support Areas
- Public Parking in a Separate Structure - Future ITF East

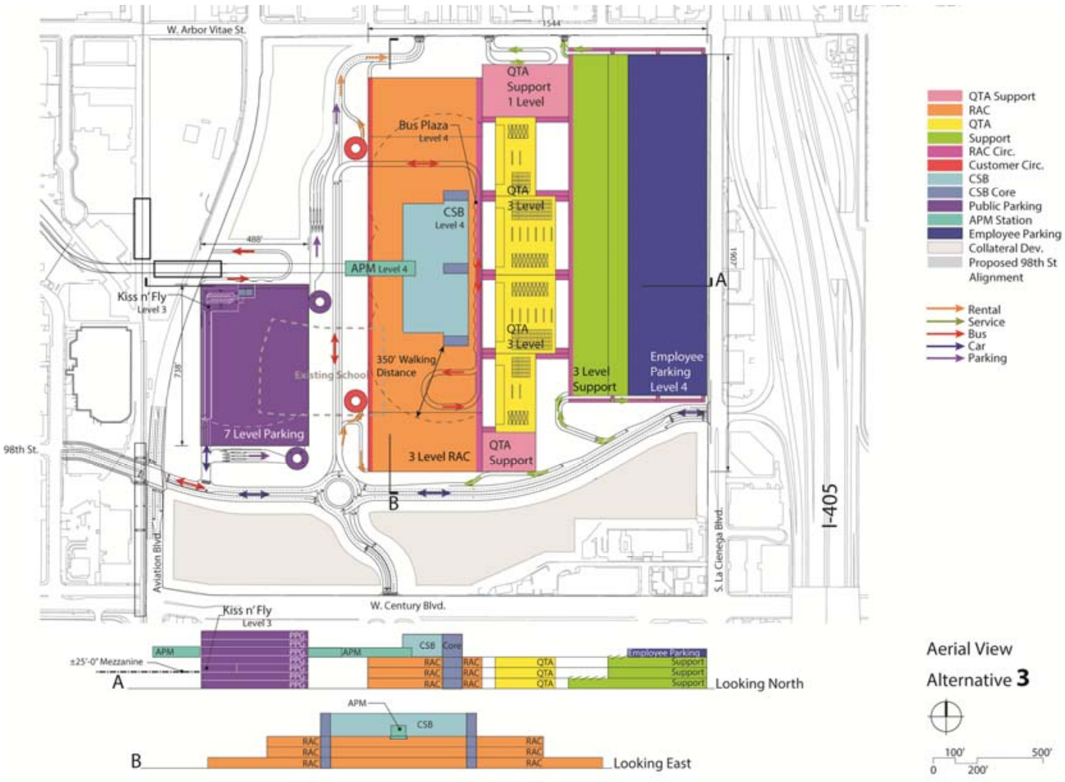


Figure 7.4.3: Refined Alternative 3

Source: TranSystems November 2014
Prepared by: TranSystems November 2014

Evaluation of Alternative 3

Advantages:

- No level change from CSB to APM
- Independent APM station for the ConRAC
- Shuttle drop-off at same level as CSB
- Parking is in separate structure
- Accommodates current RAC market share on each level
- Provides maximum flexibility for future reallocation of facilities
- No level change between QTA & Support areas and the Ready/Return area
- All brand families can function on a single floor

Disadvantages:

- Limits flexibility to reallocate facilities in the future
- Bus ramp slopes up 4 levels to CSB
- Only one entry and exit for rental customers
- Cost of 2nd APM station
- Vehicles in idle storage have to cross through the QTA to get to the ready/return area
- Difficult to construct in phases

Table 7.4.4 summarizes the characteristics of each of the three alternatives.

Table 7.4.4 Comparison of Alternatives

	Alternative 1	Alternative 2	Alternative 3
Site Utilization			
RAC Building Footprint (acres)	65.2	39.4	56.1
% of Site Occupied by RAC	51%	31%	44%
Passenger Convenience			
APM Station	Single APM Station for ConRAC & Metro Users	Separate APM Station for ConRAC	Separate APM Station for ConRAC
% of RAC AREA within 350 feet Walking Distance from CSB	48%	92%	87%
Public Parking	Roof of ConRAC	Separate Structure	Separate Structure
Construction			
Phasing	Difficult to construct in phases	Most practical for phased construction	Difficult to construct in phases
Rough Order-of-Magnitude Costs	$931,000,000	$981,000,000	$1,000,000,000

At the January 21, 2015 workshop, the rental car industry expressed a preference for Alternative 3 and requested that LAWA and TranSystems develop a version of that alternative that would incorporate the following items:

- Equalize the Ready/Return area available on all three levels.
- Locate the Idle Storage facility between the Ready/Return Building and the QTAs. The rental car industry indicated they would use the Idle Storage as a buffer for the queuing of return vehicles, waiting to be taken into the QTA, during peak rental periods.
- Organize the relationship between the Ready/Return, Idle Storage and QTA so each brand family and the small operators could move their vehicles among these facilities without crossing the boundaries into the facilities belonging to other companies.

On March 10, 2015, Alternative 4 was presented to the rental car industry addressing the rental car industry's requested improvements.

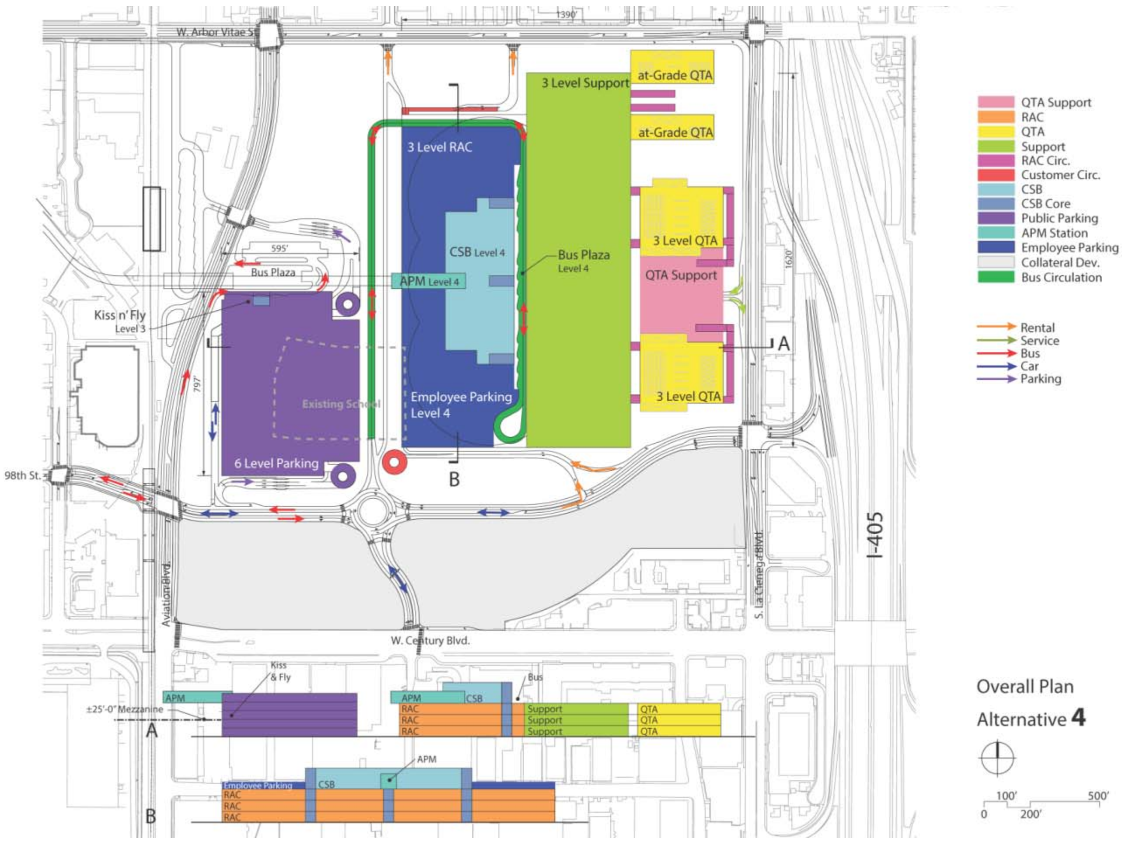


Figure 7.4.5: Alternative 4
Source: TranSystems March 2015
Prepared by: TranSystems March 2015

The features of Alternative 4, which were supported by the rental car industry, included:

- Idle Storage is now centered between the Ready Return area and the QTA.
- The area available on each level is the same, providing for flexibility in future reallocation.
- There are two multi-level QTAs for the large brand families.
- Two ground level QTAs are provided for independent operators. These QTAs can be accessed from the Ready/Return and Idle Storage for the independent operators without crossing into the secure area of the large brand families.
- Linear relationship between each of the three major components, maximizing flexibility in the movement of vehicles among these buildings.
- Bus curb provided on the east side of the garage with direct access to the Level 4 CSB.
- Direct entry into the Ready/Return building from W. 98th St.
- Exit for the Public Parking/East ITF does not interfere with ConRAC customer vehicle or shuttle bus circulation.
- The $993 million rough-order-of magnitude estimated cost for Alternative 4 is slightly less than Alternative 3.

7.5 REFINEMENT OF ALTERNATIVE 4

Subsequent to the rental car industry endorsement for developing Alternative 4 for conceptual design of the ConRAC, TranSystems, in collaboration with LAWA, its LAMP consultant team and the rental car industry continued to refine the preferred Alternative 4 to address a range of issues. These activities occurred between April 2015 and June 2016 and addressed the following:

- Provide a ground level Bus Plaza in lieu of the Level 4 location. This would allow for removal of the 1,300 foot long bus ramp. This component is to provide for an interim bus operation if the APM is not operational when the ConRAC opens.
- Coordinate the development of the area west of the ConRAC with the plans for the East ITF and the commercial vehicle areas planned to service that facility, including the extension of Concourse Way north of 98th Street.
- Provide for an entrance into the ConRAC for eastbound return customers on W. 98th St. which would allow for the free flow of westbound traffic between La Cienega Boulevard and Concourse Way.
- Look at extending Concourse Way north to connect with Arbor Vitae Street.
- Simplify the exit route and wayfinding for ConRAC rental customers to provide for appropriate decision time when leaving the facility and to allow for queuing of vehicles at the intersection with Arbor Vitae.
- Provide an alternative exit path for ConRAC rental customers and shuttle buses in case of traffic congestion on Arbor Vitae Street.
- Investigate the number and location of vertical cores serving the RAC and CSB that balance minimizing walking distances with optimizing the ready/return operations.
- Study CSB configurations to provide intuitive pathways for customers as they move from lobby service areas to the vertical connections within the RAC.
- Consolidate the QTA functions into fewer buildings.
- Adjust building configuration and locations to provide for fire department access and fire safety separations.
- Provide the flexibility for the functionality and growth of the independent operators.
- Incorporate a facility for potential use for airport employee or public parking. Provide for convenient and efficient delivery and pick-up of vehicles by car carriers in the QTA area.

The Overall/Level 4 Plan and diagrammatic section of the refined version of Alternative 4, shown in Figure 7.5.1 on the following page, reflects the results of addressing these issues.

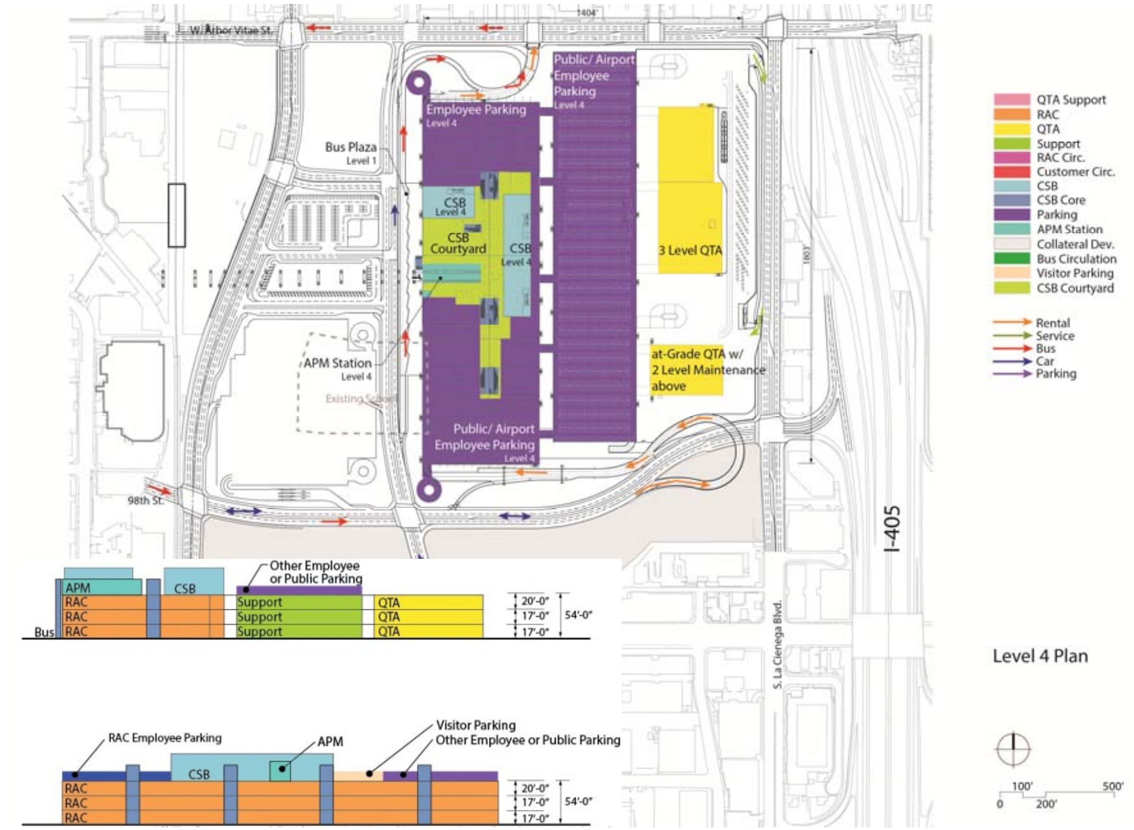


Figure 7.5.1: Preferred Alternative 4 – Overall/Level 4 Plan
Source: TranSystems June 2016
Prepared by: TranSystems June 2016

The modifications that have been incorporated into the Basis of Design for the preferred concept include:

- A ground-level Bus Plaza is provided along the west face of the ConRAC. It includes 12 sawtooth bus parking bays. A vertical core is located at the mid-point of the Bus Plaza with elevators to connect the Bus Plaza with the Level 4 CSB. The intersection of 98th St. with Concourse Way is shown as signal controlled.
- Concourse Way is extended north, from the intersection at 98th Street to W. Arbor Vitae Street. This facilitates access not only for the ConRAC shuttle buses, but also provides flexibility for a wide range of commercial vehicles to easily enter and exit the staging area being provided as part of the overall plan for the East ITF. It also provides a means of access for service and emergency vehicles along the west side of the site.
- Grade separated entry ramp for return rental customer's heading eastbound on 98th St. The ramp goes under 98th St. so there is no obstruction to westbound traffic from La Cienega Boulevard to Concourse Way.
- Separate exits for the RAC rental customers from each level of the RAC garage.
  Two independent helices for exiting RAC customers at Level 2 and Level 3 will provide them the same distance as those customers exiting from the ground floor.
- Two right-turn lanes and two left-turn lanes for ConRAC rental customers, parkers and shuttle buses exiting onto Arbor Vitae. Rental car customers going eastbound on Arbor Vitae Street will have an added lane from which to turn southbound onto La Cienega Boulevard to reach the southbound I-405 on-ramp.

- Emergency alternative exit to southbound Concourse Way for rental customers, parkers and shuttle buses as a contingency to unexpected congestion on W. Arbor Vitae Street.
- Four vertical cores in the RAC to minimize walking distances and facilitate flexible utilization of the ready/return areas.
- Layout of the CSB in a “mini-mall” configuration, wrapped around the north and east ends of the APM, to provide easy recognition of the customer service areas and intuitive wayfinding for all rental customers.
- QTA operations consolidated into two buildings, both with direct access at each level to the RAC and Idle Storage garages with no level change.
- 60-foot separation between the QTA and Idle Storage building and between the RAC garage and the Idle Storage building, to provide for emergency equipment access, exit stair areas and fire safety separation as one of the mitigation strategies for gaining code compliance for the QTAs.
- Separate connection for independent operators to the ground floor of the south QTA Building from both Levels 1 and 2 of the RAC and Idle Storage garages.
- Provision on Level 4 of the Idle Storage building to be used as either/or airport employee or public parking.
- Dedicated area on the east of the site for staging of 19 car carriers augmented with 330-stall car corrals to facilitate efficient vehicle drop-off and pick-up to help maintain a balanced fleet inventory.

Figure 7.5.2, on the following page, shows the site plan for preferred Alternative 4, followed by Level 2 and Level 3 floor plans shown in Figures 7.5.3 and Figure 7.5.4, respectively, on the subsequent pages.

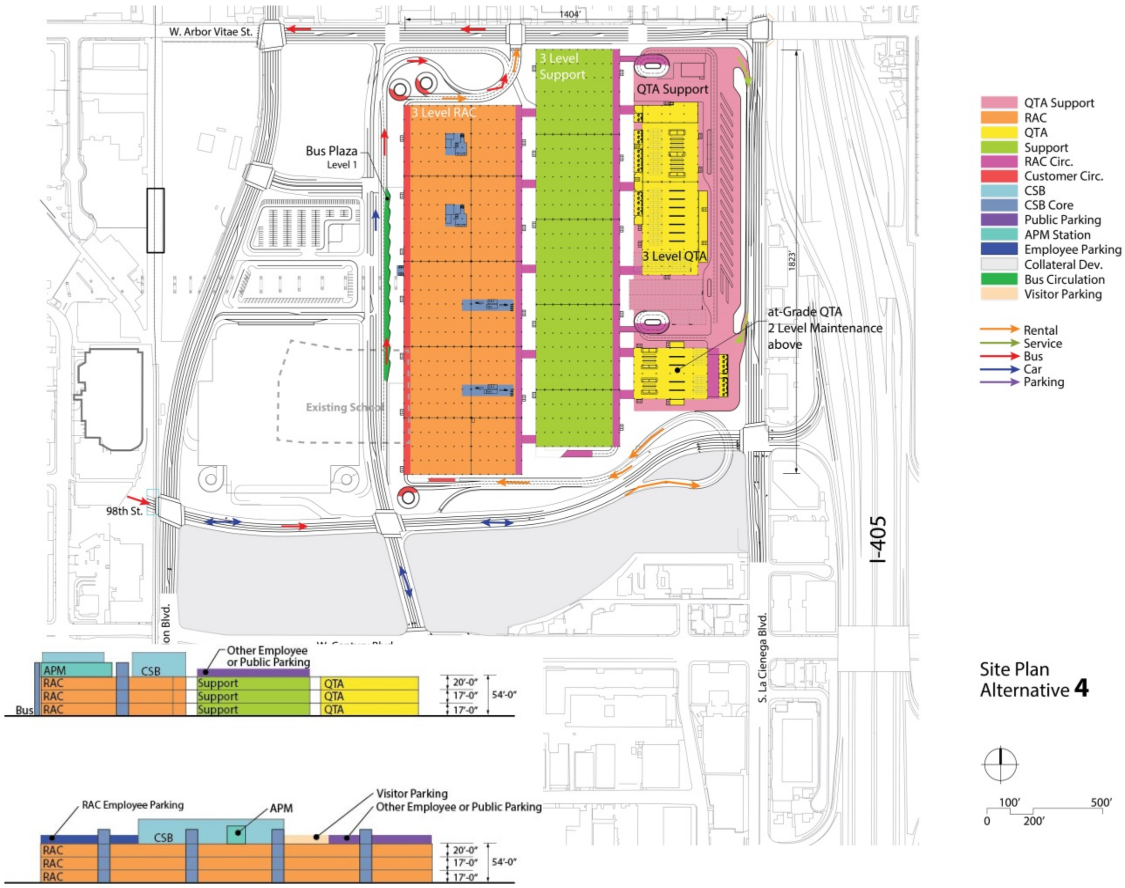


Figure 7.5.2: Preferred Alternative 4 – Site Plan
Source: TranSystems June 2016
Prepared by: TranSystems June 2016

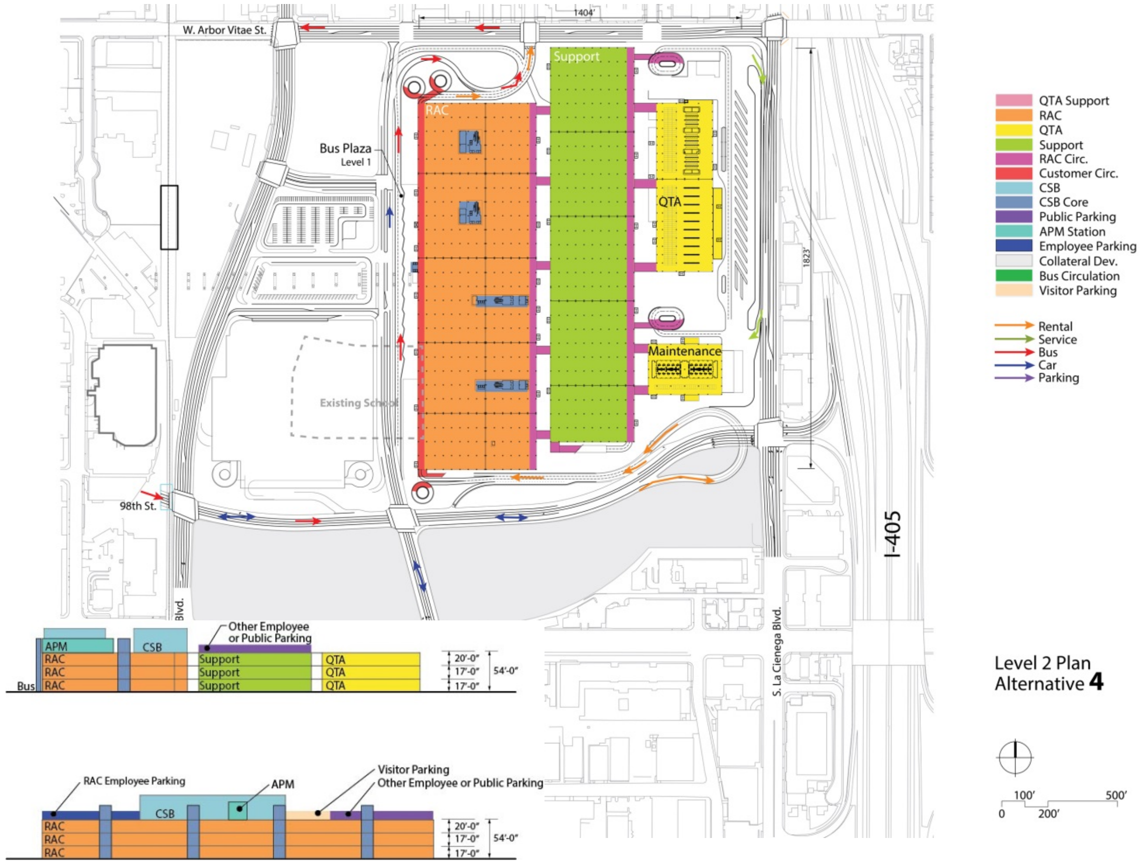


Figure 7.5.3: Preferred Alternative 4 – Level 2 Floor Plan

Source: TranSystems June 2016

Prepared by: TranSystems June 2016

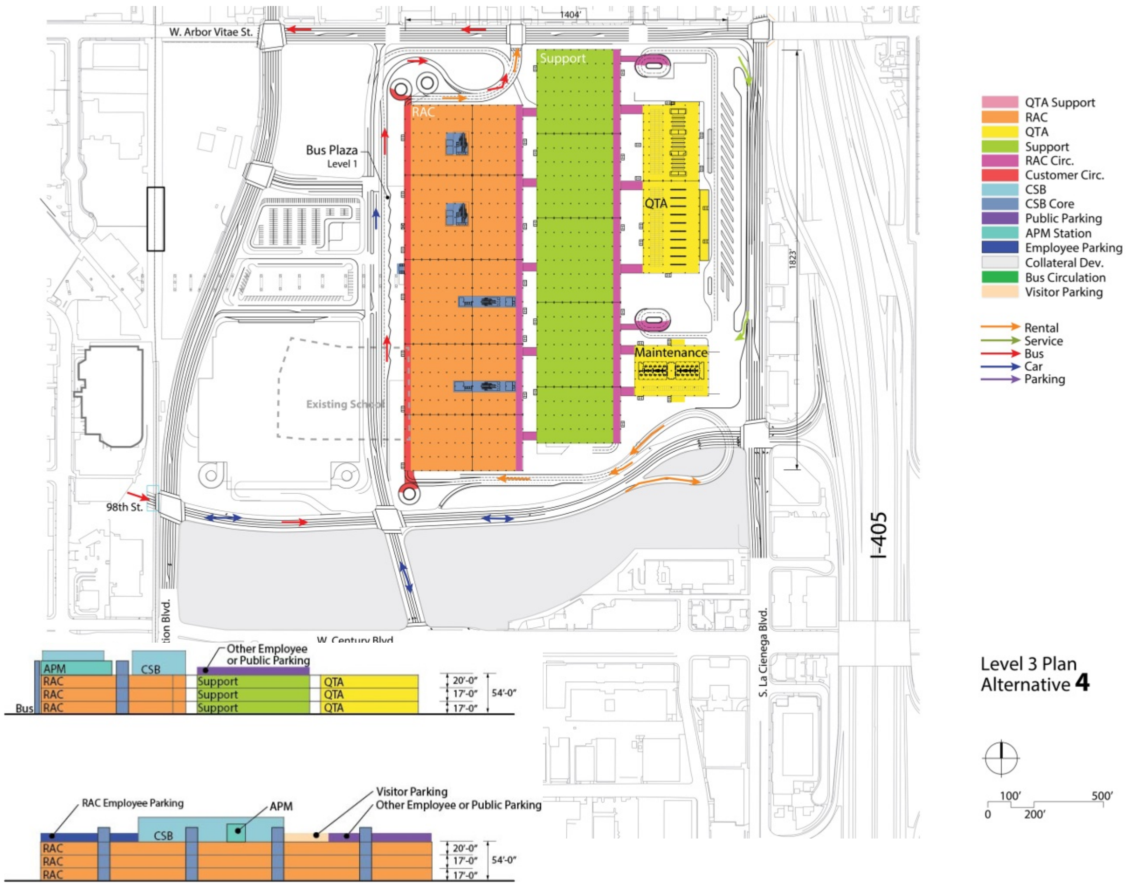


Figure 7.5.3: Preferred Alternative 4 – Level 3 Floor Plan
Source: TranSystems June 2016
Prepared by: TranSystems June 2016

Section 8: Conceptual Design Development of ConRAC Concept

8.1 SITE DESIGN

This section describes the site development, drainage, utilities, internal roadways and landscape design requirements for the ConRAC facility.

Proposed Site and Building Demolitions

The proposed ConRAC project will require removal of existing low-rise, single- and multi-family residential and other buildings located within the project site, as well as site features including asphalt and concrete paved roadways, sidewalks and yards, traffic signage, light poles, trees and other vegetation, fencing, miscellaneous site structures, and underground utilities. Demolition drawings will be developed to indicate the extent of required site demolitions. The site will also require rough grading to prepare the site for the buildings and exterior features.

While under construction, the contractor will be required to comply with local requirements for erosion and sediment control by implementing appropriate best management practices (BMPs). Examples of BMPs are inlet protection, erosion control fence, sediment logs, sediment basins, stabilized construction entrances, stockpile management, and concrete washout areas. Erosion control BMPs prevent sediment and other construction related contaminants from entering the storm drain systems and waterways downstream.

Existing Utilities

Existing utilities at the project site include the following:

- Storm Drain – There are existing underground storm drain systems that drain Manchester Square. All storm drain facilities ultimately drain to the Dominguez Channel which extends south to the Los Angeles Harbor near San Pedro. The ConRAC site area drains to two systems:
  - A 54-inch storm drain line within Hindry Avenue extending north northwest from Century Boulevard to the alleyway between Glasgow Place and 99th Street. The invert elevation of this pipe is at approximately 86.8 feet with existing ground elevation at around 94 feet. This storm drain line has been shown to have at least a 10-year storm capacity per CDM Smith's SWMM model.
  - A 30-inch storm drain line extending west from La Cienega Boulevard to the intersection of Glasgow Place and 93rd Street. The invert elevation of this pipe is at approximately 91.7 feet with existing ground elevation at around 98 feet. This storm drain line has been shown to surcharge and produce minor flooding per CDM Smith's Storm Water Management Model (SWMM). The Design Team is currently treating this line to have limited capacity.
- Sanitary Sewer – There are existing underground sanitary sewer pipe systems that drain Manchester Square and are beneath almost every street and alleyway. Since the majority of these systems will not be compatible with the new improvements, almost all will be removed, except what is noted below. The ConRAC site area drains to two systems:
  - An 8-inch vitrified clay pipe within Hindry Avenue extending north northwest from the alleyway parallel and south of Glasgow Place. The sewer system north of W. 99th Street will be removed.

The invert elevation of this pipe is at approximately 86.3 feet with existing ground elevation at around 94 feet.
    - A 10-inch vitrified clay pipe extending west from La Cienega Boulevard at 95th Street. The invert elevation of this pipe is at approximately 84.3 feet with existing ground elevation at around 98 feet.

- Domestic Water Lines – There is an existing underground water distribution system that serves Manchester Square. Water mains exist beneath most streets. Since the majority of these systems will not be compatible with the new improvements, almost all will be removed. The main Los Angeles streets in the area typically consist of 12 inch water mains or larger, however Arbor Vitae Street and La Cienega Boulevard act as the northern and eastern City of Los Angeles boundary to City of Inglewood. Because of this, Arbor Vitae Street consists of a 6 inch water main and La Cienega Boulevard consists of an 8 inch water main. These water mains may not be compatible with the new ConRAC water demands and may need to be upsized. See Proposed Fire Service below for more information on this. Static water pressure in the area ranges from about 95 psi to 100 psi.
- Natural Gas Lines – There is an existing underground gas distribution system that serves Manchester Square. Gas mains exist beneath most streets. Since the majority of these systems will not be compatible with the new improvements, almost all will be removed, except for gas mains beneath the arterial streets that surround the neighborhood such as Arbor Vitae Street and La Cienega Boulevard.

Proposed Utilities

Proposed Storm Drainage Systems-The ConRAC site will require a completely new storm drain system based the following guidelines:

- County of Los Angeles Hydrology Manual
- City of Los Angeles Low Impact Development Manual, Development Best Management Practices Handbook

Per the Low Impact Development Manual (LID Manual), the project site must capture and manage 100% of a 3/4-inch storm event and implement using, in priority order, infiltration, capture and reuse, biofiltration/retention or a combination of the above. Infiltration of stormwater into groundwater has been shown to be infeasible via geotechnical investigation and evapotranspiration is not practical because there is limited landscaping on the site. Therefore, it has been determined that only capture and reuse, biofiltration/retention, or a combination of the two are feasible for this site. Capture and reuse of stormwater is the City's preferred method. Because of the high water demand imposed by the carwash systems, capture and reuse of stormwater becomes feasible for this site. Note that toilets alone would not provide enough demand for capture and reuse to be feasible and irrigation may not be used to conform to LA Green Code voluntary measures.

As shown in Figure 8.1.1, stormwater will drain directly into underground storm drain pipe systems before draining to stormwater cisterns. Stormwater from building roofs will be directed to downspouts and roof leaders while site areas will drain into a series of catch basins and inlets. Storm drain pipes for the site will range in size from 12 inches to 48 inches in diameter and be a combination of high density polyethylene (HDPE) and reinforced concrete pipe. The total cistern volume will be approximately 500,000 cubic feet to capture a minimum of two 3/4-inch storms three days apart and provide an optimum amount of available water based on typical monthly precipitation depths. The Design Team is tentatively proposing a total of seven precast reinforced concrete underground cisterns located near the existing storm drain outlets.

On the south side, the cisterns will consist of:

- Five (5) at 40 feet wide by 160 feet long by 12 feet deep. Three of the cisterns will be located beneath the RAC garage and two will be beneath the Idle Storage garage.
- One (1) at 48 feet wide by 176 feet long by 12 feet deep. This cistern will be located south of the Idle Storage garage.

At the northeast corner, the cisterns will consist of:

- One (1) at 72 feet wide by 160 feet long by 12 feet deep. This cistern will be located near the Yard exit driveway.

The upper 1-foot of the cisterns will overflow to the downstream storm drain systems described above. The goal is to design the storm drain systems without the use of pump stations, which is feasible with the exception of the underpass, whose roadway elevation will be below the existing storm drain system invert elevations.

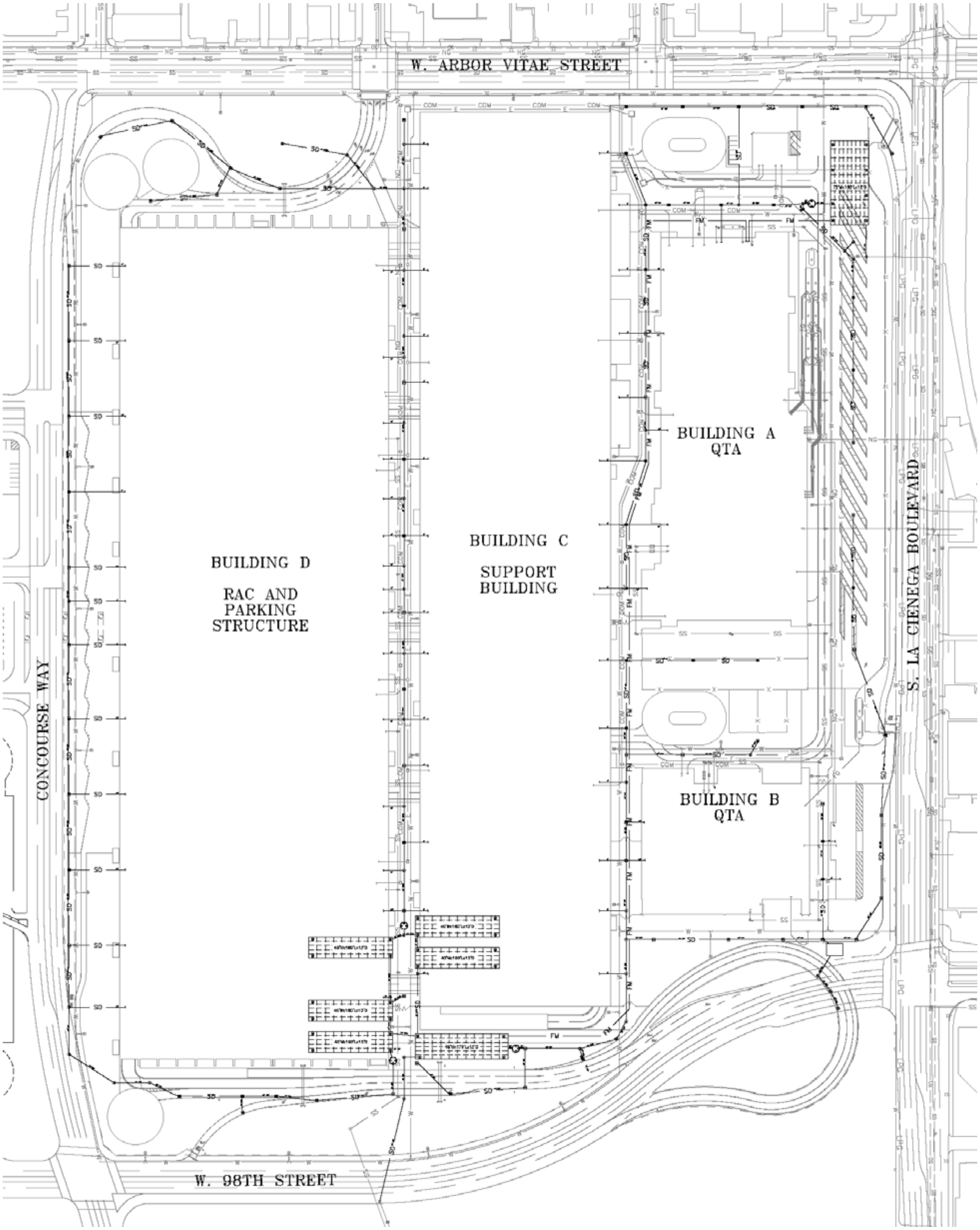


Figure 8.1.1 Proposed Stormwater Management
Source: TranSystems, June 2016
Prepared by: TranSystems, June 2016

The car wash rinse systems require very clean water to avoid water spots on the car's finish, so the stormwater must be filtered to appropriate standards. Stormwater entering the cistern will be preliminarily treated using hydrodynamic separator devices that will remove sediment, trash and debris, and hydrocarbons, etc. Stormwater stored in the cisterns will be pumped to filtration rooms beneath the QTA Buildings that will utilize reverse osmosis filtration systems.

Proposed utilities include the following:

- Sanitary Sewer Service – Sanitary sewer service will be provided to the QTA Buildings and the RAC Building as shown in Figure 8.1.2. The QTA Buildings will generate oily waste and regular sewage and therefore these systems must be separated so that the oily/fuel waste can be directed through appropriately sized sand-oil separators. The RAC Building will only generate regular sewage. Given the location and size of the existing sanitary sewer outlet pipes, it makes sense to drain the QTA Buildings to the La Cienega line and the Customer Service Lobby to the south outlet pipe. Sanitary sewer pipes will be 8-inch to 10-inch HDPE or polyvinyl chloride (PVC) pipes. Sanitary sewers will be designed to conform to City of Los Angeles Bureau of Sanitation standards.
- Domestic Water/Fire Service – The buildings on the site will be surrounded by a series of fire hydrants placed no more than 300 feet apart. Therefore, the site will be served by a new water distribution system looped around all of the site buildings as shown in Figure 8.1.3. Water service can be provided from any location along the looped system. We anticipate that the site water mains will be no more than 12 inches in diameter and be PVC. Based on the Los Angeles Fire Code 2014, the required fire flow for this facility will range from 6,000 gpm to 9,000 gpm at a minimum residual pressure of 20 psi. Based on the LAWDP computer model flow test dated March 23, 2016 performed near the intersection of La Cienega Boulevard and 97th Street, the available fire flow is approximately 4,200 gpm at 20 psi and is therefore insufficient to provide the required flows. The looped distribution system must be fed from water mains within Arbor Vitae Street and La Cienega Boulevard, however, due to insufficient capacity, the 6 inch and 8 inch water mains that exist in these streets will have to be upsized to provide required fire flows. A post indicator valve and freestanding FDC located a minimum of 40 feet from the building, will be provided on each of the two fire service laterals of the QTA Buildings A and B. Water distribution systems will be designed to conform to City of Los Angeles Department of Water and Power standards.
- Gas Service – Gas will be needed at the RAC Garage and the north QTA Building as shown in Figure 8.1.4. There are existing gas mains within Arbor Vitae Street and La Cienega Boulevard. Gas service for the RAC Garage can be from Arbor Vitae Street and gas service for the north QTA Building can be from La Cienega Boulevard. Gas service laterals will likely be polyethylene (PE) and be no greater than 6 inches in diameter. Gas service will be designed to Southern California Gas Company (SoCalGas) standards.

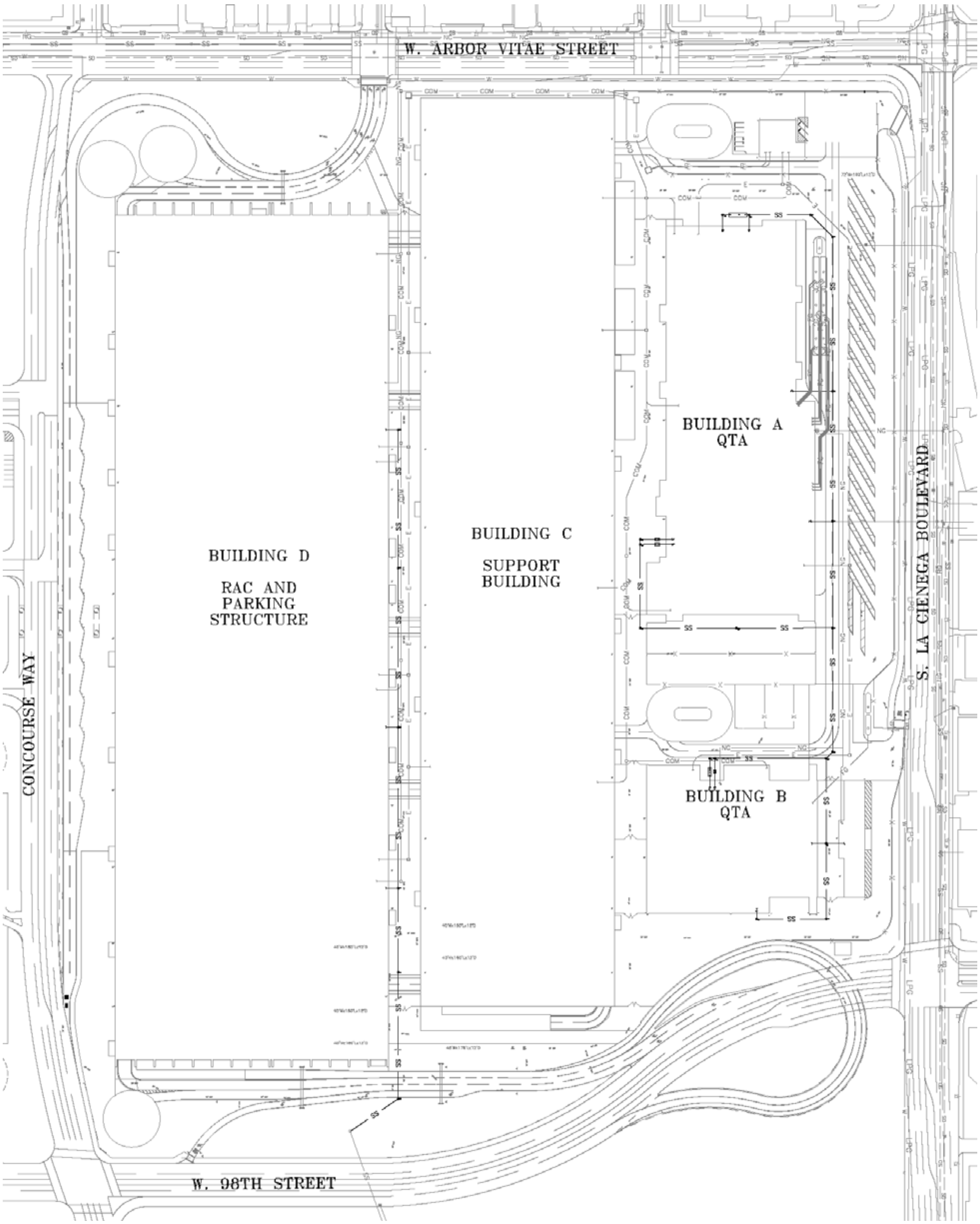


Figure 8.1.2 Proposed Sanitary Sewer
Source: TranSystems, June 2016
Prepared by: TranSystems, June 2016

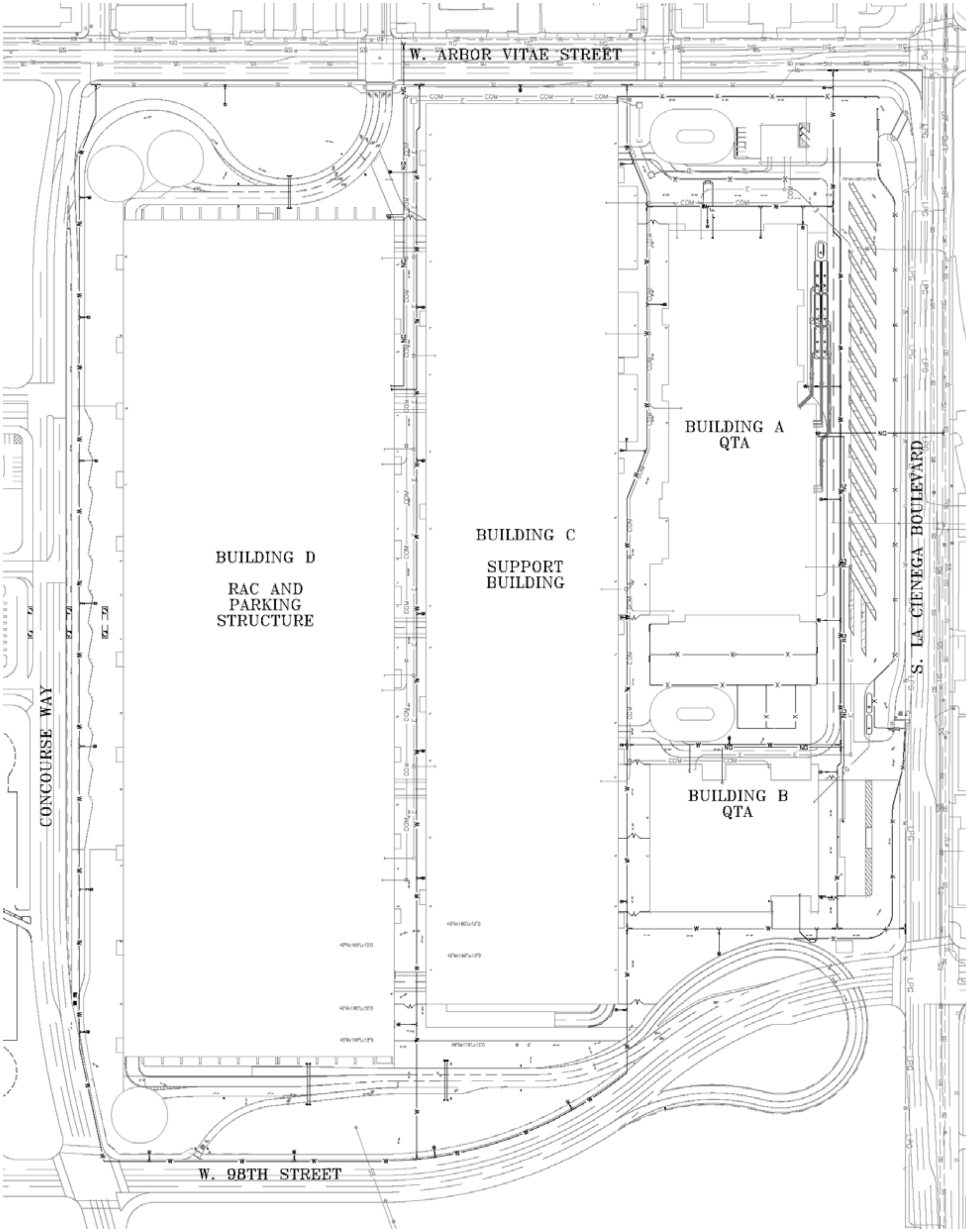


Figure 8.1.3 Proposed Water Distribution
Source: TranSystems, June 2016
Prepared by: TranSystems, June 2016

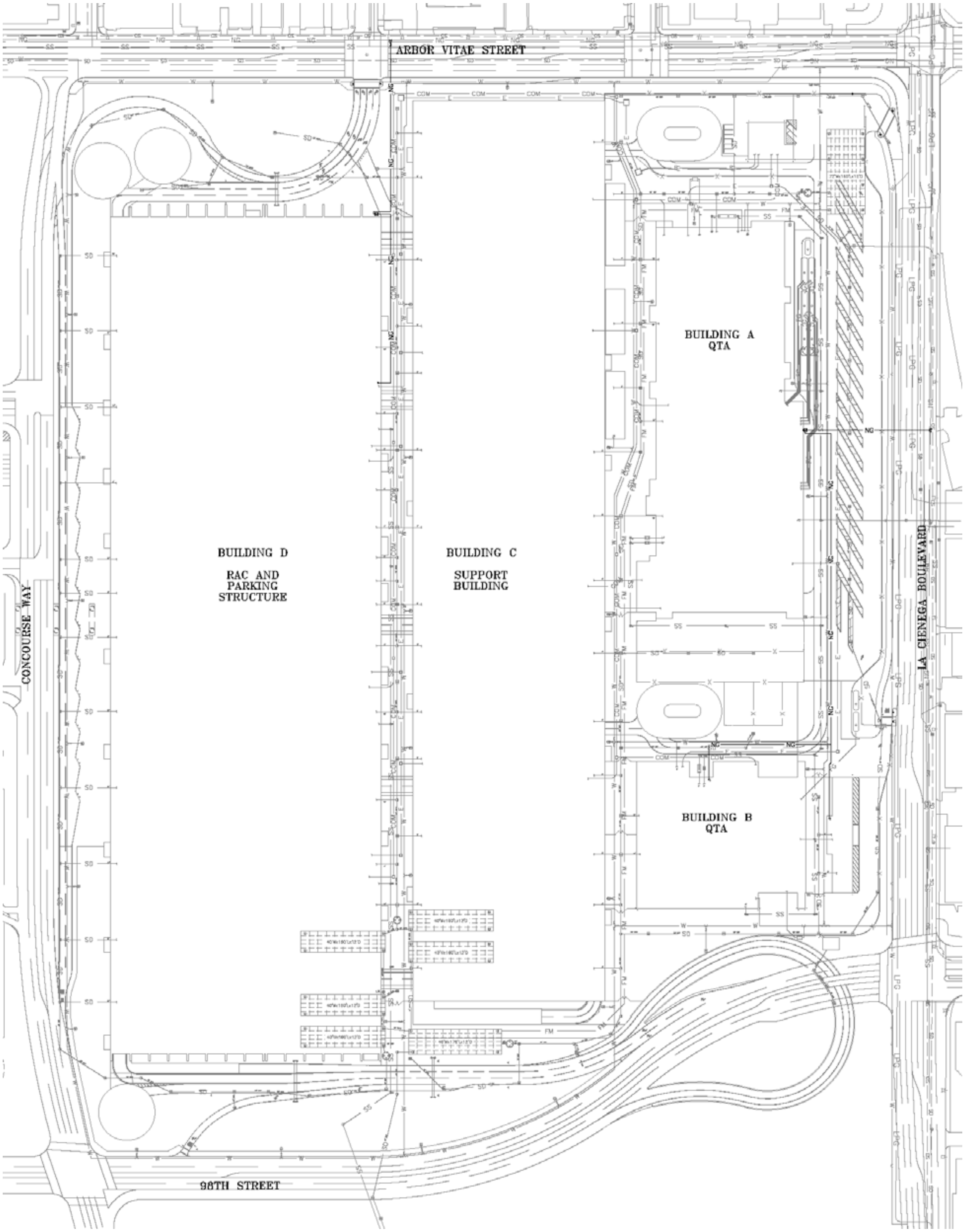


Figure 8.1.4 Proposed Gas Distribution
Source: TranSystems, June 2016
Prepared by: TranSystems, June 2016

Roadway Design

For descriptions in this section, please refer to **Figure 8.1.5** below. The proposed ConRAC facility will be linked to the surrounding roadway system, which is part of the Landside Access Modernization Program (LAMP), via the following proposed connections. Roadways/roadway improvements are being designed by others under separate contract.

- Bus Plaza connection to Concourse Way – The Bus Plaza will accommodate a total of 12 buses and is located on the west side of the RAC garage. The Bus Plaza will serve as the customer pick-up and drop-off for off-site RAC companies that are not operating at the ConRAC. Buses will be oriented northbound so that the bus doors will face the building. The plaza will run parallel to Concourse Way and buses must enter the plaza from the south near the intersection of Concourse Way with 98th Street. Buses will exit to the north via two routes: 1) buses heading eastbound will merge with Concourse Way and turn right at Arbor Vitae Street, and 2) buses heading westbound will loop around the garage exit helices to the signalized intersection with Arbor Vitae Street at Hindry Avenue (the same exit as the rental cars). The bus plaza has been designed to conform to Los Angeles County Metro standards. It is anticipated that during the first several years of ConRAC operation, before the APM is operational, the bus plaza will be used primarily to transport air passengers to and from the Central Terminal Area, and therefore all buses will turn west from the site at Hindry Avenue.
- ConRAC customer vehicle return from 98th Street – All ConRAC customers will return vehicles to the RAC garage at the south end of the site from an entrance off of 98th Street. Customers heading westbound from La Cienega Boulevard (e.g. just exited southbound I-405) will exit 98th Street via the right lane. Customers heading eastbound from Concourse Way will be directed to a looped one-lane underpass from the right lane which will make a 180 degree turn under 98th Street into the entrance. The eastbound and westbound exits from 98th Street will combine to make a three-lane entrance into the RAC garage structure. Customers returning cars to the rental car companies on the first level will be directed to the center lane which will be a level entrance roadway. Customers returning cars to the second level will be directed to the right hand lane which will ramp up to that level. Customers returning cars to the third level will be directed to the left lane taking vehicles into a helix that will ramp up to the third level. For drivers of private vehicles who accidentally navigated into the RAC entrance, an escape exit will be provided in an additional far left lane taking vehicles back to westbound 98th Street. Rental cars will exit at the north end of the garage to Arbor Vitae Street (see bullet below). The entrance roadway has been designed to conform to Caltrans and City of Los Angeles standards.
- Employee and visitor parking entrance from 98th Street – See bullet above regarding entrance configuration from 98th Street. Employees and visitors will be directed to the left entrance lane taking vehicles into a helix that will ramp up to the fourth level. Employees and visitor will exit at the north end of the garage to Arbor Vitae Street (see bullet below).
- ConRAC customer vehicle exit to Arbor Vitae Street – All ConRAC customers will exit the RAC garage at the north end of the site from a four-lane exit roadway to Arbor Vitae Street. Customers exiting the first level will take an exit roadway that will become the right lane which exits right onto Arbor Vitae Street. Customers exiting the second level will exit via a helix that will become the second lane from the left which exits left onto Arbor Vitae Street. Customers exiting the third level will exit via a helix that will become the second lane from the right which exits right onto Arbor Vitae Street. For those wishing to turn left instead of right or vice versa, there is more than sufficient length to change lanes. The far left lane is provided for buses looping around from the Bus Plaza that will turn left at Arbor Vitae Street. Buses will never need to change lanes since they would only navigate to this exit to turn left. The exit roadway has been designed to conform to Caltrans and City of Los Angeles standards.
- Employee and visitor parking exit to Arbor Vitae Street – All employees and visitors will exit the RAC garage at the north end of the site from a four-lane exit roadway to Arbor Vitae Street. Employees and

visitors will exit the fourth level via a helix that will become the second lane from the left which exits left onto Arbor Vitae Street. For those wishing to turn right, there is more than sufficient length to change lanes into one of the two right turn lanes.

- Emergency vehicle connection to Concourse Way – Emergency vehicles for the RAC garage will be expected to park within the Bus Plaza and must enter the plaza from the south near the intersection of Concourse Way with 98th Street.
- QTA service yard and access/connection to La Cienega Boulevard – The QTA service yard encompasses the full length of the east side of the site. The service yard will be used for 1) delivering new rental cars to the rental car companies and taking away old cars; 2) receiving deliveries of supplies necessary for site operations; 3) fuel truck access; 4) garbage truck access; 5) fire truck or other emergency vehicle access; 6) service vehicle access (e.g. waste oil truck, vacuum truck to clean out oil/water separators, etc.); and other uses. The yard will accommodate a maximum of 19 car carrier trucks for car deliveries. Rental car corrals are provided at the south end of the north QTA Building and will accommodate a total of approximately 350 cars. The delivery area will be at the north end of the south QTA Building. Fuel tanks are provided at two locations, adjacent to each QTA Building. There are several trash enclosures located throughout the service yard. The Fire Command and Electrical Distribution Building is located at the north end of the service yard. Access to the service yard will be via La Cienega Boulevard. The entrance will be near the south end of the site and vehicles will enter from a dedicated deceleration/right turn lane from southbound La Cienega Boulevard. The exit will be near the north end of the site and vehicles will exit to a dedicated acceleration lane to southbound La Cienega Boulevard. Access to the site has been designed with safety in mind by limiting conflict with other traffic.
- Emergency exit for ConRAC customers, employees and visitors to southbound of Concourse Way – Provisions have been made to the site for ConRAC customers, employees and visitors to exit the RAC garage via an emergency exit in case the regular Arbor Vitae Street exit is blocked for any reason. Two emergency lanes will diverge from the Arbor Vita Street intersection, loop to the west around the exit helices and direct the traffic into southbound Concourse Way. To minimize pavement/impervious surface, the emergency exit may be constructed of pervious pavers.

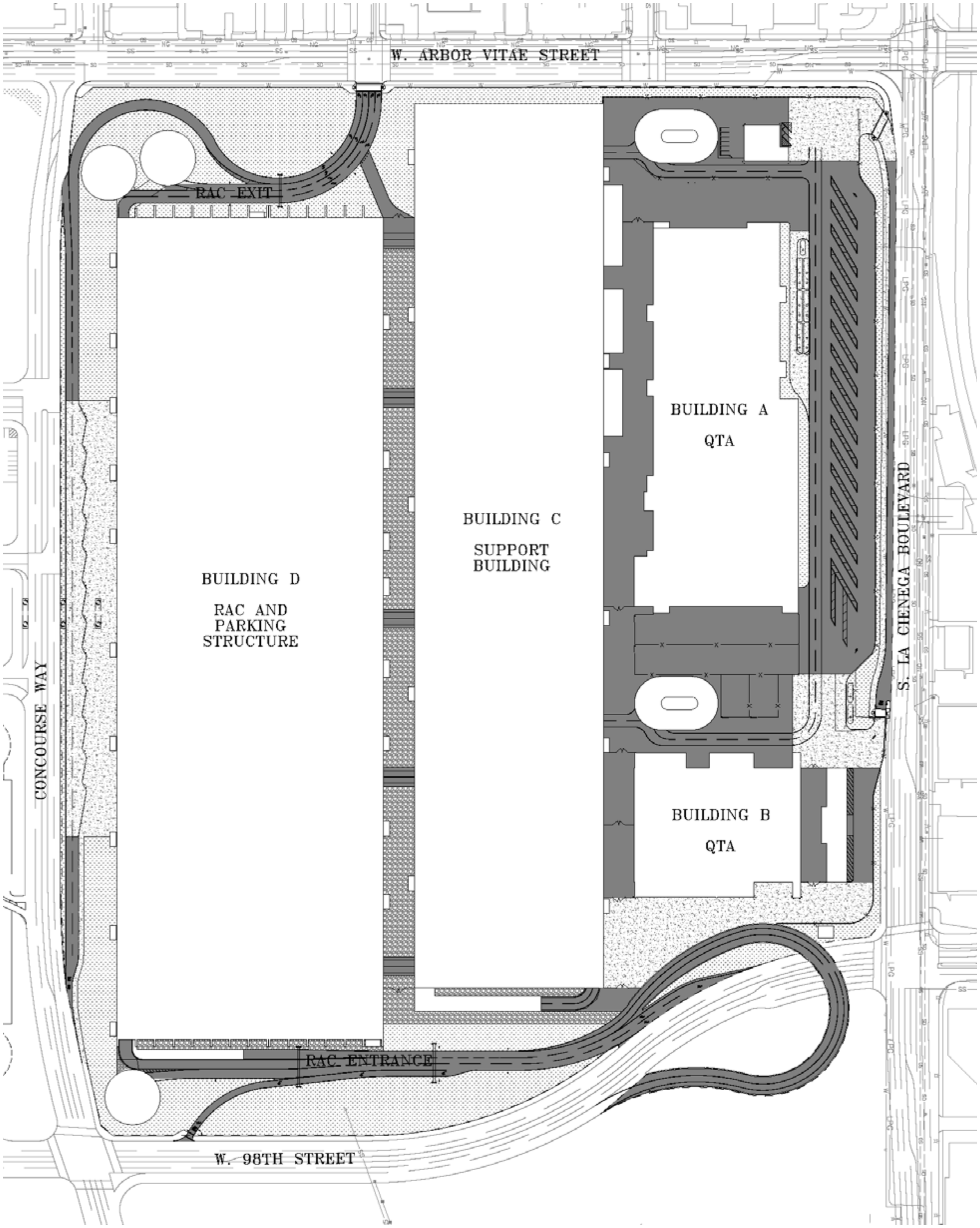


Figure 8.1.5 Proposed Site Layout
Source: TranSystems, June 2016
Prepared by: TranSystems, June 2016

Landscape Design

Opportunities to provide enhanced open space areas will be identified during detailed design. Because the large vehicle structures, QTAs, QTA service yard, internal roadways and other paved areas will consume approximately 90% of the site, landscaping will be limited. However, landscaping must be designed to comply with City of Los Angeles requirements. There are areas within the site that will be conducive for landscaping, such as:

- North and south of Bus Plaza along the west side of the RAC garage
- North of the RAC garage
- South of the RAC and Support Building garages
- Along S. La Cienega Boulevard, behind the sidewalk
- Adjacent to the entrance underpass

Sustainable landscaping using native, drought tolerant plants will be provided to minimize or eliminate the use of irrigation, fertilizers and pesticides and reduce maintenance costs over the life of the facility.

8.2 STRUCTURAL DESIGN

This section describes the foundation and structural design requirements for the two QTA Buildings (Building A and Building B), the Idle Storage Building (Building C), the RAC Building (Building D), and vehicular connection bridges, ramps and helices serving these buildings.

Structural system of all the buildings shall be designed for the following loadings. Design shall conform to the California Building Code CBC-2013, County of Los Angeles, 2014 Building Code, and ASCE7-10.

1. Live Loads: Columns, beams and slab shall be designed for strength for respective dead and live load and for serviceability criteria of L/360 for live load and L/240 for total load.
   (a) Floor/Roof (parking) 50 psf. (Un-reducible)
   (b) Floor (QTA) 50 psf. (Un-reducible)
   (c) Floor (office) 50 psf. (Reducible)
   (d) Corridors 100 psf (Un-reducible)
   (e) Stairs 100 psf (Un-reducible)
   (f) Helices 40 psf (un-reducible)
   (g) Office Partitions 20 psf (Reducible)
   (h) Roof 20 psf (Reducible)
   (i) Roof (w/garden) 100 psf (Un-reducible)
   (j) Roof (APM) 100 psf (Un-reducible)
   (k) Solar Panel Canopy 20.0 psf (Unreducible)

2. Wind Load: Wind loads are based on ASCE7-10 with the following factors
   Exposure category C
   Speed, V = 110 mph

3. Seismic Analysis: Equivalent lateral force procedure
   Site Class: D
   Risk Category: II
   Seismic Design Category: D

Seismic System: Special reinforced concrete shear walls and special concrete moment frames.

Materials

Concrete: Concrete shall have minimum compressive strength of 28 days as follows:
(a) Footing: 5000 psi
(b) Slab on grade: 4000 psi
(c) Columns, walls: 5000 psi
(d) Floors, beams: 5000 psi

Reinforcing Steel: All concrete and masonry shall be reinforced with deformed steel bars conforming to ASTM A615, Grade 60. All reinforcing steel to be welded shall conform to ASTM A706, Grade 60. Deformations shall be in accordance with ASTM A615.

Structural Steel:
(a) W and WT: ASTM A992
(b) Rectangular and square HSS: ASTM A500, Grade B
(c) Round HSS: ASTM A500, Grade B
(d) Pipes: ASTM A53, Grade B
(e) Plates and Bars: ASTM A36

Structural Steel Welding: All welding shall be in accordance with the AWS D1.1 and AWS D1.8 and shall be performed by AWS certified welders using E-70XX low moisture resisting electrodes.

Masonry: Masonry (assembly of masonry units, mortar, and grout) shall have a minimum compressive strength of 1,500 psi and shall be stacked bond construction with special inspection. All cells shall be solid grouted. Masonry units shall be medium weight units conforming to ASTM C90 and shall have a minimum compressive strength of 1,900 psi. Mortar shall be Type S of cement-lime mortar with a minimum compressive strength of 1,800 psi and comply with ASTM C270. Grout shall have a minimum compressive strength of 2,000 psi and comply with ASTM C476.

QTA Buildings

The two QTA Buildings are 4 levels and are 54 feet high to the roof level. The height of floor between Level 1 and Level 2, and between Level 2 and Level 3 is 17 feet, whereas height between Level 3 and the roof is 20 feet. The structural framing system will be provided to resist gravity, wind and seismic loads based on CBC 2013 Building Code, and County of Los Angeles, 2014 Building Code. Structural framing system will be cast-in-place concrete columns, beams and mild steel slabs to support gravity load system and concrete shear walls, diaphragms, drag members, chord members to resist wind and seismic load system. The structure will be supported by a deep foundation system to minimize differential settlements.

The deep foundation will consists of driven precast concrete piles in groups and encased in a reinforced concrete pile cap to allow the piles to work together. Number, size, shape, and pattern of square piles shown on plans represent estimated figures only, and has not been designed as geotechnical report is not available yet. This may change according to geotechnical report recommendations once it is available. The ground floor slab will be 6 to 8 inches thick, depending upon the utility of slab on grade. Slab on grade underlayment will be per geotechnical recommendations. Additional layer of concrete topping, 3-inch thick maximum, will be provided for the drainage purpose.

The second floor, third floor, and roof framing system will consists of cast-in-place concrete beams and mild steel slabs and will be designed for strength and serviceability criteria. The total depth of concrete beams from top of structural slab to the bottom of beam should be 48 inches maximum. Thickness of mild steel slab should be minimum 8 inches. Concrete topping for drainage purpose should not be more than 3 inches thick. Superimposed dead load due to slab topping, curb, islands is included in the analysis.

The lateral resisting system for wind and seismic loading will be provided through concrete shear walls, located at the exteriors. These walls will be reinforced with minimum one layer of reinforcement at each face of wall, with boundary element cage at the ends of wall. Additional dowel will be provided to transfer diaphragm shear to the shear wall. Concrete beam at the ends of shear wall will be designed as drag and gravity member.

Maintenance bay building is one story masonry building, 14 ft. high, with additional 4.0 ft high parapet wall. The roof framing system should consists of 10 inch thick hollow-core pre-cast concrete. The lateral resisting system will be provided by 12" thick masonry wall, and 4 inch thick cast-in-place roof topping slab for diaphragm. Diaphragm force will be transferred to the CMU wall through dowel between concrete topping slab and the CMU wall.

Idle Storage Building

Idle Storage Building is 4 levels, 54 feet high to the roof/fourth level. The height of floor between Level 1 and Level 2, and between Level 2 and Level 3 is 17 feet, whereas height between Level 3 and the roof is 20 feet. The structural framing system will be provided to resist gravity, wind and seismic loads based on CBC 2013 Building Code, and County of Los Angeles, 2014 Building Code. Structural framing system will be cast-in-place girders, columns, and pre-cast double-T to support gravity load system; and concrete shear walls, minimum 6 inch thick cast-in-place structural concrete topping diaphragms, drag members, chord members to resist wind and seismic load system. The structure will be supported by a deep foundation system to minimize differential settlements.

The deep foundation will consists of driven precast concrete piles in groups and encased in a reinforced concrete pile cap to allow the piles to work together. Number, size, shape, and pattern of square piles shown on plans represent estimated figures only, and has not been designed as geotechnical report is not available yet. This will change according to geotechnical report recommendations once it is available. The ground floor slab will be 6 to 8 inches thick, depending upon the utility of slab on grade. Slab on grade underlayment will be per geotechnical recommendations. Additional layer of concrete topping, 3-inch thick maximum, will be provided for the drainage purpose.

The second floor, third floor, and roof framing system will consist of cast-in-place girders and double-T with 6-inch thick minimum concrete diaphragm and will be designed for strength and serviceability criteria. The total depth of pre-cast concrete beams from top of structural slab to the bottom of beam should be 48 inches maximum and concrete diaphragm should be 6 inches think, minimum. Concrete topping at the roof level for drainage purpose should not be more than 3 inches thick. Parking spaces at the roof will be covered with future solar panel steel framing. The solar panel support framing will be steel structures with steel columns supported at pedestal. These pedestals will be minimum 3.0 ft tall, located at the building grid intersections. A 10.0 psf dead load for the PV panels and framing and 20.0 psf live load, unreducible, has been included in the analysis.

The lateral resisting system for wind and seismic loading will be provided through concrete shear walls, located at the perimeter. These walls will be reinforced with minimum one layer of reinforcement each way at each face of wall, with boundary element cage at the ends of wall. Additional dowel will be provided to transfer diaphragm shear to the shear wall. Concrete beam at the ends of shear wall will be designed as drag and gravity member. Each storage building will be provided with seismic separation/expansion joint at each floor and roof level, 5 inches at Level 2, 8 inches at Level 3, and 12 inches at the Roof/Level 4.

RAC and CSB Building

RAC and CSB Building has 4 levels, and is 54 feet high to the roof level. The floor-to-floor height between Level 1 and Level 2 and between Level 2 and Level 3 is 17 feet, whereas height between Level 3 and Roof/Level 4 is 20 feet. APM structure will be integrated with the RAC building. CSB structure will be at the roof level, close to the APM station. The structural framing system will be provided to resist gravity, wind and seismic loads based on CBC 2013 Building Code, and County of Los Angeles, 2014 Building Code. Structural framing system will be cast-in-place columns, cast-in-place girders and pre-cast double-T to support gravity load system; and concrete shear walls, minimum 6-inch thick cast-in-place concrete topping as diaphragms, drag members, chord members to resist wind and seismic load system. The structure will be supported by a deep foundation system to minimize differential settlements.

The deep foundation will consists of driven precast concrete piles in groups and encased in a reinforced concrete pile cap to allow the piles to work together. Number, size, shape, and pattern of square piles shown on plans represent estimated figures only, and has not been designed as geotechnical report is not available yet. This will be changed according to geotechnical report recommendations once it is available. The ground floor slab will be 6 to 8 inches thick, depending upon the utility of slab on grade. Slab on grade underlayment will be per geotechnical recommendations. Additional layer of concrete topping, 3-inch thick maximum, will be provided for the drainage purpose where required.

The second floor, third floor, and roof framing system will consist of cast-in-place girders and pre-cast double-T with 6-inch thick minimum concrete diaphragm and will be designed for strength and serviceability criteria. The total depth of pre-cast concrete beams from top of structural slab to the bottom of beam should be 48" minimum and concrete diaphragm should be 6-inch thick, minimum. Concrete topping at for drainage purpose should not be more than 3 inches thick.

The lateral resisting system for wind and seismic loading will be provided through concrete shear walls, located at the perimeter. These walls will be reinforced with minimum one layer of reinforcement each way, at each face of wall, with boundary element cage at the ends of wall. Additional dowel will be provided to transfer diaphragm shear to the shear wall. Concrete beam at the ends of shear wall will be designed as drag and gravity member. Each RAC building will be provided with seismic separation/expansion joint at each floor and roof level, 4 inches at Level 2, 8 inches at Level 3, and 12 inches at Roof Level/Level 4.

APM structure will be integrated with the RAC building, and will be designed for additional gravity and lateral load. Lateral system of RAC/APM building will be designed conforming to APM standards, including 0.2% deflection criteria. Lateral force resisting system for RAC/APM building will be provided by concrete shear walls on four sides. The lateral system for North and South zones (building-1 and5) is provided by shear walls in East-West directions, and 25-foot and 15-foot long buttress at each column line North-South direction. These buttresses should not interfere with approaching roads to helix.

CSB structure primarily will be steel beams and columns with metal deck. Exterior and interior partition walls will consist of metal stud with gypsum board. Special moment frames will be provided for lateral force resisting system.

Parking spaces at the roof will be covered with future solar panel steel frame structure. The solar panel support framing will be steel structures with steel columns supported at pedestal. These pedestals will be minimum 3 feet tall, located at building grid intersections. A 10.0 psf dead load for the PV panels and framing and 20.0 psf live load, unreducible, has been included in the analysis.

Bridges and Helices

RAC, Storage and QTA Buildings will be interconnected to each other at each level through a series of concrete bridges. Bridge at the roof will be covered by steel frame canopy. Bridges between RAC and Idle Storage Buildings will be rigidly connected to the Idle Storage Building on one side and special concrete moment frame on the other side with a seismic gap/expansion joint between bridge deck and RAC building at each level, as follows: 5 inches at Level 2, 8 inches at Level 3, and 12 inches at Roof Level/Level 4. Bridges between QTA and Idle Storage Buildings will be rigidly connected to the QTA Building on one side and special concrete moment frame on the other side with a seismic gap/expansion joint between bridge deck and Idle Storage Building at each level, 5 inches at Level 2, 8 inches at Level 3, and 12 inches at Roof Level/Level 4. The bottom elevation of concrete beam shall not be less than 14 feet above the pavement, conforming to the Fire Code. The bridge deck will be 8-inch thick concrete supported by 36-inch deep concrete beams.

There will be a total of five helices (three circular and two oval-shaped). The ramp will be supported by core concrete walls and beams and columns at outside perimeter. The lateral system for circular helices will be provided by core shear wall, whereas for oval shape the lateral system will be provided by shear walls at the core and perimeter. The ramp will be separated from building at each level by providing seismic gap/expansion joint. The helix structure will be supported by a deep foundation system consisting of driven precast concrete piles in groups and encased in a reinforced concrete pile cap to allow the piles to work together. The concrete ramp slab will be 12 inches thick.

8.3 ARCHITECTURAL DESIGN

This section describes the architectural design requirements for the two QTA Buildings, the Idle Storage Building and the Ready/Return and CSB Building.

Given the massive scale of this facility, its design will have tremendous visual impacts to the surrounding area. A number of factors will need to be considered during design development to ensure successful integration with the area and compatibility with other LAMP elements currently under design:

- Provide a positive arrival experience to enhance one's experience at LAX. Develop inspired design elements that provide orientation and facilitate wayfinding.
- Select materials and colors that are representative of the character in the region.
- Create a perceptible "sense" of safety for visitors, customers and employees of the facility.
- Provide a positive and synergistic relationship with the greater environment.

CSB Courtyard

Given the moderate climate conditions present at the site (see Section 2.7), a design which incorporates outdoor customer circulation is deemed appropriate. This is in contrast to ConRACs located in harsher climates (cold or hot), where user comfort dictates including as much of the customer circulation paths as is possible within conditioned spaces. At the LAX site, customers will still typically be comfortable if much of their circulation route on-site is outdoors, such as at the at-grade bus plaza area or the courtyard area between the APM Station and the CSB lobbies.

The courtyard on the CSB Level will be designed to be welcoming to leisure travelers with family while functional for the business traveler. The following architectural elements are proposed to enhance customer experience:

- Screen walls separating the roof level parking from the courtyard to provide visual and noise screening from the parking areas. Examples include decorative metal screen fencing, vertical landscape screen with drought tolerant planting and acoustic barrier louvered screen wall.
- Canopies that would provide a continuous sheltered pathway from the APM to the CSB lobbies to the vertical circulation cores, for customers and weather protection to escalators and elevators. Materials that are translucent, such as ethylene tetrafluoroethylene (ETFE), will be considered, in order to permit light transmittance from roof level to RAC levels below.
- The CSB courtyard canopy structures will be integrated with the development of the APM platform design to ensure compatibility with architecture to be proposed for the APM linkage between the ConRAC and the Central Terminal Area.

CSB Lobbies

Two distinct CSB Lobby structures will be provided to accommodate customer service lobbies, restrooms, rental car agency transaction counters, administrative offices and building support rooms. The CSB lobbies will be built out using a “mini-mall” concept, where each RAC company or brand family will be allocated with a portion of the CSB based on market share, where interior tenant improvements will be made according to their own specifications, within established tenant design guidelines.

The location, shape and size of the two CSB Lobby structures were determined based on careful review of the following factors:

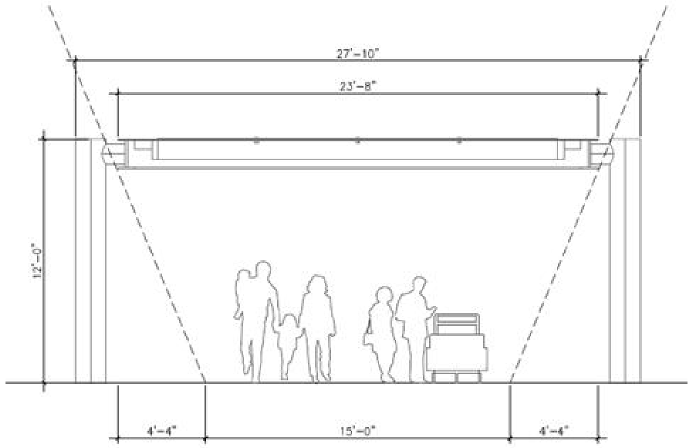
- Location: designed to maximize efficiency of customer’s movement, through the typical sequence of the car rental process without backtracking
- Walking distance: proximity of front doors of the CSB Lobbies to the APM Station platform and the vertical circulation cores
- Visibility: ability to view CSB Lobby storefronts and signage from the APM Station platform, without any large obstructions.
- Future Growth: ability to expand CSB Lobbies to accommodate future market share adjustments without impacting adjacent RAC companies.

CSB Outdoor Customer Circulation Canopies

Given the moderate climate conditions and limited amount of precipitation at the site, the outdoor customer circulation will be covered by an overhead canopy to primarily provide sun shelter and rain that is not wind-driven.

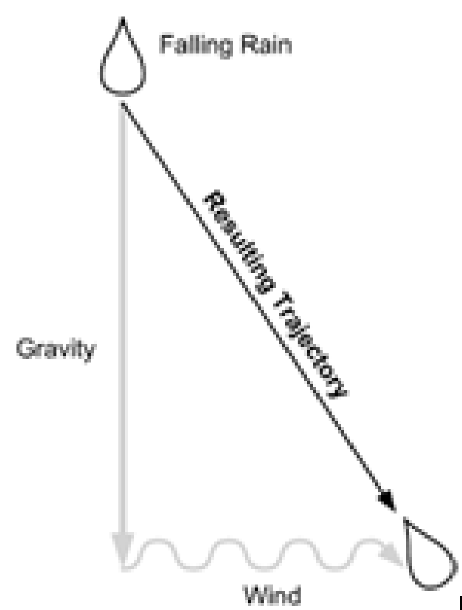
The Design Team considered the following factors in design of the circulation canopies:

- Design: The design of the canopies as proposed is 23’-8” in width and 12’ high. It comfortably accommodates two-way customer traffic by a width of 15’. (This is based on a comprehensive study entitled “SF Better Streets” of commercial walkway widths to accommodate multiple direction pedestrian traffic.) This proposed design yields an additional 4’-4” on each side of the two-way traffic for rainfall that is not perpendicular to the deck.



- Structure: The structure of the canopies should be minimal to maximize the customer's visibility of the CSB lobbies, vendor signage and wayfinding. The material for the roof should be translucent to provide sun protection. It should also be constructed with a light weight material that is supported by a simple frame.
- Precedence on width of canopies: Local mass transit rail stations in Southern California are designed with canopies to provide sun and limited rain protection. As an example, at both Exposition LRT I and Expo LRT II, per Metro guidelines the rain canopies are 13'-0" wide on a center platform that serves tracks on both sides and four lanes of pedestrian circulation. At the Crenshaw LRT, the canopies on the center platform are 23'-0" wide also on a center platform that serves two tracks on both sides and four lanes of pedestrian circulation. At the Mid-Coast Corridor Trolley project in San Diego, per SANDAG (San Diego's equivalent of Metro Authority) rain canopies 11'-3" wide serving just one side of track. No further consideration is provided to accommodate wind-driven rain.

Wind-driven rain occurs when raindrops falling to the ground at their terminal velocity are blown sideways at the speed of wind at any given height above grade. This diagram illustrates that concept:



In order to design the size of the circulation canopies to more precisely accommodate wind-driven rain, a building science engineer would need to calculate rain trajectory for a design-day. Meteorology data such as wind speed, velocity of rain as a result of wind resistance, size of rain drops, intensity of the storm and height of intersecting plan of the rain would be required and studied.

See Appendix 8.4 for record of the CSB design development.

Vertical Circulation Cores

During the conceptual design stage, the Design Team has developed a number of vertical circulation core configurations for review with LAWA and the rental car industry representatives, ranging from between three to five cores consisting of elevators and direct up and down escalators located in various locations along middle sections of the RAC/CSB Building and an additional core located along the west side of the building, consisting of elevators and escalators or elevators only, to provide access between the at-grade shuttle bus bays, mezzanine access to the ITF East and the CSB.

The selected vertical circulation core concept is expected to provide the following features/benefits:

- Three “full” north-south circulation cores with both elevators and up/down direct escalators will provide convenient access for both rental and return customers where they would be strategically placed to be close to potential customer service booths and vehicle return areas.
- One “express” east-west circulation core with elevators and down-only direct escalators located between the north CSB lobby areas and the APM platform to accommodate premium customers who will bypass counters and go directly to the ready/return floor.
- The west circulation core with two groups of three elevators facing each other within a common elevator lobby will serve the anticipated peak customer traffic load for the interim service period for use of shuttle buses to transport customers to and from the Central Terminal Area.
- Interior stairs at two of the circulation cores closest to the CSB Lobbies will provide a secondary means of access between floors for both rental car employees and customers.

In addition to the vertical circulation cores, egress stairs along the exterior of the Ready/Return Building will be located to limit exit access travel distances to not more than maximum allowed by building code. To preserve minimum separation distances between the Ready/Return Building and the Idle Storage Building, the exterior egress stairs will be staggered from those of an adjacent building.

8.4 VERTICAL CIRCULATION DESIGN

An evaluation of the vertical transportation equipment requirements, including both elevators and escalators, was conducted for this project. Vertical transportation systems are anticipated to be required at the following transitions:

- Between the at-grade Bus Plaza and Level 4 CSB at the RAC and CSB Building, with access to the mezzanine level serving the Intermodal Transportation Facility (ITF) located west of the ConRAC.
- Between Level 4 CSB and each RAC Garage floor (Levels 1, 2 and 3) at the RAC and CSB Building.
- Between Level 1 QTA Support Areas and the upper QTA fuel and wash or maintenance levels at both QTA Buildings.

The design of the vertical transportation equipment within the ConRAC will focus on enhancing the passenger experience while providing energy efficiency and maximizing long term equipment reliability.

As a part of the conceptual design effort, an analysis for vertical transportation requirements for the transitions between the RAC Levels 1 through 3 and CSB Level 4 and between the at-grade Shuttle Bus Bays and CSB Level 4 was performed. Focus of this analysis was to confirm capacity to handle expected volume of people at the four vertical transportation cores that connect each RAC level to the CSB level and the vertical transportation core that connects the at-grade Shuttle Bus Bays and the CSB level.

The following elevator configurations and groups are recommended at each of the following vertical circulation core locations:

1. Core 1

   a. One group of two (2) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54' rise. Elevators will have front opening only at all landings.
   b. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54' rise, one up and one down.
   c. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20' rise, one up and one down.
   d. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37' rise, one up and one down.
   e. Each of the levels served by the escalators will have one "Up" unit and one "Down unit". Each escalator is based on a 40" wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a "low deck" design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

2. Core 2

   a. One group of two (2) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54' rise. Elevator will have front opening only at all landings.
   b. One (1) escalator, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade, 4-flat steps. Serving levels Grade to 4, 54' rise. This unit will run in the down direction.
   c. One (1) escalator, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade, 4-flat steps. Serving levels 3 to 4, 20' rise. This unit will run in the down direction.
   d. One (1) escalator, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37' rise. This unit will run in the down direction.
   e. Each escalator is based on a 40" wide step for maximum movement of passengers.

   The proposed escalators would have glass balustrades to achieve a "low deck" design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

3. Core 3

   a. One group of three (3) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54' rise. Elevator will have front opening only all landings.
   b. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54' rise, one up and one down.
   c. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20' rise, one up and one down.
   d. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37' rise, one up and one down.
   e. Each of the levels served by the escalators will have one "Up" unit and one "Down unit". Each escalator is based on a 40" wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a "low deck" design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

4. Core 4

   a. One group of three (3) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54' rise. Elevator will have front opening only.
   b. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54' rise, one up and one down.
   c. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20' rise, one up and one down.
   d. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37' rise, one up and one down.
   e. Each of the levels served by the escalators will have one "Up" unit and one "Down unit". Each escalator is based on a 40" wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a "low deck" design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

5. Core West

   a. Two groups of three (3) cars in each group, overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. The North Core serving levels Grade & 4. The Grade will have a front opening and the 4th level will have a rear opening. The South Core serving levels at Grade, 3 & 4, with a front opening on Grade and rear opening on levels 3 and 4. All have 54' rise.

These systems in the configuration detailed will provide "Good" to "Excellent" service for the public, staff, and visitors to this building. Service will be balanced between groups with projected average intervals of 40 seconds for all Cores excluding Core West, which will have a 30 second average interval. Available handling capacity will support the estimated transitional occupancy, luggage, strollers, along with staff, no luggage carts where included in the analysis. Elevator speeds required are common to the industry utilizing well- proven designs and technology.

See Appendix 8.3 for copy of vertical transportation schematic design report, with planning criteria, detailed elevator traffic analysis and recommendations.

8.5 MECHANICAL DESIGN

This section describes the mechanical system design requirements for the ConRAC facility.

Codes and Standards

Mechanical Heating, Ventilation and Air Conditioning (HVAC) systems will comply with the following codes, standards and guidelines:

- 2013 California Energy Code, California Code of Regulations (CCR) Title-24 Part 6
- 2013 California Mechanical Code, California Code Regulations (CCR) Title-24, Part 4
- 2014 City of Los Angeles Mechanical Code
- 2013 California Green Building Standards Code (Cal Green), California Code of Regulations (CCR) Title-24, Part 11
- 2014 City of Los Angeles Green Building Standards Code
- National Fire Protection Association Codes
- All local public agencies having jurisdiction
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Design Guides
- ASHRAE Standard 62.1-2010 (Ventilation for Acceptable Indoor Air Quality)
- ASHRAE - Climatic Data for Region X
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Design Guides
- Infrastructure Standards of Practice (September 2012), published by Los Angeles World Airports (LAWA) Information Technology Group
- Design and Construction Handbook (April 2015), published by Los Angeles World Airports (LAWA)

- Airport Mechanical Design Standards (Rev. 9, November 2012), published by Los Angeles World Airports (LAWA)
- Airport Mechanical Equipment Standards (Rev. 3, September 2011), published by Los Angeles World Airports (LAWA)

HVAC System Description

Mechanical heating, ventilation and air conditioning systems will be provided for the following areas within the ConRAC facility:

- Complete HVAC system for the CSB customer service lobbies and RAC administration areas on the CSB and RAC garage levels
- Complete HVAC system for the QTA administration areas
- Complete HVAC system for the restrooms and some QTA storage rooms
- Cooling-only system for elevator machine rooms, elevator control rooms, escalator control rooms, electrical rooms and IT rooms
- Ventilation system (if required by manufacturer) for escalator motor pits and/or moving walkway motor pits
- Ventilation system for the various QTA mechanical equipment rooms
- Ventilation system for the QTA equipment rooms (pump and compressor rooms)
- Ventilation system for the QTA oil storage rooms and fuel riser rooms
- Ventilation system for general storage rooms
- Exhaust ventilation system for fuel dispensing areas within the QTA
- Ventilation system for the Automotive Maintenance Bays
- Dryer venting for dryers

Complete HVAC systems shall be provided at and comprised of:

1. QTA Administration Areas and Restrooms (Buildings A and B):
   a. Packaged large Rooftop DX VAV Air Handling Unit with variable air volume (VAV) zone dampers and heating hot water reheat coils (along with boiler), at the Administration Building.
   b. Split DX Heat Pumps with Variable Refrigerant Flow (VRF) technology, pairing modular outdoor condensing units with multiple indoor fan coil units, at the QTA Support Office Area in Building A.
2. RAC and CSB (Buildings D and E):
   a. CSB: Packaged large Rooftop DX VAV Air Handling Unit with variable air volume (VAV) zone dampers and heating hot water reheat coils (along with boiler).
   b. RAC offices: Split DX heat pumps, consisting of outdoor condensing units and indoor fan coil units.

Cooling only systems shall be provided at and comprised of:

1. Elevator Machine Rooms, Elevator Control Rooms, Escalator Control Rooms, Electrical and IT Rooms:
    a. Split System DX indoor fan coil unit with outdoor condensing unit

Ventilation systems shall be provided at and comprised of:

1. Escalator motor pits and moving walkway pits (if required by manufacturer):
    a. Exhaust ventilation fan
2. Mechanical and Equipment Room:
    a. Exhaust ventilation fan and/or supply ventilation fan
3. Fuel dispensing areas within the QTA:
    a. Exhaust ventilation fan ducted to exterior; fans shall have appropriate UL listing
4. Automotive Maintenance Bays
    a. Exhaust ventilation fan
5. General Storage Rooms
    a. Exhaust ventilation fan
6. Ventilation system for the QTA oil storage rooms and fuel riser rooms
    a. Exhaust ventilation fan and/or supply ventilation fan; fans shall have appropriate UL listing

Rooftop packaged DX cooling-only air handling units shall be furnished with variable frequency drives at the supply and return fans. Rooftop units shall be located in roof areas specifically designated for mechanical equipment. The supply airflow produced by the air handling units shall vary based on demand in the conditioned space. Variable air volume (VAV) zone damper boxes shall be provided at the zone level, to provide zone comfort control (VAV boxes shall be provided in the Tenant Improvement phase). All VAV boxes shall be provided with reheat coils, which will be fed from a central boiler system located at the rooftop in a mechanical equipment enclosure.

Heating hot water shall be produced by multiple stand-alone boiler plants, located in penthouse mechanical spaces in the QTA administration building and in the CSB Buildings. RAC offices, located at Levels 1, 2 and 3 in the RAC building, shall be provided with split DX heat pumps.

Ductwork and air distribution devices shall be provided for all systems, including full-HVAC, cooling-only and ventilation systems. Ductwork for full-HVAC and cooling-only systems shall be insulated; ventilation ductwork shall be non-insulated.

High-efficiency HVAC systems shall be provided to meet or exceed the minimum efficiency requirements in the current 2014 Title-24 Energy Standards.

Outside air shall be provided to full-HVAC systems that serve occupied areas, such as the CSB and QTA administration areas. Energy efficient economizers shall be provided for rooftop AC units at the CSB customer service building.

Restrooms shall be exhausted at a rate equivalent to 15 air changes per hour (AC/Hr), and shall be kept at slightly negative pressure, with makeup air being provided from the exterior. No air shall be returned to the HVAC systems from restrooms; all air shall be exhausted.

Fueling areas within the QTA shall be provided with exhaust ventilation fans, with ductwork extending down low as required by NFPA standards. Fans may need to be of spark-resistant and explosion proof motor construction.

Escalator and moving walkway motor pits shall be provided with ventilation fans and louvers.

A Building Management System (BMS) shall be provided to integrate the controls of all the HVAC equipment located within the ConRAC facility. Direct Digital Controls (DDC) shall be provided for all HVAC equipment. All control components including damper actuators will be electronic type. The control system shall be fully BACnet compliant, and shall have the capability to communicate remotely with LAWA's Central Utility Plant (CUP), using owner-provided IT gateways to communicate over the internet.

Energy Efficiency Measures

1. The HVAC systems will incorporate the following energy efficient measures:
    a. High-efficiency motors
    b. Variable Frequency Drives (VFD's) on supply and return fans at all large Packaged AC Units or Air Handling Units
    c. Variable Refrigerant Flow (VRF) technology for certain Split-DX Heat Pumps
    d. Direct Digital Control (DDC) for all HVAC systems, with efficiency optimization software
    e. Compliance with California Green Building Code (CalGREEN) Mandatory and Tier 1 Measures

Outside Design Conditions

	Summer	Winter
Design Temperature:	91°FDB/67°FWB (@0.1%)	40°F (@0.2%)
Outdoor Daily Range:	14°F	

Interior Design Conditions

Design Temperature:	Summer	Winter	Humidity
Air Conditioned Buildings	74°+2F max	74°F+2°F	No Control
Electrical Room	72°F max	64°F+5°F	No Control
IT Room	72°F + 2°F	64°F +2°F	No Control

Filtration

1. All HVAC units serving non-occupied spaces will have 30% efficient filters, based on ASHRAE Test Standard 52-76.
2. All HVAC equipment serving occupied spaces units will have 65% efficient filters.

8.6 PLUMBING DESIGN

This section describes the plumbing design requirements for the ConRAC facility.

Codes and Standards

Plumbing systems will comply with the following codes, standards and guidelines:

- 2013 California Plumbing Code, California Code Regulations (CCR) Title-24, Part 5 with Los Angeles 2014 Amendments, Based on 2012 UPC)
- 2014 City of Los Angeles Plumbing Code
- 2013 California Energy Code, California Code of Regulations (CCR) Title-24 Part 6
- 2013 California Mechanical Code, California Code Regulations (CCR) Title-24, Part 4
- 2014 City of Los Angeles Mechanical Code
- 2013 California Fire Code (CFC), based on 2012 International Fire Code (IFC)
- 2013 California Green Building Standards Code (Cal Green), California Code of Regulations (CCR) Title-24, Part 11
- 2014 City of Los Angeles Green Building Standards Code
- National Fire Protection Association (NFPA) Codes
- ASTM International - American Society of Testing and Materials (ASTM)
- Plumbing and Drainage Institute (PDI)
- Underwriters Laboratories, Inc. (UL)
- American Society of Mechanical Engineers (ASME)
- California State Fire Marshal Regulations (CSFM)
- National Sanitation Foundation (NSF)
- International Association of Plumbing and Mechanical Officials (IAPMO)
- Cast Iron Soil Pipe Institute (CISPI)
- All local public agencies having jurisdiction
- Infrastructure Standards of Practice (September 2012), published by Los Angeles World Airports (LAWA) Information Technology Group
- Design and Construction Handbook (April 2015), published by Los Angeles World Airports (LAWA)

Plumbing System Description

1. Site Utilities
    a. All new domestic water systems shall extend to a point-of-connection 5'-0" outside of the buildings, where civil design will pick up for continuation on site.
    b. All new sanitary sewer systems shall extend from the structures to a point-of-connection 5'-0" outside of the buildings where civil design will pick up for continuation on site.
    c. QTA domestic water supply may be sourced separately from RAC/Idle/Storage.
    d. All new natural gas piping shall be run to the point-of-connection.
2. System Description – Applicable to All Buildings
    a. Sanitary soil, waste, vent and storm drainage systems connected to site sewer and storm drain mains.

b. Below grade service weight, hubless cast iron pipe and fittings.

c. Above grade hubless service weight cast iron pipe and fittings. Joints neoprene gaskets and stainless steel clamp and shield assemblies.

d. Natural gas supply to be further evaluated. Most economical energy source to be provided for heated water in CSB and QTA buildings. In buildings where gas is deemed most economical, domestic water heating to be natural gas storage type water heater. In buildings where electric type is deemed most economical, domestic water heating to be electric instantaneous type water heater.

e. Floor drains, trench drains and floor sinks shall be cast iron body with removable strainers, J.R. Smith or Zurn. Trap primers were provided for all sanitary waste drains. Roof drains and overflow drains will be provided for storm drain system.

f. Plumbing fixtures shall be commercial grade in accordance to LAWA standards. Plumbing fixtures to be hands-free in QTA buildings A and B for RAC employees.

g. Sand oil interceptor for parking structure drainage system connecting to sanitary sewer, to be coordinated with civil design drawings.

h. Type “K” or “L” copper tube hard drawn. Fittings cast brass or wrought copper, solder joints. Type “K” below grade and Type “L” above grade. Hot water piping shall be insulated.

i. All devices and piping that are intended to dispense water for human consumption shall comply with California Assembly Bill 1953.

j. All plumbing piping shall be sized per 2014 Los Angeles Plumbing Code.

k. Condensate drains shall be provided for all the new HVAC units and shall discharge into an approved receptor, as per 2014 Los Angeles Plumbing Code.

l. Trap primers shall be provided for the floor drains going to Sanitary Sewer.

m. Seismic expansion joints on Domestic Water, Reclaimed Water, Waste, Vent and Natural gas piping when crossing building expansion joints.

n. Earthquake shut off valves as required for gas regulators within building space.

3. Systems Description – QTA Bldg. A

a. Traffic weight drains, trench drains, sanitary sewer piping connecting to oil water separators and then to site sanitary sewer.

b. Domestic water and sanitary sewer piping for car wash utilities, to be coordinated with Car Wash System drawings.

c. Storm and overflow drain piping will be provided from roof and overflow drains. Piping will collect within the building and extend and be collected on-site.

d. Combination Eye Wash / Eye Shower to be provided in light maintenance area.

e. Gas will be provided to QTA buildings. Natural gas water heating to be basis of design for restrooms with multiple handwashing sinks.

f. Piping to be provided to each carwash bay that interfaces with the carwash drawing package. RO Reject piping, Second Rinse piping, Drain Piping and Reclaim Piping to each carwash bay with shut-off provided for each. All carwash rough-in piping to be provided and stubbed into basement containing Carwash Recycle system. Coordination required between plumbing and Car Wash drawings.

g. Domestic water makeup to be provided into basement for clean water rinse supply. Domestic water supply size is based on total load required at peak to be fed to domestic water booster pump.

h. Trench Drains for each carwash bay on each floor to be collected and drained into waste reclamation provided on Car Wash drawings. Drains gravity to car wash system in basement. Sanitary overflow from Car Wash reclaim system to Oil/Water Separator.

i. Drains provided within fueling zone boundary to be collected and drained to a dedicated Oil/Water Separator. The Oil/Water separator handling fueling drains will not accept drainage from other common drains.

j. Booster pump to be provided for car wash supply. Reduced pressure backflow preventer and backflow preventer provided. Carwash domestic water supply system to be isolated from restroom plumbing fixtures to prevent damage from water hammer and pressure.

k. Waste and vent piping will be provided and connected to all new plumbing fixtures and required equipment in building support restrooms and QTA support area.

l. Waste piping will collect within the structure and extend to 5'-0" outside of the building. Vent piping will collect within the structure and extend up through the roof.

4. Systems Description – QTA Bldg. B

a. Traffic weight drains, trench drains, sanitary sewer piping connecting to oil water separators and then to site sanitary sewer.

b. Domestic water and sanitary sewer piping for car wash utilities, to be coordinated with Car Wash System drawings.

c. Storm and overflow drain piping will be provided from roof and overflow drains. Piping will collect within the building and extend and be collected on-site.

d. Combination Eye Wash / Eye Shower to be provided in light maintenance area.

e. Option to provide either electrical water heating or gas water heating. Evaluation to be determined per building.

f. Piping to be provided to each carwash bay that interfaces with the carwash drawing package. RO Reject piping, Second Rinse piping, Drain Piping and Reclaim Piping to each carwash bay with shut-off provided for each. Coordination required between plumbing and Car Wash drawings. Car washes in QTA B are located only on level 1.

g. Domestic water makeup to be provided into car wash reclamation system for clean water rinse supply.

h. Trench Drains for each carwash bay on each floor to be collected and drained into waste reclamation provided on Car Wash drawings. Drains directly to car wash reclamation system on Level 1 of QTA South. Sanitary overflow from Car Wash reclaim system to Oil/Water Separator.

i. Drains provided within fueling zone boundary to be collected and drained to a dedicated Oil/Water Separator. The Oil/Water separator handling fueling drains will not accept drainage from other common drains.

j. Booster pump to be provided for car wash supply. Reduced pressure backflow preventer and backflow preventer provided. Carwash domestic water supply system to be isolated from restroom plumbing fixtures to prevent damage from water hammer and pressure.

k. Waste and vent piping will be provided and connected to all new plumbing fixtures and required equipment in building support restrooms and QTA support area.

l. Waste piping will collect within the structure and extend to 5'-0" outside of the building. Vent piping will collect within the structure and extend up through the roof.

5. Systems Description – Idle Storage

a. Waste and vent piping will be provided and connected to all plumbing fixtures and required equipment. Waste piping will collect within the structure and extend to 5'-0" outside of the building. Vent piping will collect within the structure and extend up through the roof.

b. Storm and overflow drain piping will be provided from roof and overflow drains. Piping will collect within the building and extend and be collected on-site.

c. Domestic cold water piping will be provided and connected to all plumbing fixtures and required equipment. Cold water piping will collect within the structure and extend to 5'-0" outside of the building. Domestic hot water will be provided by water heaters and piped to all fixtures and equipment requiring hot water.

d. Trap primers shall be provided for vented floor drains flowing directly to sanitary.

6. Systems Description – RAC Ready

a. Waste and vent piping will be provided and connected to all plumbing fixtures and required equipment. Waste piping will collect within the structure and extend to 5'-0" outside of the building. Vent piping will collect within the structure and extend up through the roof.

b. Storm and overflow drain piping will be provided from roof and overflow drains. Piping will collect within the building and extend and be collected below to storm drainage piping for the top of the parking lot.

c. Gas or Electric water heating supplied to restrooms for Core areas on level 1 to level 3 to be further evaluated.

d. Domestic cold water piping will be provided and connected to all plumbing fixtures and required equipment. Cold water piping will route down to grade and extend to 5'-0" outside of the parking structure. Domestic hot water will be provided by electric water heaters and piped to all fixtures and equipment requiring hot water.

7. Systems Description – CSB

a. Waste and vent piping will be provided and connected to all plumbing fixtures and required equipment. Waste piping will collect within the structure and extend to 5'-0" outside of the building. Vent piping will collect within the structure and extend up through the roof.

b. Storm and overflow drain piping will be provided from roof and overflow drains. Piping will collect within the building and extend and be collected below to storm drainage piping for the top of the parking lot.

c. Gas will be provided to CSB buildings. Natural gas water heating to be basis of design for restrooms with multiple handwashing sinks.

d. Domestic cold water piping will be provided and connected to all plumbing fixtures and required equipment. Cold water piping will route down to grade and extend to 5'-0" outside of the parking structure. Domestic hot water will be provided by electric water heaters and piped to all fixtures and equipment requiring hot water.

8.7 QTA SYSTEMS DESIGN

This section describes the rental car Quick Turn-Around (QTA) systems design requirements, including the following:

- A gasoline fuel dispensing system, arranged in rows or islands.
- Emergency stop system
- Environmental monitoring and fuel control system
- Fuel management and revenue control system.
- An installed vacuum system at the fuel islands.
- Compressed air and windshield washer fluid hose reels at the fuel islands.
- An installed car wash system in dedicated “tunnels”.
- New lube oil distribution, used oil collection, and compressed air systems within vehicle light maintenance bays.

The specific QTA systems program is outlined in the following table:

		Building A	Building B
Gasoline Fueling	Underground Gasoline Storage Capacity	270,000 gallons	40,000 gallons
	Two-hose Dispensers	81	12
	Vehicle Fueling Positions	162	24
	Fuel Management/Revenue Control	HID card reader in fuel dispensers	
Windshield Washer Fluid (WWF)	Pre-mixed WWF Storage Capacity	15,000 gallons in a UST, 250 gallons on Levels 1, 2, and 3 in an AST	2,000 gallons in an AST
	Hose Reel with Dispense Nozzle	One (1) per gasoline dispenser	
Compressed Air	Hose Reel with Tire Chuck (Fueling Area)	One (1) per gasoline dispenser	
	Drop and Wall Mounted Regulator	One (1) per tire changer/balancer area and one (1) additional per bay	
	Overhead Hose Reel	One (1) per maintenance bay	
	Integrated Workstation	One (1) per vehicle lift on vehicle lift	
Installed Vacuum System	Vacuum Drop with Service Wand	One (1) per vehicle fueling position	
Car Wash	Tunnels	32	5
	Nominal Capacity	11,200 cars per day	1,750 cars per day
Maintenance Equipment	Vehicle Lifts	15	49
	Work Light and Power Reel	One (1) per maintenance bay	
Lube Oil	Storage Capacity	5,000 gallons	16,000 gallons
	Hose Reels	Two (2) grades per two (2) lifts	
Used Oil	Storage Capacity	5,000 gallons	16,000 gallons
	Collection Stations	One per four (4) maintenance bays	

Gasoline Fuel System

The gasoline fuel dispensing system is designed to deliver eight (8) to ten (10) gallons per minute (GPM) of fuel to 50% of the vehicle fueling positions (1 nozzle per dispenser) at any given time during operation. The system is highly segregated so that the failure of one component will have minimal impact to other fueling systems. The gasoline systems in each building are unique and served by separate underground storage tank (UST) systems. USTs are equipped with spill containment fill buckets within DW secondary containment sumps, DW containment sumps for the submersible pumps and piping, mechanical overfill protection devices, audible and visual overfill protection devices (one dedicated for each tank), automatic line leak detectors (ALLDs), anchoring devices, vents, and Stage I Vapor Recovery System, and a covering concrete pad rated for fully loaded fuel delivery trucks. Clear and prolific signage and instructions are provided for every fill port opening, alarm device, and other user interfaces at the tanks. Gasoline is piped from the underground tanks to the QTA building in double-walled, continuously monitored pipe. The piping is sloped back to the tank containment sump, and may include an intermediate sump to break slope. Realizing that underground gasoline piping is not normally found at the perimeter of parking garages, the piping will be installed with detectable warning tape and a subsurface protective concrete cover. The gasoline system in each building is described below.

1. Building A:

    a. Fuel Storage: Gasoline storage for Building A is provided by six (6), 45,000 gallon double-walled (DW) fiberglass reinforced plastic (FRP) USTs located in a service yard on the eastern side of Building A. A dedicated pull-off lane is provided for delivery trucks to deliver fuel from the right side of the fuel trailers. Each of the USTs, associated sumps and Vent transition sumps are equipped with brine leak monitoring systems.

    b. Fuel Distribution: Fuel distribution is different between ground and upper levels in building A. Single or dual (master/slave configuration) Variable Frequency Drive (VFD) Submerged Turbine Pumps (STPs) provide fuel to distinct fuel lines that each serve between three (3) and five (5) fuel dispensers. Each of these fuel lines can be isolated and operates independently of each other during fuel dispensing operations. Underground fuel piping for all systems is a DW, UL 971 piping with an interstitial space that is continuously monitored by vacuum. Aboveground fuel piping is a system designed to mitigate the hazards of piping gasoline through the QTA building. The primary piping is Schedule 40 or 80 welded steel, surrounded by a Schedule 40 secondary pipe. The double-walled piping is a pre-manufactured, industrial grade system, including coatings on the exterior of the primary pipe, coatings on the inside of the secondary pipe, and a heavy-duty fiberglass wrap coating on the outside of the secondary pipe to maximize protection and longevity. The piping will be colored yellow in its entirety, the industry standard color for flammable liquid piping, and will be labeled as containing gasoline. Because gasoline piping is not normally found in a building, this helps prevent maintenance personnel from mistaking this pipe for a different non-flammable system. Horizontal runs of the aboveground gasoline piping are monitored by a piping-manufacturer supplied leak detection tape, which has the capability to identify moisture on the tape to an accuracy of one (1) foot.

i. Level 1: Fuel is provided to level 1 dispensers via six (6) underground DW FRP lines. Fuel is routed from the underground DW FRP piping to dispensers within DW dispenser containment sumps. The interstitial space of DW dispenser containment sumps is brine monitored.

ii. Levels 2 and 3: Fuel is provided to levels 2 and 3 via twelve (12) underground DW FRP lines that travel to two (2) separate Flammable Liquids Storage Rooms. Underground DW piping is continuously monitored by vacuum to provide an alarm if there is any breach in the primary or secondary piping. Inside each riser room, the fuel piping transitions from FRP to steel. The piping transition area includes a number of controls on the gasoline system. Thermal relief devices are provided to absorb thermal expansion and contraction of the aboveground fuel column. Various isolating valves are provided to allow for isolating portions of the system during times of maintenance, testing, and repairs. Relief valves are also provided to relieve expansion. Bypass lines around the check valves are included should the need to drain the system arise. Flexible connections are provided to accommodate seismic and other motions. Double check-valves are provided to support the aboveground fuel column when the pumps are not in use. The fuel system has numerous local and remote pressure gauges and monitoring equipment provided for commissioning and troubleshooting. After the controls inside of the Flammable Liquids Storage Room, the steel pipe transitions to DW steel piping described above. The pipe will be enclosed in a 2-hour rated chase when traversing the building from the Flammable Liquids Storage Room to the aboveground dispenser containment sumps. Aboveground fuel piping serving level 2 dispenser is located in the ceiling area of level 1, and fuel piping serving level 3 dispensers is located in the ceiling area of level 2.

c. Fuel Dispensing: Fuel dispensers are single-product, lane-oriented, two-hose units. Each fuel dispenser is equipped with a number of safety devices, including shear/crash valves at the dispenser base, breakaway valves at the hoses, portable, hand-operated fire extinguishers, “fire-stomper” type automatic foam chemical canisters in the sumps, and programmed dispensing limits for each transaction. The dispensers are equipped with multiple metering pulse outputs allowing for the dispensers to provide electronic metering information to the fuel management/card reader/revenue control system and a tenant installed productivity system. The Human Interface Device (HID) card reader for the fuel management system is mounted in the fuel dispenser cabinet (as is a traditional retail credit card reader) to eliminate the footprint of a typical fleet fuel management pedestal in the space constrained fuel island area. A dedicated exhaust system (discussed in other sections) serves the dispensing area. The dispensers on each level will not operate unless the ventilation system serving the dispenser is operating. The fuel islands are only slightly larger than the footprint of the dispensers to avoid the trip hazards created by “full-length” retail-type fuel islands.

i. Level 1: Fuel dispensers are located above DW dispenser containment sumps.

ii. Levels 2 and 3: The fuel dispensers on the second and third levels are set on stainless steel containment sumps positioned between double-structural beams. A raised island is integrated into the main structural pour to prevent seams or pathways for spilled fuel to migrate to the floor below. All conduits and piping penetrations to support the fuel and other systems are located within the fuel dispensing and other raised islands to minimize fuel spill pathways.

2. Building B:

   a. Fuel Storage: Gasoline storage for building B is provided by two (2), 20,000 gallon DW FRP USTs located in a service yard to the north east of Building B. A dedicated pull-off lane is provided for delivery trucks to deliver fuel from the right side of the fuel trailers. Each of the USTs, DW UST and Vent transition sumps are equipped with brine leak monitoring systems.

   b. Fuel Distribution: Single, Variable Frequency Drive (VFD) Submerged Turbine Pumps (STPs) provide fuel to 3 distinct fuel lines that each serve either four (4) or five (5) fuel dispensers. Each of these fuel lines can be isolated and operates independently of each other during fuel dispensing operations. Underground fuel piping for all systems is a DW, UL 971 piping with an interstitial space that is continuously monitored by vacuum.

   c. Fuel Dispensing: Fuel dispensers are single-product, lane-oriented, two-hose units. Each fuel dispenser is equipped with a number of safety devices, including shear/crash valves at the dispenser base, breakaway valves at the hoses, portable, hand-operated fire extinguishers, “fire-stomper” type automatic foam chemical canisters in the sumps, and programmed dispensing limits for each transaction. The dispensers are equipped with multiple metering pulse outputs allowing for the dispensers to provide electronic metering information to the fuel management/card reader/revenue control system and a tenant installed productivity system. The Human Interface Device (HID) card reader for the fuel management system is mounted in the fuel dispenser cabinet (as is a traditional retail credit card reader) to eliminate the footprint of a typical fleet fuel management pedestal in the space constrained fuel island area. .A dedicated exhaust system (discussed in other sections) serves the dispensing area. The dispensers on each level will not operate unless the ventilation system serving the dispenser is operating. The fuel islands are only slightly larger than the footprint of the dispensers to avoid the trip hazards created by “full-length” retail-type fuel islands.

Emergency Stop System

An extensive emergency stop system is included in each QTA building which will have its own separate system. Manual actuators and inputs described below will initiate and emergency stop and secure the entire building associated with the actuation. Reset actuators in the Fuel Manager’s Offices and Fire Command Centers will allow the reset of the emergency-stop system in each affected building by floor.

1. Emergency Stop Actuation: The emergency-stop will be actuated by any of the following events:

   a. Depression of any one of the manual actuators (buttons) on the operating floors. Actuators are proposed in the following locations:

i. In the Fire Command Center(s) (1) minimum;

ii. In the Fuel Manager's Office(s) (1) minimum;

iii. In Rental Car Supervisors/Dispatchers Offices on each floor with fueling (4 minimum);

iv. At the end of each fuel island row (32); and

v. At major building egress points (34);

b. A critical leak alarm. A critical leak alarm is defined as the detection of gasoline by a discriminating sump sensor in a dispenser containment sump above an occupied space (i.e. a dispenser containment sump on the upper floors).

c. Activation of any fire alarm;

d. Flow of sprinkler water;

e. Visual or Ultraviolet/infrared flame detection; or

f. Seismic sensor actuation.

2. Emergency Stop Functions: Upon activation, the emergency stop system will perform the following functions on the entire building affected:

a. De-energizing submersible gasoline pumps and fuel dispensers;

b. Isolation of the fuel and windshield washer fluid systems by closing isolation valves.

c. Isolation of all data circuits in and out of the fuel dispensers;

d. De-energizing of the installed vacuum system;

e. Isolation of the compressed air system by the closing of a solenoid valve;

f. Isolation of the windshield washer fluid dispensing system by the closing of a solenoid valve;

g. Signaling that the emergency stop system has been actuated in the respective Building status panels in the Fire Command Canter and Fuel Manager's/Supervisors' Offices;

h. Signaling the Fire Alarm Control Panel. This signal will allow, if desired by the responding fire officials, for the Fire Department to be alarmed upon activation of the emergency stop system; and

i. Energizing of yellow warning lights, to notify occupants that the emergency stop system was actuated.

Environmental Monitoring and Fuel Control System

An Environmental Monitoring and Fuel Control System is provided to continuously monitor secondary containment areas for leaks, to monitor and control the submersible pumps, to interface with the line leak detection system, and to manage and isolate the dispenser hook signals. The system includes a minimum of one (1) control console per fueling floor in each building.

The consoles, which may be from the same or from multiple systems, also provide level monitoring for each aboveground and underground storage tank, and with that level information, provide the audible and visual overfill alarm for each tank. The consoles also monitor an input from the submersible pump controllers, monitoring the pumps for trouble signals.

An input from the emergency stop system is landed in the Environmental Monitoring and Fuel Control Systems so that logged in users can see an emergency shutdown status remotely. The monitoring system sends the following output signals:

1. An output signal to the appropriate floor emergency stop system, when discriminating dispenser sump sensors detect gasoline in the second or third floor dispenser sump, i.e. when gasoline is detected in a containment structure above an occupied space; and

2. An output signal to the fuel system annunciators to indicate the presence and nature of a leak detection alarm.

The system consoles manage hook signals from the dispenser to the submersible pumps, activating the appropriate pump when a dispenser handle is raised, and isolating that hook signal when power is secured to the dispenser. It is through this system that the hook signals are re-directed in the case of system cross-connecting.

In addition to the local displays and printers on the consoles, each is monitored by two personal computers in the fuel managers office, which are configured for remote, web-based monitoring over the network or internet. Each console is also configured to e-mail one or more facility managers during some, or all, alarm events. An all-in-one computer is also mounted on the wall of the fire command rooms for the purpose of allowing access to the status windows of the monitoring system to personnel in the command room.

A fuel system status annunciator panel is located in the fire command room and the Fuel Manager’s office. Additional “Manager’s” Annunciators are provided in offices on each level and in the Fuel Manager’s Office. These annunciators have multiple lighted windows and are intended to alert managers to system issues that warrant further investigation.

The Manager’s Annunciators on each level will be specific to the level, while the Annunciator in the Fuel Manager’s Office will indicate affected level.

Fuel Management and Revenue Control System

A Fuel Management and Revenue Control System is provided to authorize and track fuel dispenser transactions. The system includes an HID card reader mounted within the fuel dispenser cabinet, a central control unit, and system software. To the extent possible, the HID reader is compatible with other CONRAC facility security devices, so that RAC personnel can be assigned one HID access card for multiple purposes.

Both the Fuel Management and Revenue Control System and the Environmental Monitoring and Fuel Control System are controlled from two (2) redundant desktop computers in the Fuel Manager's office. Both systems are accessible from and internal facility network and both will also have the ability to be remotely monitored and controlled over the internet. A virtual private network provides this capability.

Surge suppression is provided at each fuel panel that contains sensitive or critical electronic control equipment. Surge suppression is also provided for all communications lines as they enter the respective systems. Uninterruptible power supplies (UPS) are provided for each of the computers and electronic control units that control the fuel system.

A comprehensive map-type diagram is mounted on the wall of the Fuel Manager's Office which displays the designation of every piece of fuel system equipment in plan view. Each designation on the map is the same as the equipment designations programmed into each of the monitoring, management, alarm, and control systems.

Every piece of QTA equipment is labeled with permanent embossed plastic labels with the appropriate designation to match the designation diagram and systems programming.

Car Wash System

The Car Wash System includes thirty-seven (37) automated car wash "tunnels" in both Buildings designed to wash cars as part of the QTA vehicle turn-around process. Each tunnel is designed for a nominal capacity of 350 cars per day, for a total capacity of 12,950 cars between both QTA buildings. The car wash tunnels are drive-through, i.e. the driver retains control of the car and drives through the bay. Total time in the tunnel is approximately one (1) minute. The car wash bays are lighted. Refer to architectural, electrical, and mechanical sections for more information on these aspects of the system.

Car wash phases are activated by a series of electronic eyes that are triggered as the car moves through the tunnel. The each car wash "tunnel" includes:

1. Pressure washer: Pressure washers provide an initial manual rinse of cars. Water and electrical provisions are included for tenant installation of pressure washers to provide an initial rinse of cars. Water for pressure washers is from a combination of domestic potable water, reverse osmosis (RO) reject water, and rainwater.

2. Flooder arch and wash arch: Provides a full soak, detergent application, and brushing of all sides of the vehicle. The wash arch includes a 5-brush unit that includes an overhead brush, and four side brushes. Water for the flooder arch is supplied by reclaim water. i.e. water that has been collected from previous car wash cycles. During each wash, water used in each wash travels by gravity to reclaim pits or clarifiers where particles are allowed to settle. Sump pumps transfer this reclaimed water to reclaim tanks which store water for subsequent flooder and wash arch cycles.

3. First rinse arch: Provides an initial rough rinse of the vehicles exiting the wash arch to remove detergent and dirt. Water for the freshwater rinse arch is supplied by a combination of reverse osmosis (RO) reject water and rainwater, with domestic potable water supplementing when necessary.

4. Reverse Osmosis (RO) rinse arch: Provides a final purified water rinse. The RO rinse arch is the second rinse arch for vehicles exiting the car wash. The RO rinse provides a spot-free rinse that removes any remaining detergent and rinses off water from the first rinse arch. A manual emergency bypass of domestic potable water will be provided.

5. Blower arch: Removes remaining water accumulation on cars. The blower system is the final component of each bay and is automatically activated with an electric eye. The blowers remove excess water providing water to the reclaim system and minimizing water left on cars that may evaporate.

Carwash construction in each building

1. Building A: The car washes in Building A are arranged into 12 distinct, vertically connected systems, each with 2-3 bays. In this arrangement, when one system is not operating for repairs or maintenance, each floor is affected equally, rather than affecting multiple tunnels on a single floor. For example, if one pump system is down, no more than one bay on each floor is affected. All car wash equipment for Building A is located in the Building A. Building A uses aboveground clarifiers to reclaim used car wash water. Reclaim clarifiers, reclaim tanks, RO purification units, RO tanks, and RO reject tanks, and all pumps are all located in the basement of Building A.

2. Building B: The car washes in Building B are grouped into sections of 2 and 3 bays. In this arrangement, if one system is not operating, a group of 2 or 3 bays would be affected. Building B uses underground reclaim and sump pits to reclaim used car wash water. Reclaim pits, reclaim tanks, and reclaim pumps are located in rooms adjacent to each group of car wash bays. RO purification units, RO tanks, RO reject tanks, RO pumps, and rinse pumps are located in a car wash equipment room on the North side of Building B.

Carwash water types

1. Domestic water/potable water – water input from municipal supply. Potable water provides the input for the RO purification unit, and make up water for the first rinse arch.
2. Reverse Osmosis (RO) water – municipal water that has been treated by the RO purification units (component of car wash equipment). RO water is used for the final, spot free rinse in each car wash.
3. RO reject water – the concentrate (reject) water of the RO purification process. RO reject water is captured and used in the first rinse arch of each car wash.
4. Rainwater – rainwater that has been captured and treated.
5. Reclaim water – water that has been captured from a car wash cycle and that has undergone settling in aboveground clarifiers (building A), or reclaim pits (building B).

Refer to the plumbing sections for more information on these aspects of the system.

Windshield Washer Fluid System

The Windshield Washer Fluid (WWF) system is designed to accommodate the delivery of a wide range of concentrations of methanol-based WWF mixes. The WWF system can store and deliver a range from 0% to 50% methanol and water to fuel island hose reels for replenishing vehicles. The system is designed to provide fluid to 25% of the hose reels simultaneously at a minimum of one (1) gallon per minute.

When the water and methanol concentration is at 50% of each, the mixture is classified as a Class 1C flammable liquid by the LAFC. The system is designed to receive bulk mixed deliveries at varying concentrations, and is not designed to receive or handle concentrated methanol. Similarly, there are no provisions for on-site mixing with water.

1. Building A

   a. WWF Storage. Bulk WWF is delivered and stored for Building A in a 15,000-gallon double-walled fiber-reinforced plastic (FRP) underground storage tank (UST) located adjacent to the gasoline USTs In Building A, the design and features of the WWF UST are the same as the gasoline USTs. The UST is equipped with a submersible pump, which transfers the mixed WWF to day tanks on each QTA garage level. The submersible pump is capable of delivering fluids with a specific gravity of 1.0 (water) and is explosion-proof to accommodate flammable liquids. Day tanks are located in Flammable Liquid Storage Rooms on each level of Building A. WWF is transferred from the USTs to the day tanks in a two (2) pipe conduit including the supply pipe and an overflow pipe. The piping from the UST to Building A is a double-walled UL-971 system. The piping from the transition area to the day tanks is all within the flammable liquid rooms and will be a welded, stainless steel system.

   b. WWF distribution. WWF is distributed from day tanks on each floor of Building A to dispensing points by a pneumatic diaphragm pump through overhead, welded, stainless steel piping. The distribution pump is equipped with a controlling air regulator and runaway valve, which shuts off air supply if an unusually high air flow is detected. Air supply to the WWF distribution system is secured in the event of emergency stop, thereby preventing WWF from being pumped to the fuel island during that shutdown condition.

   c. WWF dispensing. WWF is dispensed from hose reels located at each fuel dispenser.

2. Building B

   a. WWF Storage. Bulk WWF is delivered and stored for Building B in a 2,000 gallon protect aboveground storage tank.

   b. WWF distribution. In Building B, WWF is distributed from the AST to the first floor dispensing points by a pneumatic diaphragm pump through overhead, welded, stainless steel piping. The distribution pump is equipped with a controlling air regulator and runaway valve, which shuts off air supply if an unusually high air flow is detected. Air supply to the WWF distribution system is secured in the event of emergency stop, thereby preventing WWF from being pumped to the fuel island during that shutdown condition.

c. WWF dispensing. WWF is dispensed from hose reels located at each fuel dispenser.

Compressed Air Systems

The compressed air system is designed to provide service to a number of users in the QTA buildings. They include:

- The motor oil distribution pumps located at the motor oil tanks;
- The used oil collection pumps, located at each used oil collection station;
- The WWF distribution pumps, located at each WWF day tank;
- The general purpose workstations in the maintenance bays;
- The general purpose work stations in other maintenance areas;
- The hose reels and work stations in each maintenance bay;
- The drops for tenant installed tire changing and balancing equipment; and
- The fuel island tire filling hose reels.

The system consists of t least five (5) 15-HP air compressors in Building A, nine (9) 15-HP air compressors in Building B, distribution piping, regulators, and safety devices. The systems are designed to operate at a maximum pressure of 150 psi. These compressors serve the maintenance bay users, the WWF day tanks, and the fuel island hose reels. The systems are segregated by floor, with cross-connecting valves provided in the event of a compressor failure or malfunction. Compressors in the motor oil supply rooms will serve the motor oil distribution pumps and waste oil collection pumps. The waste oil collection pumps are served from these compressors because the air supply to those pumps is routed through a float-operated mechanical overfill protection device that cuts off air supply to the collection pump when the respective receiving tank is full.

Each system includes a refrigerated drier at the discharge of each compressor. Master system pressure is controlled by a pressure regulator at the discharge of the drier. Each user, including all banks of overhead hose reels, is also controlled by an individual pressure regulator/filter assembly. Regulators serving pumps and general workstations are also equipped with air lubricators. Each system is equipped with a solenoid valve which closes in the event that the emergency stop system is activated.

Installed Vacuum System

The installed vacuum system is designed to provide vacuum service to each of the 186 vacuum service positions at the QTA Buildings fuel dispensing areas. The system consists of vacuum producer/collection units, metal collection tubing, and vacuum service wands.

Each fueling area level is served by up to ten (10) 25-HP vacuum producer/collection units. Each vacuum producer serves up to two, non-adjacent rows of fuel positions. This provides redundancy so that each side of the fuel dispensers is served by separate vacuum producers. Any unit failure impacts a single side of the dispensers and other systems will continue to provide service to the level.

Electrical power to the vacuum units is secured in the event of a fuel system emergency stop event. Remote on/off controllers are provided in the supervisors office for ease of de-energizing during slow periods.

Lube and Used Oil Systems

An installed lube and used oil system will serve the maintenance bay areas for the dispensing of lube oil and the evacuation of used oil. Lube oil dispensing and used oil evacuation collection will be provided for Building A in maintenance bays adjacent to level 1 and also on all three floors of Building B. The oil systems include storage tanks, piping, pumps, controls, new oil distribution hose reels, and used oil collection stations.

1. Building A:

    a. Lube oil:

        i. Lube oil storage: Lube oil will be stored at ground level in compartmented, UL-2085 protected tanks. One (1) 5,000 gallon compartmented tank is provided to serve all 15 maintenance bays on level 1 of Building A. The 5,000 gallons tank is compartmented into two compartments to allow for 2,500 gallons of storage of two separate grades of lube oil (i.e. conventional and synthetic).

        ii. Lube oil distribution: Lube oil will be distributed via overhead piping to maintenance bays. Two distribution systems (one per grade of lube oil) are each split into three separate lines which a block of five (5) maintenance bays.

        iii. Lube oil dispensing: The two grades of lube oil are distributed to overhead, metered hose reels in the maintenance bays. Two hose reels (1 per grade of lube oil) provided for every two (2) bays. The metered nozzles will wirelessly track the lube oil dispensed for reconciliation with a revenue management system. The revenue management system provides the facility manager the ability to invoice each rental car agency for lube oil dispensed.

    b. Used oil:

        i. Used oil collection: Each maintenance bay will have a 25 gallon oil collection caddy for collecting used oil. Collection stations are provided for each bank of five (5) bays, with. Each collection station will route used oil via overhead piping to the used oil storage area.

        ii. Used oil storage: Used oil storage will be at ground level in compartmented, UL-2085 protected tanks. One (1) 5,000 gallon compartmented tank is provided to serve all 15 maintenance bays on level 1 of Building A. This tank has three compartments, with one compartment per group of five bays. This setup will allow some flexibility in future maintenance bay allocation between tenants.

2. Building B:

    a. Lube Oil:

        i. Lube oil storage: Lube oil will be stored at ground level in three (3) compartmented, UL-2085 protected tanks. One (1) 8,000 gallon compartmented tank, with 4,000 gallons allocated for two grades of lube oil is provided to serve the 8 maintenance bays on level 1 of Building B. One (1) 6,000 gallon compartmented tank with two grades of lube oil is provided to serve the 20 maintenance bays on level 2 of Building B. One (1) 6,000 gallon compartmented tank with two grades of lube oil is provided to serve the 21 maintenance bays on level 3 of Building B.

ii. Lube oil distribution: Lube oil will be distributed via overhead piping to maintenance bays. Two distribution systems (one per grade of lube oil) are each split into multiple lines that serve from four (4) to six (6) per distribution pipe. Each level in building B is served by its own lube oil tank, meaning that tenants that may share a level in building B will share a lube oil tank.

iii. Lube oil dispensing: The two grades of lube oil are distributed to overhead, metered hose reels in the maintenance bays. Two hose reels (1 per grade of lube oil) are provided for every two (2) bays. The metered nozzles will wirelessly track the lube oil dispensed for reconciliation with a revenue management system. The revenue management system provides the facility manager the ability to invoice each rental car agency for lube oil dispensed.

b. Used oil:

i. Used oil collection: Each maintenance bay will have a 25 gallon oil collection caddy for collecting used oil. Collection stations are provided for each bank of four (4) to five (5) bays. Each collection station will route used oil via overhead piping to the used oil storage area.

ii. Used oil storage: Used oil storage will be at ground level in compartmented, UL-2085 protected tanks. One (1) 8,000 gallon compartmented tank with 4,000 gallons of used oil storage is provided for maintenance bays on level 1. The 4,000 gallons of used oil storage is compartmented into eight (8) 500 gallon compartments with one compartment dedicated to each maintenance bay. This way, each maintenance bay can have a separate tenant with dedicated used oil storage. Two (2) 6,000 gallon compartmented tanks are provided to serve maintenance bays on levels 2 and 3 of Building B with each floor having its own tank. These two tanks have four compartments each, with one compartment per group of five bays.

Both lube and used oil is stored at ground level in compartmented, UL-2085 protected tanks in the quantities described above. Aggregate for both buildings is 21,000 gallons of lube oil and 21,000 gallons of used oil.

Used oil is collected at collection stations on the maintenance bay floors. Each collection station is equipped with a pneumatic pump which is powered by compressed air with a normally-close solenoid that secures the air when the corresponding tank activates a high-level float. The collection pumps transfer the used oil from collection caddies into the used oil tanks.

Each tank compartment is equipped with an audible-visible high level alarm. The annunciators for the new oil tank alarms are located at the respective fill connections. The annunciators for the used oil compartments are located at the respective collection stations. Each tank interstice and liquid level is be monitored by the Environmental

Monitoring and Fuel Control System, and each tank compartment has mechanical level gauges mounted at the tank tops. Fill lines for new and used oil are provided with mechanical overfill protection devices.

A separate emergency stop system controls the new and used oil system. This system is actuated by hand operated push buttons or an output signal from the main fuel system emergency stop system. Hand operated buttons are be located in each of the storage tank rooms, and on each level maintenance bay bank (one button per four bays). Actuation of the motor oil emergency stop system secures air to all used and new oil pumps.

8.8 ELECTRICAL DESIGN

This section describes the electrical design requirements for the ConRAC facility.

Codes and Standards

Electrical systems will comply with the following codes, standards and guidelines:

- 2013 California Building Code.
- 2013 California Electrical Code.
- 2014 City of Los Angeles Electrical Code
- 2013 California Green Building Standards Code.
- 2014 Los Angeles Green Building Code Ordinance. The building will be designed to meet Tier 1 requirements.
- Applicable Portions of Title 8, Title 17 And Title 24 Energy Code.
- National Fire Protection Association (NFPA).
- National Electrical Manufacturer's Association (NEMA).
- Los Angeles World Airports (LAWA) Adopted Standards and Ordinances.

As design progresses, the Design Standards will be updated to ensure appropriate applicability and conformance to budget. Any deviation from these standards will be documented and will be issued to ensure acceptance from LAWA.

Design Approach

The ConRAC site will be served by a new LADWP Industrial Station. The intent is to have an enclosed LADWP station to house the utility transformers and associated equipment, with an immediately adjacent LAWA main electrical room housing a double-ended MTM medium voltage meter/service/distribution switchgear (ConRAC Service SWGR "CSSWGR") to serve normal power for the entire CONRAC site. 4,160V power from this switchgear will be distributed to secondary unit substations at the buildings as required.

Design Goals

1. Functionally Operating Facility.
2. Economical Initial Construction Cost.
3. Economical Annual Utility Cost and Consumption.

4. Reliable and flexible electrical distribution system to meet the needs of today while anticipating those of tomorrow.
5. Systems with High Level of Durability and Longevity.
6. Minimize excessive feeder runs with high voltage drops to provide an efficient system.
7. Provide Good Accessibility For Maintenance Access.
8. Design and Installation of emergency power infrastructure to support both life safety and operational loads, such as fueling areas ventilation.
9. Utilize Locally Serviceable Equipment And Replacement Parts.
10. Maintain Functionality During Routine Maintenance.
11. Utilize Sustainable Design, Materials And Construction Methods Where Cost Effective.
12. Provide Systems With Favorable Life Cycle Cost Value.
13. Design systems to have adequate source of power for future expansion or remodel.

Power Distribution

1. Site Distribution:

   The ConRAC site will be served from the new LADWP Industrial Stations. This station will house two (2) LADWP Utility Transformers rated at 10 MVA and served by 2 incoming feeders. The secondary voltage of these transformers will be at 4,160 Volts. The service will enter into the adjacent LAWA ConRAC Service Switchgear “CSSWGR” with two (2) main meter section. These mains will then serve a double ended distribution system, with tie breaker to support the full buildout of the ConRAC. Each main is sized at 3,000A at 4,160V, 3-phase, and serves distribution breakers. An underground duct bank with 5” conduits will be routed from the CSSWGR to Main Electrical Rooms of each building/area unit substation(s) via manholes as required.

2. Estimated Power for Entire ConRAC:

LAX ConRAC Facility Preliminary Electrical Load (kVA)			
Area Description	Sq Ft	Total (KVA)	Remarks
RAC Ready/Return Garage	3,169,777	3,380	
Idle Storage Garage	2,490,511	1,342	
Customer Service Building	95,280	2,695	
QTA Buildings	1,099,947	6,778	
	6,855,515	14,196	KVA
		1,973	AMPS @ 4160V

3. RAC/CSB Building:

a. RAC/CSB Building will receive service from CSSWGR as required for garage areas, employees and visitors parking, and customer services area.

b. RAC Ready/Return garage areas and employees and visitors parking will be served by two secondary unit substations located in the lowest level of the building;

c. Electrical distribution will be designed to limit excessive voltage drop for feeders and branch circuits. Electrical rooms will be located to ensure that the overall voltage drop from source to end of branch circuit does not exceed 5% as mandated by code.

d. Electrical distribution equipment will be provided within the building to serve the various loads. Numerous panels will be required, as well as associated transformers, to accommodate the segregation of loads as mandated by Title 24 and by LAWA. This equipment will need to be coordinated in detail with the design team to ensure that adequate clearances and space are provided throughout.

RAC Ready/Return Garage

Load Type		Lighting	General Power	Electric Vehicle Charging	Plumbing	HVAC	Spare Capacity (15%)	Total	Remarks
		0.30	0.15	0.30	0.04	0.02	0.12	0.93	VA/Sq Ft
RAC Ready/Return Garage (level 1, 2 & 3)	2,448,792	735	367	730	98	49	297	2,275	
		0.10	0.00	0.33	0.00	0.00	0.06	0.49	
RAC Ready/Return Garage	704,984	70	0	230	0	0	45	346	
(level 4 = roof)									
Special Systems Load (see separate calc)								759	
Roof (APM)	16,001							0	
	3,169,777								
	Sq Ft					Grand Total		3,380	KVA
								470	AMPS @ 4160V

Assumptions:
Lighting – 0.3W/Sq. Ft. for RAC garage, considering 10-20FC for sales floor
Power – General power includes power for receptacles and miscellaneous items, such as IT/Security and Signage
Electric Vehicle Charging–Includes 5 % of 7,600 cars (lvl 1,2,3) = 380 cars x16Ax120V=729,600 VA + 10% of 1200 cars (lvl 4) =120 cars x16Ax120V=230,400VA
HVAC – HVAC includes power for HVAC equipment for booths

SPECIAL SYSTEM LOAD CALCULATIONS				
Vacuum	VA, each	QTY	kVA	
25HP/6 Positions	27100	28	759	Assumed 4 vacuum positions at 14 bays (56 positions) on each floor, or 168 positions total at all 3 floors.

4. Customer Service/Building/Areas:

   a. Areas will be served by two secondary unit substations on located on the fourth level. Similar considerations apply for voltage drop and space requirements.

Customer Service Building									
Load Type		Lighting	General Power	Vertical Transport	Plumbing	HVAC	Spare Capacity (15%)	Total	Remarks
		1.00	3.00	12.60	1.00	7.00	3.69	28.29	VA/Sq Ft
Customer Service Building	95,280	95	286	1200	95	667	352	2,695	
	Sq Ft					Grand Total		2,695	KVA
								375	AMPS @ 4160V

Assumptions:
VT = (18 Elevators x 40KVA = 720KVA) + (24 Escalators = 24 x 20KVA = 480KVA) = 1200KVA
Lighting – 1W/Sq. Ft. for CSB considering 30-40FC
Power – General power includes power for receptacles and miscellaneous items, such as IT/Security
HVAC – HVAC includes power for HVAC equipment, such as AHUs, VAVs, split system and exhaust fans

5. Idle Storage Garage:

a. Idle storage areas (3 levels) plus fourth level for employee/visitor parking) will be served by two secondary unit substations located on the first level. Similar considerations apply for voltage drop and space requirements.

Idle Storage Garage									
Load Type		Lighting	General Power	Electrical Vehicle Charging	Plumbing	HVAC	Spare Capacity (15%)	Total	Remarks
		0.20	0.10	0.00	0.04	0.01	0.05	0.40	VA/Sq Ft
Idle Storage Garage (levels 1, 2 & 3)	1,867,884	374	187	0	75	19	98	752	
		0.10	0.00	0.72	0.00	0.00	0.12	0.95	
Idle Storage Garage (level 4)	622,627	62	0	451	0	0	77	591	
	2,490,511								
	Sq Ft					Grand Total		1,342	KVA
								187	AMPS @ 4160V

Assumptions:
Lighting – 0.2W/Sq. Ft. for parking at 10fc on levels 1, 2 & 3, and 0.1W/sf for parking at 5fc on roof
Power – General power includes power for receptacles and miscellaneous items, such as IT/Security and Signage (if required)
Electric Vehicle Charging – Includes 0% of 10,600 cars (lvl 1,2,3) plus 10% of 2,350 employee/visitor cars on roof = 235x16Ax120V=451,200VA

6. QTA Buildings:

   a. QTA areas are unique and different entities with different load requirements. QTA is broken down into two (2) buildings, both with 3 levels, and will be provided with three (3) secondary unit substations, two for building. A and one for building B.

QTA Buildings

Load Type		Lighting	General Power	Vertical Transport	Plumbing	HVAC	Spare Capacity (15%)	Total	Remarks
		0.60	0.50	0.14	0.40	0.50	0.32	2.47	VA/Sq Ft
QTA Buildings	831,841	499	416	120	333	416	268	2,051	This total KVA does not include QTA System load.
QTA roof (green roof)	268,106							0	
QTA System Load (See Separate Calculations)								4,727	
	1,099,947								
	Sq Ft					Grand Total		6,778	KVA
								942	AMPS @ 4160V

Assumptions:
VT = 3 Elevators = 3 x 40KVA = 120KVA
Lighting – 0.6W/Sq. Ft. for QTA, considering different FC levels for different areas
Power – General power includes power for receptacles and miscellaneous items, such as IT/Security
HVAC = HVAC includes power for HVAC equipment in restrooms/offices.

QTA SYSTEM LOAD CALCULATIONS						
	VA, each	QTY		kVA		
Gasoline, WWF						
STP 4 HP w VFD	5200		30		156	
Dispenser	600		90		54	
Monitoring	150		6		0.9	
WWF Pump	6400		2		12.8	
Miscellaneous Control Loads					10	
Total Gas, WWF					233.7	
Per Fuel Position			180		1.30	
Per Dispenser			90		2.60	
Vacuum 25HP/6 Positions	27100		30		813	
Compressors (15 HP+Dry)	16800		10		168	
Lifts (20A/208V)	7197		63		453	
Car Wash	VA	QTY		kVA		
(based on 39 Bays Total)						
Brush Motors – 6.5A/480V	5397.6	QTY	39		211	
RO System (2 HP)	2240		24		54	6000 GPD units assumed, 144,000 GPD total
25HP Reclaim	27,100		13		352	1 pump set per 3 bays assumed – assumed flooder arch
10HP Rinse	11,200		13		146	1 pump set per 3 bays assumed
Blowers (50 HP)	56,000		39		2184	
Pressure Washer	5,625		20		113	Electrical hot water, 1 per 2 bays assumed
Total Car Wash					3059	
Per Bay (39 assumed)					78	
Total All QTA Equipment Loads					4727	kVA

Lighting

1. Lighting for the project will comply with the requirements set forth in the 2013 CA Title-24. This will dictate the lighting density requirements for each space, the controls measures and the approvals needed for occupancy. Below are the fc design light levels for the spaces:

AREA	LIGHT LEVEL	IESNA STANDARDS
RAC Parking Space	10 - 20	5
CSB Offices	30	30
QTA	50 - 70	50 - 70
Idle Storage Parking / Roof	10 / 5	5

2. Controls

   a. The lighting controls for this facility will be use Lutron or LCD Control System for each building. Multiple control panels will be provided within each building to support the needed control measures. Overall the lighting control system will be integrated into the BMS system and will allow for remote modification and programming to allow flexibility and expansion.

Emergency Power

1. Local emergency generator and ATSs will be provided at each building to provide power for life safety equipment as required by code, such as exit signs, and for fueling area ventilation but not for elevators and other loads that are not required by code.

8.9 FIRE PROTECTION DESIGN

This section describes the fire protection design requirements for the ConRAC facility.

Codes and Standards

Fire protection systems will comply with the following codes, standards and guidelines:

- City of Los Angeles Building Code – 2014
- City of Los Angeles Fire Code – 2014
- NFPA 13, Standard for the Installation of Sprinkler Systems with Local Amendments – 2013
- NFPA 14, Standard for the Installation of Standpipes and Hose Systems with Local Amendments -2103
- NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection - 2013

Fire Protection Sprinkler Systems Description

Fire sprinkler systems will be provided for the following areas:

- QTA fueling areas - An Extra Hazard Group 1 wet pipe sprinkler system will be provided at fuel dispensing areas within the QTA Buildings. The sprinkler system will be designed to provide a minimum density of 0.30 gpm/sq. ft. over the most hydraulically remote 2,500 sq. ft. area with a hose demand of 500 gpm.
- QTA Vehicle Queuing, Storage, Car Wash, and Car Maintenance - An Ordinary Hazard Group 2 wet pipe sprinkler system will be provided. The sprinkler system will be designed to provide a minimum density of 0.20 gpm/sq. ft. over the most hydraulically remote 2,500 sq. ft. area with a hose demand of 250 gpm.
- QTA office/administrative areas – A Light Hazard wet pipe sprinkler system will be provided. The sprinkler system will be designed to provide a minimum density of 0.10 gpm/sq. ft. over the most hydraulically remote 1,500 sq. ft. area with a hose demand of 100 gpm.
- QTA Janitor Closets, Electrical, IDF, and Elevator Machine Rooms - An Ordinary Hazard Group 1 wet pipe sprinkler system will be provided. The sprinkler system will be designed to provide a minimum density of 0.15 gpm/sq. ft. over the most hydraulically remote 1,500 sq. ft. area with a hose demand of 250 gpm.
- Idle Storage Building - An Ordinary Hazard Group 1 wet sprinkler system will be provided except for those areas that qualify as Light Hazard.
- Ready Return / CSB Building - An Ordinary Hazard Group 1 wet sprinkler system will be provided except for those areas that qualify as Light Hazard.

Fire pumps may be required for the QTA Buildings, the RAC Building and the CSB. The QTA fire pump will be a 1,000 gpm fire pump for the sprinkler demand. The fire pump for the RAC/CSB will be 1,000 gpm for the sprinkler/standpipe demand.

Standpipes for the QTA are proposed to be manual wet Class I standpipes (interconnected) located in each exit stair. This proposal should be reviewed and confirmed with the LA Fire Department.

8.10 FIRE ALARM DESIGN

This section describes the fire alarm design requirements of the ConRAC facility.

Codes and Standards

Fire alarm systems will comply with the following codes, standards and guidelines:

- 2014 City of Los Angeles Building Code
- 2014 City of Los Angeles Fire Code
- 2014 City of Los Angeles Electrical Code
- California and Federal Accessibility requirements
- NFPA 72, National Fire Alarm and Signaling Code with Local Amendments -2013

QTA Fire Alarm System Description

The proposed fire alarm system for the QTA Buildings A and B will be designed as a general evacuation, zoned notification fire alarm system and will be monitored by an approved supervising station. The fire alarm system will be a point addressable system that will monitor fire alarm initiating devices such as manual pull stations, waterflow switches, smoke detectors (for elevator recall), flame detectors (for emergency fuel shut down), heat detectors, supervisory devices such as sprinkler control valves and the status of fire pumps (if required). These devices will light zone graphic annunciators and activate audible horns and strobes on a zoned basis or throughout the facility. The proposed system design will use graphic annunciators which will show the location on floor plates to illustrate the location of the activated alarm initiating device. The main fire alarm control panel and the main graphic annunciators will be located in the main Fire Command Center north of the QTA Building A. Additional fire alarm control panels and graphic annunciators will be located in the secondary fire command centers in QTA Building A and QTA Building B to support fire department operations.

Fire alarm system control panels, subpanels, monitor modules, and smoke detectors will generally be confined to condition spaces. Heat detectors, manual pull stations, and horn/strobe notification appliances used in the open non-conditioned spaces will be rated for temperature range and type of usage. The fire alarm system will be interfaced (via relays) with the QTA fuel shutoff control system to allow for the fire alarm system to initiate fuel systems shutdown and allow for the fuel system safety controls to initiate fire alarm signaling and occupant notification zones.

Manual pull stations will be located at each stairwell exit from the QTA floors and additional manual pull stations will be dispersed throughout the floor areas. Vane-type waterflow switches and sprinkler control valve supervisory switches will be provided for wet sprinkler systems. Explosion proof horn/strobes will be provided at or near the fueling islands. Waterproof horn/strobes will be provided, as needed, in the car wash areas.

8.11 TELECOMMUNICATIONS DESIGN

This section describes the telecommunications and special systems infrastructure design requirements for the ConRAC facility. The telecommunications infrastructure will be designed to be robust, scalable and flexible to respond to the ever-changing and ever-expanding nature of technology. The telecommunications infrastructure is described in more detail below, but consists of the following key components:

- Outside Plant Connection
- Main and Intermediate IT Distribution Rooms
- Optical and copper backbone cabling to interconnect all IT Rooms
- Grounding, HVAC and UPS Systems for all IT Rooms
- Public and Private Data Network Access for all Facility Tenants
- Distributed Antenna System (DAS) for WiFi, Cellular (4G LTE) and Radio Frequency signal distribution

Codes, Standards and References

All telecommunications installation will comply with the latest National Electric Code, the Los Angeles City Building and Safety Electric Code, and the specific codes, standards, and methodologies listed below.

If there is an apparent conflict between this specification and any code or standard, then the NEC and City of Los Angeles Building and Safety Codes shall prevail.

Standards and practices that prevail and are generally accepted within the industry shall be used to assure the highest quality materials, equipment and workmanship. The following are industry standard Codes, Standards and References governing infrastructure installation at the ConRAC Facility (newest version or release):

ANSI/ICEA S-83-596	Fiber Optic Premises Distribution Cable Technical Requirements.
ANSI/NEMA FS 1	Fittings and Supports for Conduit and Cable Assemblies.
ANSI/TIA/EIA 107	Return Loss for Fiber Optic Components.
ANSI/TIA/EIA-455-A	Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components (FOTPs) Standard Test Procedures for Optical Fibers & Cables.
ANSI/TIA/EIA 455-60	Measurement of Fiber or Cable Length Using An OTDR.
ANSI/TIA/EIA 455-61	Measurement of Fiber or Cable Attenuation Using An OTDR.
ANSI/TIA/EIA 455-95	Absolute Optical Power Test for Optical Fibers and Cables.
ANSI/TIA/EIA -526-7	Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
ANSI/TIA/EIA 455-171	Attenuation by Substitution Measurement - for Short-Length Multimode Graded-Index and Single-mode Optical Fiber Cable Assemblies.
ANSI/TIA/EIA-568-C.1	Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
ANSI/TIA/EIA-568-C.2	Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components
ANSI/TIA/EIA-568-C.3	Commercial Building Telecommunications Cabling Standard Part 3: Optical Fiber Cabling Components
ANSI/TIA/EIA –569-B	Commercial Building Standard for Telecommunications Pathways and Spaces
ANSI/TIA/EIA -607	Commercial Building Grounding and Bonding Requirements for Telecommunications

ANSI/TIA/EIA –758	Customer-Owned Outside Plant Telecommunications Cabling Standard
ANSI/TIA/EIA – 854	A Full Duplex Ethernet Specification for 1000Mb/s (1000BASE-TX) Operating over Category 6 Balanced Twisted-Pair Cabling
ANSI/TIA/EIA – 862	Building Automation Systems Cabling Standard for Commercial Buildings
ANSI/TIA/EIA-4750000B	Generic Specifications for Fiber Optic Connectors.
BICSI	Telecommunications Distribution Methods Manual (Tenth Edition).
FCC 47 Part 68	Code of Federal Regulations, Title 47, Telecommunications.
IEEE	National Electrical Safety Code (NESC)
LADBS	Los Angeles Department of Building and Safety - City of Los Angeles Electrical Code.
	LAWA Design and Construction Handbook
	LAWA IMTG IT Standards of Practice
NEMA 250	Enclosures for Electrical Equipment (1000 V Maximum).
NFPA-70	National Electric Code
TIA/EIA TSB 67	Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
TIA/EIA TSB 72	Centralized Optical Fiber Cabling Guidelines.
TIA/EIA TSB 75	Additional Horizontal Cabling Practices for Open Offices.
UL 1459 Underwriters	Laboratories Standard for Safety – Telephone Equipment.
UL 1863 Underwriters	Laboratories Standard for Safety – Communications Circuit Accessories.

Abbreviations

ACAMS	Access Control and Monitoring System
ACR	Attenuation to Crosstalk Ratio
AWG	American Wire Gage
ANSI	American National Standards Institute
BTU	British Thermal Units
BICSI	Building Industry Consultants Service International
BOAC	Board of Airport Commissioners
CAT	Category e.g. CAT6
CATV	Cable Television
CCTV	Closed Circuit Television
EIA	Electronic Industries Association
EMT	Electrical Metal Tubing
IT	Information Technology
ITMG	(LAWA) Information Technology and Management Group
MPOE	Minimum Point Of Entry
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NEXT	Near End Crosstalk
O.D.	Outer Diameter
OSP	Outside Plant
OTDR	Optical Time Domain Reflectometry
PVC	Polyvinyl Chloride
GRC	Galvanized Rigid Conduit
SM	Singlemode fiber optic cable
TDR	Time Domain Reflectometry
UTP	Unshielded Twisted Pair

WAO Work Area Outlets

Telecommunications Systems Description

The anticipated systems that the telecommunications infrastructure will need to be able to support are listed in the table below.

Category	Individual System
Data and Telephone Services	Telephone and Communications Systems Public Pay Telephones Cellular Telephone Systems (4G LTE) IT Rooms Voice and Data Cabling for workstations, kiosks etc. Data Networks Wireless LAN
Visual Information Systems	Flight Information Display System (FIDS) Branding Displays Master Antenna Cable Television
Security Systems	Duress Alarm CCTV System Access Control and Alarm Monitoring Automatic License Plate Recognition
Facility Management Systems	Public Address System Trunked Mobile Radio (TMR)
Intermodal Transportation Systems	Systems Associated with the APM Future Baggage Tracking Systems

The foundation for a flexible IT network distribution in the ConRAC complex is an industry standards compliant telecommunications infrastructure which ensures that access to the data network is available at any part of the facilities and high speed access to data networks outside of the facility.

Access to Outside Telecommunications Services

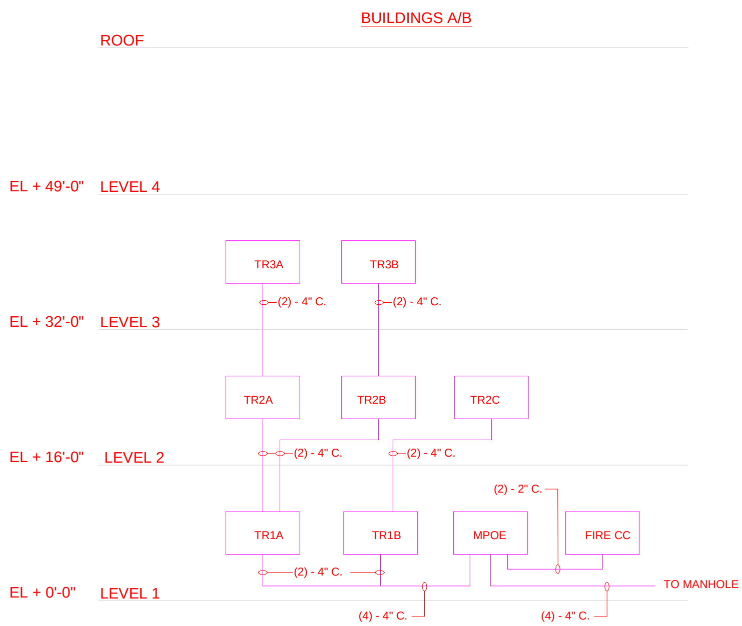
The ConRAC will be fed by four conduits in underground duct bank to connect the nearest manhole on Arbor Vitae Boulevard. These conduits will route to the Main Equipment Room (MER/MPOE) on the northeast corner of the QTA Building A. Conduits coming into the facility will route alongside the main electrical services entering the building. This entry point will provide AT&T and other service providers access to the facility for them to pull in their cabling.

Fiber connection to the LAWA Central Terminal Area is envisioned to be brought to the ConRAC via the new Automated People Mover track system.

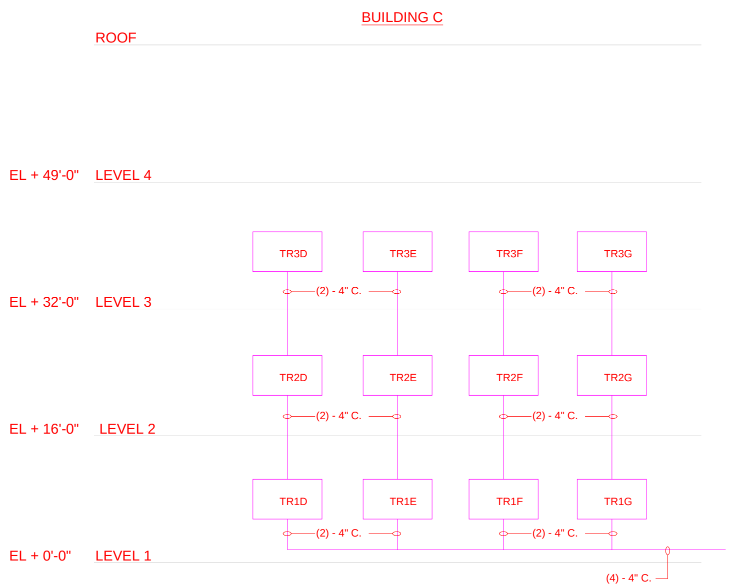
Minimum Point of Entry

The MPOE will serve as the main distribution point for fiber and copper cabling to all IT Rooms throughout the facility. This room needs to be a minimum of 12 feet x 30 feet and have redundant connections to outside data services. All IT rooms shall connect to the main telecommunications room (MPOE) with a minimum of two 4-inch conduits. From the MPOE to each IT Room, provide a minimum 72 strand single-mode optical fiber, 100-pair copper cable and a No. 6 AWG ground cable. Provide at least one 42-inch deep equipment cabinet for larger chassis equipment and 36-inch cabinets for standard equipment.

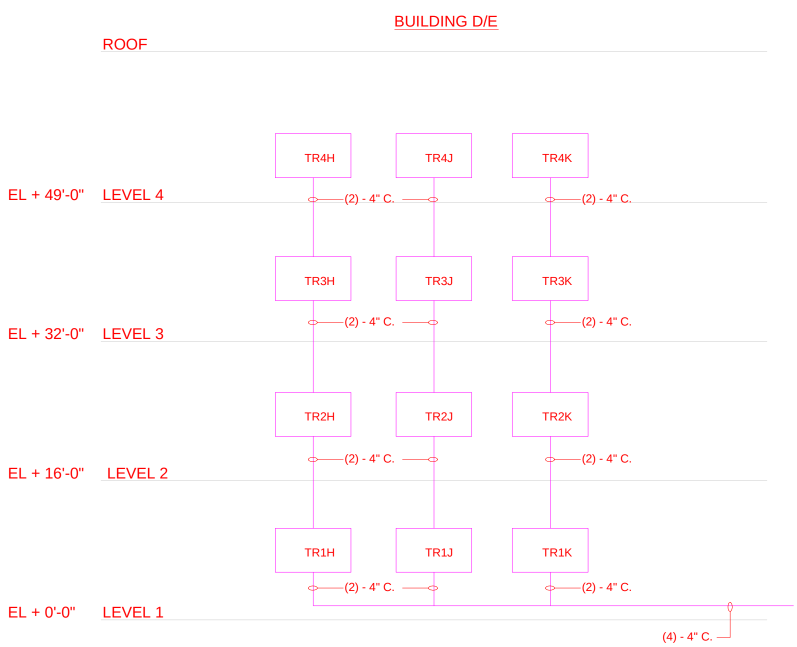
The figure below shows the recommended IT Rooms per Building and Level.



Buildings A/B IT Room Riser Diagram



Building C IT Room Riser Diagram



Buildings D/E IT Room Riser Diagram

IT Rooms

Since at this stage of the facility planning, the locations for network devices (work stations, kiosks, electronic signage, cameras, etc.) are not yet determined, it is critical that there are IT Rooms within standard required distance. Refer to conceptual floor plan drawings that show preliminary numbers of required IT Rooms to accommodate required cable distances.

The following are critical requirements taken from the LAWA IMTG *IT Standards of Practice* for the provisioning of IT Rooms:

- The environment surrounding the location of the IT room must be free from sources of electromagnetic interference.
- The immediate environment surrounding the IT room cannot contain equipment such as steam boilers, compressors, chilled/hot water pipes, elevator equipment, electrical co-generation equipment, or waste processing.
- The location must be above any potential flood zones, including not being located below rest rooms. Water, sewage or storm drainage piping shall not be run through IT Rooms.
- IT rooms need be located away from flying dirt and debris (i.e. airline equipment ramps). If that is not feasible, then the IT rooms shall have positive ventilation and magnetic gasketing.
- IT rooms need to be accessible from a corridor, stairwell, and/or a service elevator large enough for cabinet and equipment loading and servicing.
- The location and quantity of telecommunications rooms shall be designed so that the maximum distance from the IT room to any field device that the room supports shall not exceed 250 feet via the longest possible route (i.e. right angles) traveled by the cable from the room to the field device. This includes all work area outlets, ACAMS card readers, cameras, access points, displays, antennas, etc.
- If the distance from the IT room to the furthest field device exceeds 250 feet via the longest possible route, then another IT room shall be installed to accommodate the distant field devices.
- Where feasible, to maximize coverage of an IT room, IT rooms should be located near the center of the floors that they serve, and there shall be a minimum of at least one IT room per floor.
- Within a building, if there are two or more IT rooms per floor, then the distance from one IT room to an adjacent IT room shall not exceed 500 feet via the longest possible pathway route (i.e. right angles).
- In a multi-level building, IT rooms on different floors should stack on top of each other. Straight vertical cable risers should be established for the purpose of cable routing.
- Size for typical IT Rooms should be approximately 11 feet x 24 feet or approximately 264 sq. ft. IT Rooms shall not be less than 11-foot wide to allow for code required clearances behind and in front of equipment cabinets. IT Rooms that contain six to seven equipment cabinets plus one or two UPS cabinets. It is preferable to have the UPS in one cabinet footprint – leaving seven equipment cabinets.

- Sizing IT rooms for office locations is different than sizing for rooms to support active equipment. IT rooms sizes for offices shall be based upon the number of work stations supported. Final room sizing, location, orientation, and layout shall be reviewed with LAWA for approval beforehand.

- Provide and install a dedicated ceiling-mounted air conditioning unit w/ reheat and humidification function (LAWA Standard is Liebert). Unit shall be installed immediately outside of the IT space to provide for 24-hour service.

- Air conditioning unit shall be chilled water type. If a suitable chilled water source does not exist, contractor shall coordinate with the owner to specify a DX system based on existing conditions and using the same capacities as outlined.

- Air units shall be sized according to max user equipment loads in the space as calculated by the UPS size in kW for both TR an MPOE rooms.

- Inside temperature shall be maintained between 64 deg F to 75 deg F, at between 30% and 55% relative humidity.

- A thermostat shall be provided within the room.

- New electrical distribution will be provided in each IT room.

    - A 225A, 277/480 volt, 3-phase, 4-wire panel board will be dedicated for each IT room.

    - A 75 KVA transformer will be provided to serve a 225A, 120/208 volt, 3-phase, 4-wire panel board.

    - A 125A, 120/208 volt, 3-phase, 4-wire sub-panel will be provided for additional circuits where needed.

- Provide a minimum 20kVA/16kW UPS for conditioned user equipment loads as the basis for design for typical IT Rooms (LAWA Standard is Liebert).

- For the MPOE, use a minimum 30kVA/24kW for conditioned user equipment loads as the basis for design.

- All IT room doors shall be sealed for dust-proofing, have positive ventilation, and all ventilation ducts into the room shall be filtered for dust abatement purposes.

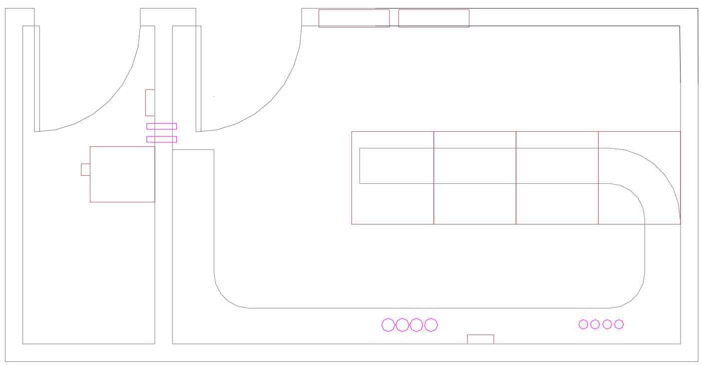
- Provide self-contained double-interlocked pre-action riser system to support IT Room. Location of pre-action cabinet shall be outside of IT Room space and shall be coordinated with owner for approval.

- Interior Illumination Level: Except where limited by Title 24 energy guidelines, illumination foot-candle levels will be as follows (as prescribed in the latest edition of the LAWA Infrastructure Standards of Practice Guidelines:

    - IT Room: 50 foot candles measured at 3 feet-3 inches above the floor.

    - Lighting Control: Occupancy sensors will be provided in the fire protection and IT Rooms.

The following figure shows a typical IT Room layout with cabinets cable tray.



Typical IT Room Layout with Adjacent Tenant Closet

Voice and Data Cabling

The voice and data cabling consists of the following media installed in accordance with best practice and TIA/EIA standards:

- Singlemode optical fiber
- Category 3 copper voice cabling
- Category 6A UTP
- Specialized *cable (for ACS, paging etc).*

Visual Information Display Systems

It is anticipated that flight information displays would be desired in the RAC Building for customers heading to the APM heading to the Airport. Waiting and lounging areas would be provided with cable television and rental counters would desire branding and advertising displays.

8.12 SECURITY DESIGN

This section describes the security systems design requirements for the ConRAC facility. The systems will be designed to not only provide 24/7 situational awareness, but also provide forensic information required to investigate and prosecute criminals and address problematic activity. Anticipated security systems to be provided are:

- Access control to back of house areas, IT Rooms and other office areas with high value assets
- CCTV surveillance cameras, recording and playback
- Automatic License Plate Reader system
- Rental counter duress call system

Access Control and Monitoring System (ACAMS)

The ACAMS provides electronic access control, door position monitoring, intrusion detection, and input and output control functions. Areas not intended for public access (i.e. back-of-house) shall be controlled via ACAMS.

All access control panels and electrified locking hardware power supplies shall be located in LAWA IT Rooms. There are standard details and installation requirements for security junction boxes (SJB) and wall-mounted security panels.

Provide ACAMS Workstations as required for tenants and facility security personnel. They include monitors, operating system, virus software and software licenses for fully functional workstations. All equipment will be powered by a UPS with a capability to support operations for at least ninety (90) minutes after supply power loss.

Closed Circuit Television (CCTV) Surveillance

Stakeholder workshops will be required to determine what areas tenants and LAWA require video surveillance.

In addition, 'damage capture cameras' will be provided that provide the ability to go back and check video for cars that left with damage when there is a dispute with a renter.

The video management system (VMS) shall be an extension to the existing system currently deployed throughout the Airport (NiceVision). Contractor shall provide user licenses for each camera and workstation as required by NiceVision.

Video recording and storage shall be an extension to the existing LAWA NiceVision system. Designer shall coordinate with ATBS for required model video servers and central storage servers. Submit storage calculations to LAWA for approval.

All cameras shall be IP camera technology and connect to LAWA approved IP switches. The Security Systems Contractor or approved subcontractor shall be certified security system installer for the specific type of cameras being installed. Contractor shall coordinate connection and activation on the LAWA network with OIT who will provide IP address and port assignments. Programming and configuration of all necessary camera parameters is by the contractor. All cameras shall be configured using the LAWA assigned camera name per the LAWA naming convention.

Camera standards are as follows:

- Pan-Tilt-Zoom (PTZ) interior - Sony SNC-WR600
- PTZ exterior - Sony SNC-WR602C

Roof top cameras or cameras requiring long distance viewing - Sony SNC-WR632

- Fixed interior - P3301Sony model SNC-VM601
- Fixed exterior - Sony model SNC-VM601 with ceiling flush mount housing Sony YT-ICB600

802.3at PoE Power Injector - PowerDsine model PD-9500G

Provide a Category 6 UTP or a 6-strand singlemode optical fiber cable to each camera

All equipment will be powered by a UPS with a capability to support operations for at least ninety (90) minutes after supply power loss.

If available, receive approval for CCTV camera mounting arrangement and final locations utilizing 3D modeling (BIM). If 3D modeling is not available, Contractor shall demonstrate or provide high definition photographs of proposed camera views to Stakeholders using a CCTV camera. This shall be performed when construction has advanced enough to view final major architectural features and potential obstructions.

Automatic License Plate Reader (ALPR) System

Entry and Exit facilities will be provided with ALPR cameras that have integral recording and archiving.

8.13 SIGNAGE/WAYFINDING DESIGN

This section describes the signage and wayfinding requirements for the ConRAC facility. The primary objectives for an effective signage and wayfinding package are as follow:

- Presents concise, comprehensible and legible wayfinding information, in a consistent format throughout the facility.
- Enhance user experience by ensuring accessibility compliance and maximizing functionality and durability of the signage system.
- Accommodate rental car customers who arrive to the facility via different modes of transportation: APM, shuttle bus or private vehicles.
- Orient arriving customers to customer service areas for the rental car company of their choice or directly to the RAC floor for preferred customer rentals.
- Orient customers returning their vehicles to the most direct and safest path to return to the terminals.
- Direct rental car customers exiting the facility to the roadway system toward the freeway and direct rental car customers returning their vehicles to exit the roadway system and enter the facility at the floor where their rental car company operates.

During the design phase, the appearance, graphics, materials, location and mounting of all signage elements will be developed for review with project stakeholders.

8.14 INTEGRATION OF PUBLIC ART

One of the objectives of this project is to integrate public art with the architecture of the building through creative use of materials and construction methods, resulting in an improved public environment through the enhancement of city buildings and spaces with quality works of art by professional artists. It is expected that public art integration will apply to areas that are publicly accessible, such as in the CSB courtyard, RAC circulation cores and Bus Plaza areas.

8.15 SUSTAINABLE DESIGN

This section describes sustainable design requirements and guidelines for the ConRAC facility.

The prevailing green code for the City of Los Angeles is the 2014 L.A. Amendment Green Building Code (Article 9, Chapter IX of L.A. Municipal Code, amended by Ordinance No., 182849). This is an amendment of the 2013 California Green Building Standards Code (“CalGreen”). The L.A. Amendment Green Building Code requires certain mandatory measures for non-residential buildings (Division 5 in L.A. Green Code and Chapter 5 in CalGreen Code). In addition, the L.A. Green Code contains two sets of Nonresidential Voluntary Measures (Division 12, Appendix A5 of L.A. Green Code and Appendix A5 in CalGreen Code) – Tier 1 and Tier 2.

LAWA has established the minimum requirement of achieving all L.A. Green Code Tier 1 voluntary measures for the ConRAC project. LAWA has also expressed their preference to achieve as many Tier 2 voluntary measures as practical and continue to develop a range of sustainability features/requirements of the ConRAC. A series of sustainability planning sessions was held with the design team, EIR team, and LAWA personnel to identify sustainability measures that will be targeted for incorporation and to determine performance metrics for energy and water use of this facility.

Section 9: Traffic Analysis

Traffic analysis for the current concept is in progress and will be included in future submittal.

Section 10: Cost Estimates

10.1 COST ESTIMATES FOR CURRENT CONCEPT

A Rough Order of Magnitude (ROM) cost estimate has been prepared to reflect the project team's opinion of the anticipated construction cost for the overall project. The preparation of this estimate is based on the concept refinement level documents. The detailed estimate is included as Appendix 10.1.

Section 11: Construction Schedule and Phasing

11.1 CONSTRUCTION SCHEDULE AND PHASING

The high-level schedule for the ConRAC indicates completion of the new facility by the end of 2022. The APM is anticipated to be operational simultaneous with the completion of the ConRAC.

Activity Description	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Environmental Impact Report										
Pre-Design / Design										
ConRAC Construction										
APM Construction										

Appendix 3.1: Bus Trip Time Analysis

3.1.1 OVERVIEW BUS OPERATIONS

As outlined in Section 3.1, should the ConRAC open prior to the APM being operational then passengers would be transported between the ConRAC and the LAX CTA via a bus system using a common fleet of buses. For trip time analysis purposes this interim busing operation is assumed to have the following general characteristics:

- 40 feet long buses as depicted in Figure 3.1.A below with a capacity of 30 passengers per bus and an assumed average peak load of 24 passengers per bus.

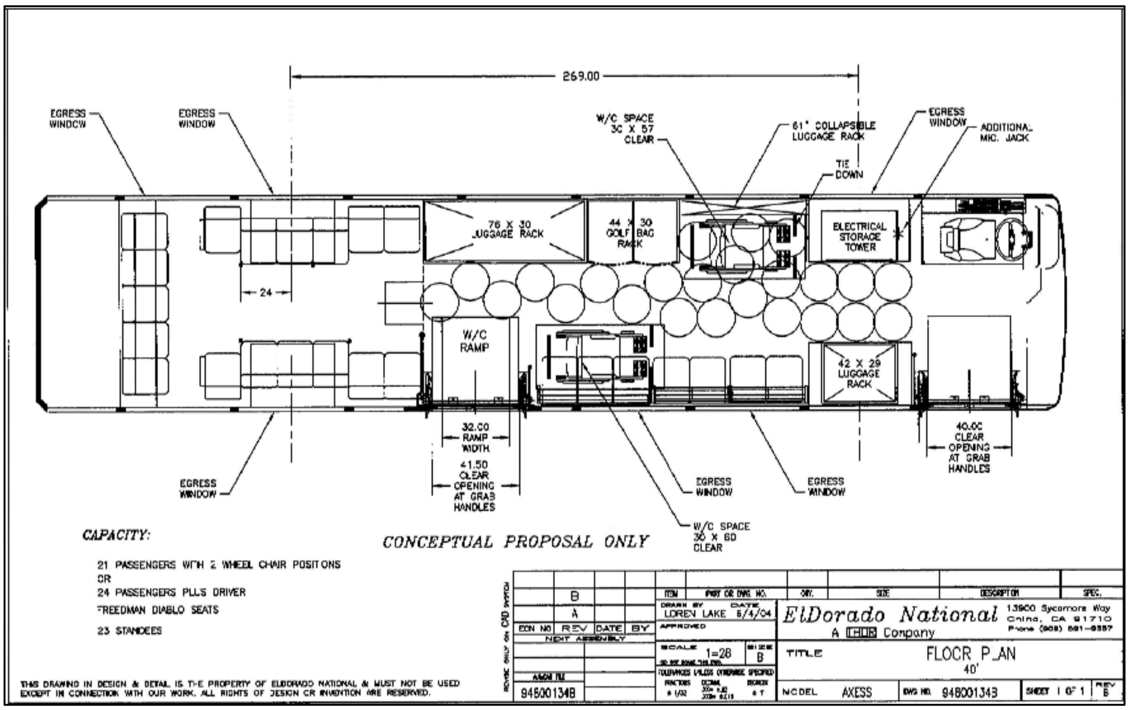


Figure 3.1.A
Dimension of Typical Rental Car Shuttle Bus
Source: Lea + Elliott, January 2014
Prepared by: Lea + Elliott, January 2014

- Buses will be equipped with luggage racks and ConRAC passengers will be transported with their luggage/bags on board.
- The ConRAC bus service would drop-off passengers on the departures level within the CTA, and pick-up passengers on the arrivals level.
- Three separate routes would operate between the ConRAC and CTA, in order to distribute the passenger load among the seven terminal stops within the CTA and reduce average trip trips times per passenger.

- As depicted in **Figure 3.1.B**, between the ConRAC and CTA it is assumed that buses, would travel westbound along W. Arbor Vitae St. to Aviation Boulevard, southbound along Aviation Boulevard to W. Century Boulevard, and then proceed westbound along W. Century Boulevard to the departures level roadway to their receptive stops within the CTA.

	Stop Pattern
Route 1	T1, T2, T3/TBIT
Route 2	TBIT/T4, T6
Route 3	T5, T7/T8

Figure 3.1.B
Assumed Shuttle Bus Routes between ConRAC and LAX CTA
Source: TranSystems, December 2015
Prepared by: TranSystems, December 2015

As an Alternative scenario, a "single-level" bussing operation was also studied. In this scenario, busses would drop-off and pick-up passengers only at the departures level. This would require arriving passengers, with bags to claim, to transfer from the lower level, up to the departures level, after claiming their bags.

3.1.2 BUS ROUNDTRIP TIMES

The next step in the analysis was to estimate bus running times on the defined routes. This was developed as follows:

- The route between the ConRAC and the CTA was divided into a series of roadway links and the length of each link was measured in feet.
- The analysis assumes an average travel speed of 20 mph which is the projected traffic conditions for a mid-afternoon on a Friday in 2023.
- Link distance and bus speed were then combined to derive travel time through each link.
- For those links where a traffic signal is present, a delay factor of 0.75 was also added to link time.
- Bus trip times were analyzed for both dual-level and single-level operations. The bus trip times for the dual level operation include the time for busses from the departure level to recirculate down to the arrivals level.
- The resulting travel times by link are shown in Table 3.1.A for the dual-level operation and Table 3.1.B for the single-level operation.

Per the link values in Table 3.1.A, the round trip time for the dual-level operation, without stops, is approximately 38 minutes. Per the link values in Table 3.1.B, the round trip time for the single-level operation, without stops, is approximately is 29 minutes.

Table 3.1.A Dual-Level Bus Travel Time by Link on Existing Roadways
From ConRAC at Manchester Square through LAX CTA and Back

Roadway		Segment		Distance (ft)	Speed (mph)	Travel Time (min)	Signal Delay	Link Time W/Signal Delay
#	Street	From	To					
0	Concourse War	ConRAC	Arbor Vitae St.	1,313	20	0.75	Y	1.50
1	Arbor Vitae St.	Concourse Way	Aviation Bl	521	20	0.30	Y	1.05
2	Aviation Bl	Arbor Vitae St	Century Bl	2,657	20	1.51	Y	2.26
3	Century Bl	Aviation Bl	Bellanca Ave	457	20	0.35	Y	1.10
4	Century Bl	Bellanca Ave	International Rd	477	20	0.36	Y	1.11
5	Century Bl	International Rd	Airport Bl	1,361	20	0.77	Y	1.52
6	Century Bl	Airport Bl	Avion Dr	1,231	20	0.70	Y	1.45
7	Century Bl	Avion Dr	World Way Ramp	790	20	0.45	Y	1.20
8	World Way Ramp	Century Bl	T1	2,475	20	1.41		1.41
9a	World Way N	T1	T1.5	405	20	0.31		0.31
10a	World Way N	T1.5	T2	405	20	0.31		0.31
11a	World Way N	T2	T2.5	550	20	0.31		0.31
12a	World Way N	T2.5	T3	550	20	0.31		0.31
13a	World Way N	T3	TBIT	720	20	0.41	Y	1.16
14a	World Way	TBIT	T4	705	20	0.40		0.40
15a	World Way S	T4	T5	600	20	0.34	Y	1.09
16a	World Way S	T5	T6	812	20	0.46		0.46
17a	World Way S	T6	T7	650	20	0.37	Y	1.12
18a	World Way S	T7	T8	340	20	0.26		0.26
19a	World Way S	T8	T1	2276.9	20	1.29	Y	2.04
9b	World Way N	T1	T1.5	405	20	0.31	Y	0.31
10b	World Way N	T1.5	T2	405	20	0.31	Y	1.06
11b	World Way N	T2	T2.5	550	20	0.31	Y	0.31
12b	World Way N	T2.5	T3	550	20	0.31	Y	1.06
13b	World Way N	T3	TBIT	720	20	0.41	Y	0.41
14b	World Way	TBIT	T4	705	20	0.40	Y	1.15
15b	World Way S	T4	T5	600	20	0.34	Y	0.34
16b	World Way S	T5	T6	812	20	0.46	Y	1.21
17b	World Way S	T6	T7	650	20	0.37	Y	0.37
18b	World Way S	T7	T8	340	20	0.26	Y	1.01
19b	World Way Ramp	T8	Century Bl	2374.7	20	1.35	Y	1.35
20	Century Bl	World Way Ramp	Avion Dr	790	20	0.45	Y	1.20
21	Century Bl	Avion Dr	Airport Bl	1,231	20	0.70	Y	1.45
22	Century Bl	Airport Bl	International Rd	1,361	20	0.77	Y	1.52
23	Century Bl	International Rd	Bellanca Ave	477	20	0.36	Y	1.11
24	Century Bl	Bellanca Ave	Aviation Bl	457	20	0.35	Y	1.10
25	Century Bl	Aviation Bl	Concourse Way	949	20	0.54	Y	1.29
26	Concourse Way	Century Bl	ConRAC	1,313	20	0.75	Y	1.50

Total Time W/ Signal Delay	38.10
Total Dwell Time	18.00
Total Round Trip Time	56.10

Source: Lea + Elliott, January 2014 – updated by TranSystems January 2016
Prepared by: TranSystems, January 2016

Table 3.1.B Single-Level Bus Travel Time by Link on Existing Roadways From ConRAC at Manchester Square through LAX CTA and Back

Roadway		Segment		Distance (ft)	Speed (mph)	Travel Time (min)	Signal Delay	Signal Delay	Link Time W/Signal Delay
#	Street	From	To						
0	Concourse War	ConRAC	Arbor Vitae St.	1,313	20	0.75	Y	0.75	1.50
1	Arbor Vitae St.	Concourse Way	Aviation Bl	521	20	0.30	Y	0.75	1.05
2	Aviation Bl	Arbor Vitae St	Century Bl	2,657	20	1.51	Y	0.75	2.26
3	Century Bl	Aviation Bl	Bellanca Ave	457	20	0.35	Y	0.75	1.10
4	Century Bl	Bellanca Ave	International Rd	477	20	0.36	Y	0.75	1.11
5	Century Bl	International Rd	Airport Bl	1,361	20	0.77	Y	0.75	1.52
6	Century Bl	Airport Bl	Avion Dr	1,231	20	0.70	Y	0.75	1.45
7	Century Bl	Avion Dr	World Way Ramp	790	20	0.45	Y	0.75	1.20
8	World Way Ramp	Century Bl	T1	2,475	20	1.41			1.41
9a	World Way N	T1	T1.5	405	20	0.31			0.31
10a	World Way N	T1.5	T2	405	20	0.31			0.31
11a	World Way N	T2	T2.5	550	20	0.31			0.31
12a	World Way N	T2.5	T3	550	20	0.31			0.31
13a	World Way N	T3	TBIT	720	20	0.41	Y	0.75	1.16
14a	World Way	TBIT	T4	705	20	0.40			0.40
15a	World Way S	T4	T5	600	20	0.34	Y	0.75	1.09
16a	World Way S	T5	T6	812	20	0.46			0.46
17a	World Way S	T6	T7	650	20	0.37	Y	0.75	1.12
18a	World Way S	T7	T8	340	20	0.26			0.26
19b	World Way Ramp	T8	Century Bl	2374.7	20	1.35	Y		1.35
20	Century Bl	World Way Ramp	Avion Dr	790	20	0.45	Y	0.75	1.20
21	Century Bl	Avion Dr	Airport Bl	1,231	20	0.70	Y	0.75	1.45
22	Century Bl	Airport Bl	International Rd	1,361	20	0.77	Y	0.75	1.52
23	Century Bl	International Rd	Bellanca Ave	477	20	0.36	Y	0.75	1.11
24	Century Bl	Bellanca Ave	Aviation Bl	457	20	0.35	Y	0.75	1.10
25	Century Bl	Aviation Bl	Concourse Way	949	20	0.54	Y	0.75	1.29
26	Concourse Way	Century Bl	ConRAC	1,313	20	0.75	Y	0.75	1.50

Total Time W/ Signal Delay	28.83
Total Dwell Time	18.00
Total Round Trip Time	46.83

Source: Lea + Elliott, January 2014 – updated by TranSystems January 2016
Prepared by: TranSystems, January 2016

3.1.3 BUS PASSENGER DWELL TIMES

The next step, in estimating the overall trip time, was to factor in the dwell time at each stop required to allow passengers to board and de-board the bus. Dwell times were computed based on the following set of assumptions:

- The average boarding/deboarding time per passenger is estimated to be 5 seconds per field observations of the rental car shuttle bus operation conducted at the Phoenix ConRAC
- The average load per bus per trip is 24 passengers inbound to the CTA and 24 outbound to the ConRAC.
- This translates to an average overall dwell of 12 minutes for each bus, within the CTA, as the busses pass through the CTA.
- An additional 6 minute dwell is assumed at the ConRAC stop, allowing passengers to fully board and de-board a bus.
- The total dwell time for all stops within the CTA, plus the dwell time at the ConRAC is estimated to be approximately 18 minutes.

3.1.4 INBOUND BUS TRIP TIMES

Total inbound passenger trip times were then estimated for each of the three respective routes and stops based on the following:

- Running times from Tables 3.1.A and 3.1.B.
- Dwells by route and stop assuming each bus will carry on average 24 passengers.
- Passenger boarding and de-boarding would be equally divided among the various stops on each route and dwell times by stop were computed accordingly.
- Walk time from the bus stop to the entrance of the destination terminal was then added based on an assumed walk rate of 120 feet per minute.

The total estimated inbound time, from the ConRAC to each terminal, derived per the above is summarized in Table 3.1.C. The trip time to each terminal for the dual-level option is shorter than the trip time for the single-level option. The reason for this is that under the single-level option, the dwell time at each stop is longer because the busses are waiting to unload plus load passengers.

Table 3.1.C
Estimated Inbound Passenger Trip Time from ConRAC to Terminal Entrance

Destination Terminal	Trip Time (min)	
	Dual -Level	Single - Level
T1	17	17
T2	21	21
T3	22	26
TBIT	18	21
T4	20	21
T5	21	22
T6	25	29
T7	26	30
T8	28	30

Source: Lea + Elliott, January 2014 – updated by TranSystems January 2016
Prepared by: TranSystems, January 2016

3.1.5 OVERALL ROUNDTRIP TIME

The overall roundtrip time for both options is the sum of the bus roundtrip times, per the link values in Tables 3.1.A and 3.1.B, plus the total passenger dwell time of 18 minutes. The resulting total estimated round trip time is 56 minutes for the dual-level busing, and 47 minutes for the single-level bussing operation.

3.1.6 BUS FLEET REQUIREMENTS

The 2023 bus fleet requirements were calculated both for a dual level and a single level operation. Table 3.1.D summarizes the fleet calculations. The number of bus trips required in the peak hour was calculated based on dividing the total peak hour passengers in 2023, from Section 2.5, by the average passengers per bus. Then the total number of peak hour buses required was calculated by dividing the peak hour bus trips by the average number of bus trips per hour. The total fleet required adds spare buses based on 15 percent of the number of peak hour buses required. The resulting total fleet requirement is 114 buses for the dual level operation and 97 buses for the single-level operation.

Table 3.1.D
Bus Fleet Requirements for Interim Shuttle Bus Operation

	Drop-off and Pick-up		
	Dual - Level	**Single - Level**	
Total Peak Hour Passengers	2,480	2,480	passengers
Average Passengers Per Bus	24	24	passengers/bus
No. of Bus Trips in peak hour	104	104	bus trips
Average Roundtrip Time/Bus	56	47	minutes
Bus Trips Per Hour	1.1	1.3	trips/hour
No. of Buses Required iin the Peak	99	84	buses
No. of Buses Per Route	33	28	buses
Frequency of Buses Leaving the ConRAC Bus Plaza	1.7	1.4	buses/minute
Fleet Required with 15% Spares	114	97	buses

Source: Lea + Elliott, January 2014 – updated by TranSystems January 2016
Prepared by: TranSystems, January 2016

Appendix 4.1 Code Compliance for Multi-Level Fueling Facilities LADBS / LAFD Information Sessions Minutes and Presentations

LAX ConRAC – Los Angeles Fire Department Kick-Off Meeting

Meeting Date: Wednesday, June 3, 2015, 10:00am – 11:30am PDT
Location: Room 210, LAWA Administration Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to provide a briefing to the Los Angeles Fire Department regarding design of the Consolidated Rental Car Facility (ConRAC), and particularly on the unique features of a Quick Turn-Around (QTA) Facility, code considerations and approvals. See Attachment A2 for copy of meeting agenda. A document entitled QTA Background Information, dated May 26, 2015, was distributed to the attendees prior to this meeting and is included with the minutes as Attachment A3.

The items discussed are noted below. Items in **Bold Font** represent action items to which the design team or LAWA will respond.

1. Jeff Jarvis, project manager from TranSystems, provided an introduction of the design firms and their respective role: TranSystems is the architect of record; Stantec Consulting is the engineer of record for the fuel systems: Aon Fire Protection is the fire protection engineer for life safety of the buildings; RAW International is a local architectural firm who will be providing assistance with permitting and coordination of reviews by agencies. The primary duty is to make the project safe.
2. Pat Tomcheck, Senior Project Manager with LAWA, provided a background of the project to LAFD personnel and explained that this team has spent the past 14 to 15 months developing programming of the project to size the ConRAC to meet expected growth in rental car activity into the future. The ConRAC project is actually part of a larger program called LAX Landside Access Modernization Program (LAMP), which includes an Automated People Mover with three stations from the Central Terminal Area (CTA) to the ConRAC, two Intermodal Transit Facilities (ITF), and connections to Metro Stations. LAWA is preparing a draft Environmental Impact Report (EIR), anticipated to be completed by April 2016. The Design Team is engaged in 30% conceptual design of the project. Completion of program will be 2017 at the earliest.
3. The ConRAC and the East ITF will be sited at Manchester Square, bordered by W. Arbor Vitae St to the north, S. La Cienega Blvd to the east, 98th St to the south and Aviation Blvd to the west. The site is mostly owned by LAWA, with the exception of a few properties that are privately owned. The different parts of the ConRAC Facility, including the Ready/Return Garage, a Customer Service Building, a Support Building for storage of vehicles, and the QTA for fueling, washing and light maintenance of rental car vehicles, were described.
4. Mr. Jarvis noted that even though a ConRAC may look like a garage, it is actually quite different. In a typical airport parking garage, a car may be parked there for a long period of time. At a ConRAC, the same parking space will be turned over three to six times a day. This facility at LAX is expected to handle 20,000 rental car transactions in a day. To meet this demand, vehicles need to be serviced as quickly as possible, to allow the rental car to be turned around and be ready for next customer. The QTA is proposed to be elevated and stacked above other QTA floors, in order to provide secured transition from the RAC ready/return areas and the QTA areas. The Storage Building will handle the peaks of the rental car

business, by allowing close access to a ready vehicle that can be moved quickly to a stall in the RAC Garage, ready for customer pick-up.

5. This facility also needs to address needs of two different types of customers: frequent business travelers who want to get through the car rental process as quickly as possible and get on the road and leisure travelers that are often in a big group or family, with lots of luggage and questions.
6. RB Laurence, a mechanical engineer with Stantec Consulting, will be the engineer of record for the fuel systems. He noted that this will be the first of many meetings with the Fire Department, and that the team is interested in hearing input from LAFD so any requirements can be accommodated. Safety and welfare of the occupants in the facility will be the primary objective for the project.
7. The QTA will be designed to restrict public access. Dedicated vehicular paths are provided for moving of vehicles by rental car employees only and are segregated from normal customer rental and return routes. It was noted that the typical turn-around time for a vehicle at the QTA is between 12 and 15 minutes. While a car is parked at the fuel island, the rental car service agent will also vacuum the interior of the vehicle, check/refill tire pressure and windshield washer fluid. The time spent on fueling is typically less than a minute. The quantity of fuel dispensed per vehicle is less than the typical corner gas station, since vehicles are often returned with the gas tank full or nearly full. Car wash tunnels are provided for washing of cars, typically the last step before the vehicle is returned to the ready stall. A number of light maintenance bays are also included in the program to allow rental car agencies to perform oil change and tire change as required.
8. Fuel storage will be underground at site location near the QTA buildings. The rental car industry prefers to have up to 8 days of storage capacity, but this will be verified. The team anticipates that a total of 240,000 gallons of fuel will be stored in six (6) 40,000-gallon underground tanks. 10,000 to 15,000-gallon windshield washer fluid underground storage tanks are anticipated to be required and will be pumped up to protected day tanks within the QTA Facility.
9. Code requirements to allow indoor fueling were reviewed. Recognizing that a facility of this nature does not fit within the constraints of the Fire Code, a performance-based approach will be utilized in the design of the facility. As a part of this approach, the team will identify the presumed code objectives, identify safeguards and protection features in the design to address code objectives, and incorporate the mitigating features to create a facility that meets code expectations.
10. Dan O'Conner, Fire Protection Engineer with Aon Fire Protection, noted that a fire suppression system will be proposed for the entire QTA Facility and will be designed with higher hazard group than typically required for parking garages. At this stage, the team has not completed the analysis on whether foam or water suppression system would be more appropriate for this application. Mr. Laurence noted that there are pros and cons on either system, and that both have been provided at similar facilities in other parts of the country. Foam suppression may be better for pool fires, but it actually represents a relatively small risk at a QTA due to the limited design spill of 25 gallons. The team looks forward to talking with the Fire Department over future meetings to come up with solutions.
11. An expanded electrical hazard area will be identified at the fueling areas. A robust shut-down system will be in place, including alarm on actuated stop and fuel detection in sumps. Double-walled fuel piping system will be provided. Only trained employees will be allowed to dispense fuel, which requires employee's card swipe authorization for each transaction. This card swipe limits maximum fuel dispensing to only 25 gallons

per transaction. Other likely mitigating features were highlighted in the attached QTA Background Information briefing.

12. LAFD noted that the closest responding firehouse is Station 95, located on Century and International, but it may consolidate with Station 51 in the near future. LAFD does not have information regarding fire flow water rate or conditions at the Manchester Square site.
13. David Lee of TranSystems noted that he will be the Architect of Record for the QTA Buildings, and he will be the primary contact person from the Design Team for coordination with the Building and Fire Department. Assisting TranSystems with this process will be Rosa Doran, architect with RAW International.
14. Other code considerations, such as occupancy group classification, occupant load calculations, required building and fire separation will be reviewed further in a future meeting. LAFD suggested that the team engage with a case manager at the L.A. Department of Building and Safety to review specific code issues. ACTION: **The Design Team will contact LAWA to request for a meeting with DBS and LAFD in early July.**

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster
A2: Meeting Agenda
A3: QTA Background Information

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning		Date:	June 3, 2015
	Los Angeles International Airport		Time:	10:00 am – 11:30 am
Re::	Fire Department Briefing		Location:	LAWA Admin Building East, Room 210

Name	Representing	Telephone Number	Email Address	Present
Dean Ulrich	L.A. City Fire Department	(424) 646-8299	Dean.ulrich@lacity.org	DU
Marcus Law	L.A. City Fire Department	213 272-8553	MARCUS.LAW@LACITY.ORG	
Braxton Clark	L.A. City Fire Department		Braxton.clark@lacity.org	BC
Oscar Scott	L.A. City Fire Department		oscott@lawa.org	OS
Pat Tomcheck	LAWA	(424) 646-5192	ptomcheck@lawa.org	Pat
Fatima Hashim	LAWA	(424) 646-5173	fhashim@lawa.org	
Jeff Jarvis	TranSystems	(602) 681-0401	jgjarvis@transystems.com	Phone
David Lee	TranSystems	(510) 835-9916	dklee@transystems.com	DPL
Ann Chavez	Aon Fire Protection	(213) 630-1376	Ann.Chavez@aon.com	
Vidar Landa	Aon Fire Protection	(213) 630-1376	Vidar.Landa@aon.com	V.K.
Dan O'Connor	Aon Fire Protection	(847) 442-6566	Dan.Oconnor@aon.com	
Rosa Doran	RAW International	(213) 622-4993	rdoran@rawinternational.com	RD
RB Laurence, Jr.	Stantec Consulting Inc.	(603) 206-7559	ronald.laurence@stantec.com	

ISSUED FOR LAWA AND LAFD

Background

The Los Angeles World Airports (LAWA) is developing a new Consolidated Rental Car Facility (ConRAC) at the Los Angeles International Airport (LAX). Located on a 135 acre site known as Manchester Square, this development is consistent with airport and rental car industry trends to consolidate all of the operating rental car facilities in a single facility with the goals of:

1. Improving the Passenger Experience;
2. Improving Traffic Flow;
3. Freeing-up Curb Space;
4. Creating Operational Efficiencies; and
5. Improving Land Use.

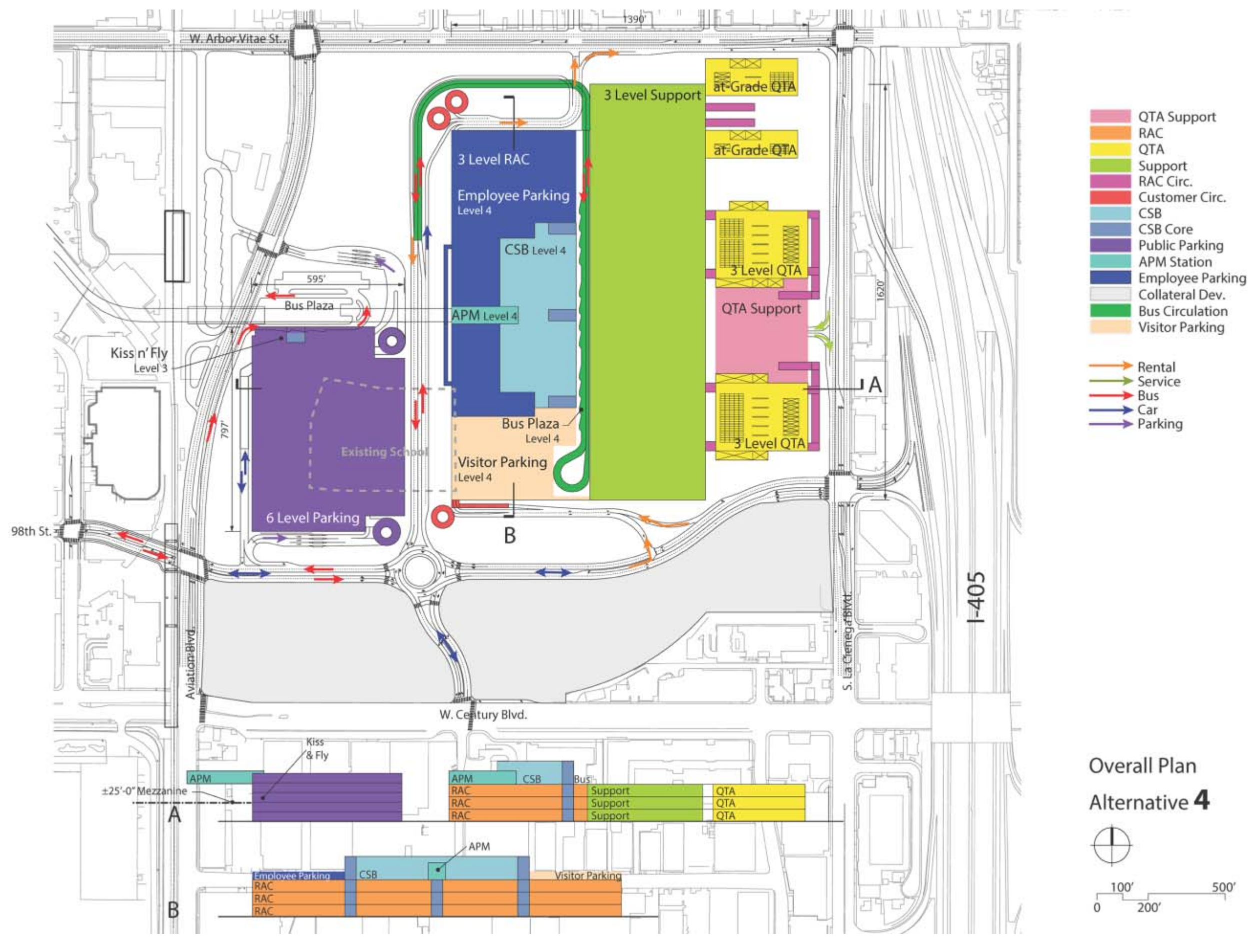
Key to this operational improvement is the co-location of the vehicle fueling and turn around area with the rental area. This maximizes the overall efficiency of the facility by reducing the travel distances of the rental cars when they are being processed for re-rental.

Similar multi-level fueling facilities have opened in San Jose, Miami, Providence, Burbank, and are in development in Tampa, San Diego, Chicago, Austin, and San Antonio. The goal of this document is to begin the discussion of how this facility can be safely developed in collaboration with key stakeholders.

About This Facility

The rental car facility includes three buildings: the Rent-a-car (RAC) facility, which provides the ready and return areas for customers to rent and return. On Level 4 of this facility is also the Customer Service Building, which includes the rental car counters. The second building is a support area, used for the storage of vehicles during peak periods. The third building is the Quick Turn-Around (QTA) Facility, the primary subject of this summary.

A preliminary schematic layout of this facility is depicted below:



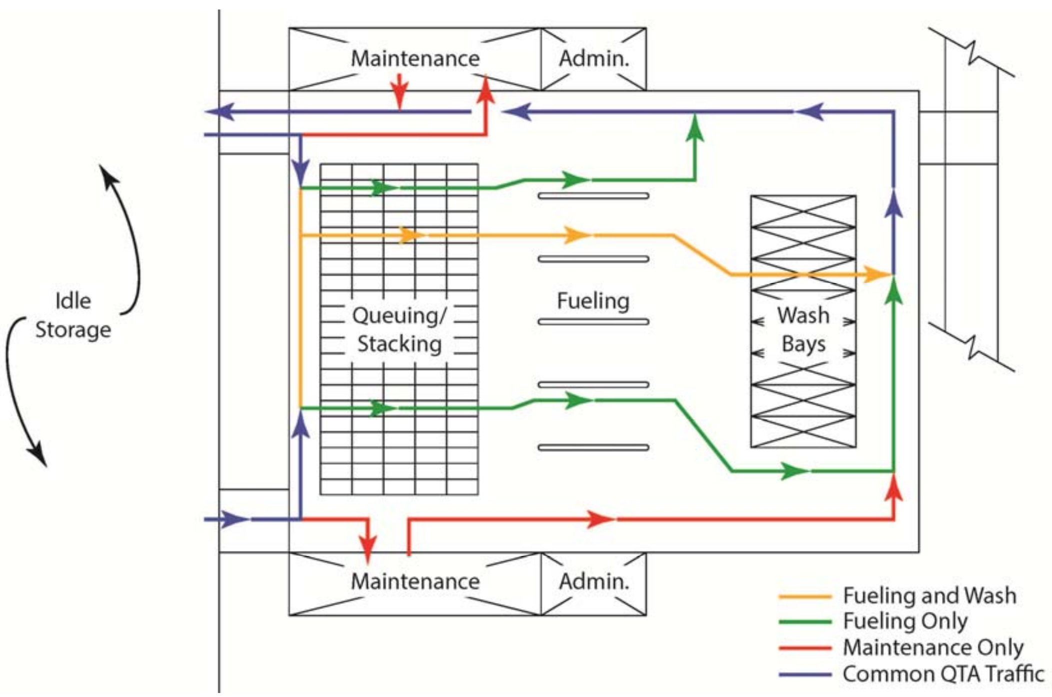
ISSUED FOR LAWA AND LAFD

The Rental Car "QTA" Facility

The Quick Turn-Around (QTA) Facility provides the infrastructure for the "back-of-house" operation. This is where rental car company employees process returned cars and prepare them for immediate rental. The facility also serves as a place to conduct scheduled preventative maintenance (oil changes/safety checks) and to complete light repairs (tire repair).

The vehicle turn-around process takes approximately 12 to 15 minutes. The vehicle is driven into the QTA building by a rental car employee and positioned into the stacking spaces. Generally, a different employee then drives the car into the fuel island area. It is here that the vehicle is fueled (if necessary), hand cleaned, vacuumed, checked for safety, and replenished with washer fluid and tire air (if necessary) from fixed overhead reels. After completing this process, the vehicle is driven through the fixed car wash and returned to a ready space in main RAC garage for rental. Cars identified as requiring scheduled maintenance may enter the maintenance bays at that point, or may make a dedicated trip into the QTA building for maintenance.

Schematic layout of typical QTA area is illustrated below:



While the design is currently in very preliminary stages, the current QTA facility layout is comprised of one (1) three (3)-level building with two (2) distinct QTA areas, and two (2) at-grade QTA areas. Each of these areas is self-contained and includes stacking spaces, fuel island area, and car washes. In the case of the multi-level building, each floor is operationally self-contained, and includes each of these components.

All QTA areas combined will include the following:

QTA Feature	Approximate Facility-wide Total Quantity
Gasoline Dispensers	99
Fueling Positions (Nozzles)	198
Windshield Washer Fluid and Air Hose Reels	99
Vacuum Drops	198
Car Wash Tunnels	52
Maintenance Bays	62

Note that these quantities are preliminary and may change as the design is developed.

Indoor Fueling Requirements

The 2014 Los Angeles Fire Code Section 2301.4 requires indoor motor fuel-dispensing facilities to comply with NFPA 30A.

NFPA 30A Sections 7.3.6.5 and 7.3.6.6 limit motor fuel-dispensing operations to:

1. the street level of a building,
2. to not more than four motor fuel-dispensing stations total; and
3. fuel-dispensing stations to be within 50 feet of the exterior walls of the building

NFPA 30A Background

The proposed LAX QTA facility does not conform to the above provisions of NFPA 30A. Consequently, if NFPA 30A was strictly applied, the project would not be allowed. To better understand the basis and history of the NFPA 30A provisions, NFPA staff and documents have been reviewed and a short history is presented below.

The limitations of NFPA 30A for indoor fueling areas were first considered and adopted by the NFPA Technical Committee in the early 1980s; however, the documentation from 1980 is somewhat vague as to the basis for the limitations originally appearing in NFPA 30 (1981 edition) and now NFPA 30A. .

To further explore the basis for the NFPA 30A limitations, the QTA fueling system consultant for this project, R.B. Laurence, inquired about the history to Robert Benedetti, NFPA Principal Flammable Liquids Engineer. Mr. Benedetti's response noted the following with regard to the "four vehicle service restriction":

> *This particular restriction has been a part of NFPA 30A since its inception in 1984. The same restriction appears in NFPA 30A's predecessor, Chapter 7 of the 1981 edition of NFPA 30. The restriction to "four vehicles at one time was added then as part of a more comprehensive rewrite of the provisions for service stations inside buildings. The substantiation statement for this rewrite, in the Fall 1980 Technical Committee Reports, does not explain why the restriction was added.*
>
> *The scope of Chapter 7 of NFPA 30-1981 reads: "This chapter applies to automotive and marine service stations and to service stations located inside buildings." There is no reference to fleet operations anywhere in this chapter, so I can only conclude that the restriction applies solely to a retail operation. Given that a retail operation would, by its nature, involve the general public and would inherently involve reduced control of the environment, the restriction is probably understandable.*

Mr. Benedetti's response provides the best-known history of NFPA 30A on this subject. Based on Benedetti's response, it appears the NFPA 30A restriction was to address public retail service station environments in the 1980s and was not related to fleet servicing facilities (i.e. QTA). For this reason, the design team believes the NFPA 30A restrictions were never intended to address or preclude the type of facility and non-public fueling operations that will be conducted at the LAX QTA facility.

Understanding that the multi-level QTA building will not explicitly comply with the NFPA 30A provisions, the project team will be developing an alternative design approach that uses multiple and redundant levels of safeguards and protection features to mitigate or eliminate the anticipate hazards of the rental car fueling and maintenance operations. This type of a performance-based design approach has been successfully developed for other QTA facilities in collaboration with the jurisdiction's Fire Department.

Performance-Based Approach

The proposed approach to mitigate the code departures is to:

1. Identify the presumed code objectives;
2. Identify multiple and redundant levels of safeguards and protection features design features to address each of the code objectives;
3. Incorporate the mitigating features using an integrated approach to create a facility that meets code expectations for property protection, life safety and will accommodate fire department operations.

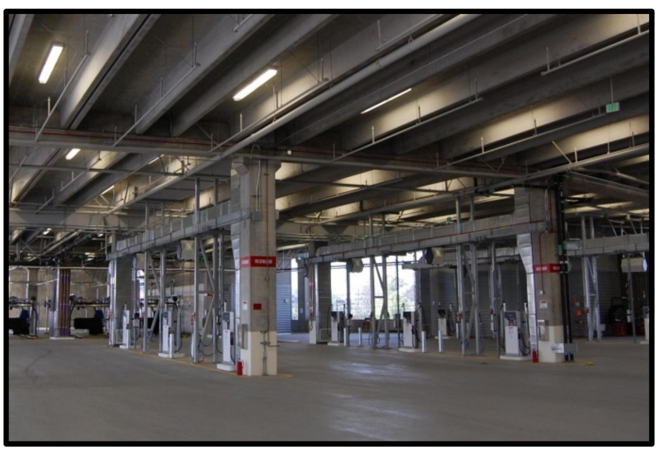
A number of very important safeguards will be provided for the QTA facility with a significant emphasis on preventing a flammable liquid spill and ignition scenario from developing, but recognizing that should a flammable liquid fire result there must be fire protection systems for the protection of occupants and the structure. While the process will involve a collaborative process with team stakeholders (including the Fire Department), some initial proposed mitigating features will likely include:

1. Effective fixed fire suppression over fuel dispensing area;
2. Expanded electrical hazard area;
3. Dispenser area exhaust ventilation system;
4. Fire resistive rated construction;
5. Appropriate fire department vehicle and personnel access and staging areas for responders;
6. System shutdown, controls, and annunciators available at multiple responder access points;
7. Additional emergency stop devices, annunciation, and integration;
8. Double-walled, industrial grade piping run in fire rated raceways/chases;
9. Trained operators only allowed to operate the fueling systems;
10. Programmed dispensing limits per authorization;
11. Integrated drainage(if needed) and fire suppression system; and
12. Controlled dispensing area floor penetrations.

While there are many specifics to develop within the context of these proposed mitigations, a collaborative process to define and develop these mitigations is the next step in this process.

San Jose Airport QTA Facility Photos

Photos of the San Jose Airport Multi-Level QTA facility are provided below as a reference.



QTA Fueling Areas

QTA Car Wash Areas

AGENDA

LAX ConRAC - Consolidated Rental Car Facility
LAFD Kick-Off Meeting

Meeting Date: Wednesday, June 3, 2015, 10:00am – 11:30am PDT
Location: Room 210, LAWA Administration Building

1. Introductions
2. Design Team Members and Project Roles – Jeff Jarvis, TranSystems
3. Project Background, Benefits for Airport and Schedule – Pat Tomcheck, LAWA
4. Functionality of a ConRAC – Jeff Jarvis, TranSystems
5. Quick Turn-Around (QTA) Facility Briefing – RB Laurence, Stantec Consulting
6. Other Code Considerations – Dan O'Connor, Aon Fire Protection
7. Next Steps, Project Development and Approval Process – David Lee, TranSystems

FOR DISTRIBUTION - ISSUED JULY 20, 2015

LAX ConRAC – Los Angeles Department of Building & Safety and Fire Department Review Meeting

Meeting Date: Friday, July 10, 2015, 10:15am – 11:45am PDT
Location: Executive Conference Room, LAWA Administration East Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to provide members of the Los Angeles Department of Building and Safety (LADBS) and Los Angeles Fire Department (LAFD) an introduction to the LAX Consolidated Rental Car Facility (ConRAC) project and describe significant building and fire code considerations with the planned hazard mitigations in order to facilitate a future code waiver. A copy of the meeting presentation is included as Attachment A2.

The items discussed are noted below. Items in **Bold Font** represent action items to which the design team or LAWA will respond.

1. Jeff Jarvis, Project Manager with TranSystems, provided an introduction of the design firms and their respective role: TranSystems is the architect of record; Stantec Consulting is the engineer of record for the fuel systems: Aon Fire Protection is the fire protection engineer for life safety of the buildings; RAW International is a local architectural firm who will be providing assistance with permitting and coordination of reviews by agencies.
2. Pat Tomcheck, Senior Project Manager with LAWA, provided a background of the project and described the LAX Landside Access Modernization Plan (LAMP), which includes an Automated People Mover (APM) from the Central Terminal Area (CTA) to the ConRAC, Intermodal Transit Facilities (ITF), and connections to Metro Stations.
3. The ConRAC and the East ITF will be sited at Manchester Square, bordered by W. Arbor Vitae St to the north, S. La Cienega Blvd to the east, 98th St to the south and Aviation Blvd to the west. The site is mostly owned by LAWA, with the exception of a few properties that are privately owned. The different parts of the ConRAC Facility, including the Ready/Return Garage, a Customer Service Building, a Support Building for storage of vehicles, and the QTA for fueling, washing and light maintenance of rental car vehicles, were described.
4. Mr. Jarvis provided an overview of the ConRAC and typical pattern of vehicular circulation. This facility at LAX is expected to handle 20,000 rental car transactions in a day. To meet this demand, vehicles need to be serviced as quickly as possible, to allow the rental car to be turned around and be ready for next customer. The Quick Turn-Around (QTA) Facility is proposed to be elevated and stacked above other QTA floors, in order to provide secured transition from the RAC ready/return areas and the QTA areas. The Idle Storage Building will handle the peaks of the rental car business, by allowing close access to a ready vehicle that can be moved quickly to a stall in the RAC Garage, ready for customer pick-up.
5. RB Laurence, a mechanical engineer with Stantec Consulting, provided an overview of the QTA facility, history of multi-level fueling and general safety features. Dedicated vehicular paths are provided for moving of vehicles by rental car employees only and are segregated from normal customer rental and return routes. It was noted that the typical turn-around time for a vehicle at the QTA is between 12 and 15 minutes. While a car is parked at the fuel island, the rental car service agent will also vacuum the interior of the vehicle, check/refill tire pressure and windshield washer fluid. The time spent on fueling is typically less than a

minute. The quantity of fuel dispensed per vehicle is less than the typical corner gas station, since vehicles are often returned with the gas tank full or nearly full. Car wash tunnels are provided for washing of cars, typically the last step before the vehicle is returned to the ready stall. A number of light maintenance bays are also included in the program to allow rental car agencies to perform oil change and tire change as required.

6. Code requirements to allow indoor fueling were reviewed. Recognizing that a facility of this nature does not fit within the constraints of the Fire Code, a performance-based approach will be utilized in the design of the facility. As a part of this approach, the team will identify the presumed code objectives, identify safeguards and protection features in the design to address code objectives, and incorporate the mitigating features to create a facility that meets code expectations.
7. Lily Teng, Case Manager with LADBS, inquired if the ConRAC Facility will be one building. Mr. Jarvis clarified that it has multiple buildings connected by vehicular bridges. Ms. Teng's interpretation of the building code is that two buildings that are connected are not necessarily considered separate buildings even if there is appropriate fire separation distance between them. The Design Team holds a different interpretation on this and plans to review this further with LADBS.
8. Ms. Teng requested for additional information on other ConRAC projects where these jurisdictions have permitted NFPA 30A code waivers to allow indoor fueling with more than four dispensers, specifically on which codes were waived and conditions of approvals at these other facilities. ACTION: The Design Team and LAWA will gather an overview of code waivers and the restrictions imposed on other multilevel ConRAC facilities, where such information can be made available.
9. Dan O'Connor, Fire Protection Engineer with Aon Fire Protection, provided an overview of proposed occupancy classifications for the areas of the building. LADBS/LAFD did not voice any oppositions to the proposed building classifications provided at the meeting. Ms. Teng indicated that the proposed Group F-1 occupancy for the QTA appears to be more appropriate than a Group M mercantile occupancy normally associated with motor fuel dispensing facilities.
10. Required building and fire separation distances were reviewed, for both exterior wall and exterior wall openings. Mr. O'Connor indicated that automatic sprinkler system would be required for Group F-1 occupancy (QTA), but that open-air parking structures and Group B occupancies located not more than 55 feet above lowest level of fire department vehicle access would not require sprinklers. The APM is classified under the Transit Station Group A occupancy, and that sprinklers are not required if it is an open station or has platforms with three open sides.
11. Ms. Teng noted that the City of Los Angeles' interpretation of the code is that if the project is viewed as one building and one part of the building is sprinklered, then all parts of the building will need to be sprinklered. Mr. O'Connor noted that appropriate "Fire Separation Distances" were being considered to break major pieces of the project into separate buildings with open air bridge connections. The bridge connections would serve also as exits routes similar to walking across a street. Mr. Jarvis noted that the connecting bridges could be designed as separate structures independent of the garage structures. The nature of these connecting bridges and their design would support the case that the ConRAC Facility is not a single building but is composed of several well separated buildings.
12. Although a case could be made for use of Ordinary Hazard 2 sprinkler system for the QTA, use of Extra Hazard 1 sprinklers (0.3 gpm/sf) will be proposed as part of the code mitigations.

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13. The following two photos of the San Jose Airport ConRAC were shown at the meeting, to illustrate typical QTA features and how storm water, car wash and fuel drainage were separated and contained:

QTA Fueling Areas

QTA Car Wash Areas

14. LAFD inquired about fuel tanks and sizes. Mr. Laurence noted that this is still under design, but the approximate size would be between 200,000 and 300,000 gallons in six underground storage tanks. Alternative fuels would not be incorporated into the design, as there has not been significant demand by the rental car industry yet. **ACTION: Stantec will provide contact information for points of contact responsible for approval of underground storage tanks at other multi-level ConRAC sites.**
15. Tim Griffith of LADBS asked about other hazardous materials that may be present at the facility. Mr. Laurence responded that there will be windshield washer fluids (WWF) in underground storage tanks and motor and used oil stored in protected aboveground storage tanks.
16. Greg Stevens of LAFD noted that clarifiers are regulated by Bureau of Sanitation and County Public Works, while underground storage tanks are regulated by the Fire Department. Ms. Teng mentioned that the Mechanical Section needs to be brought in for discussion on the car wash systems. Mr. Laurence recognized that these are important review items, but the most critical issue that needs to be reviewed and resolved first is how the fundamental code restriction of indoor fueling can be mitigated and approved.
17. Ms. Teng inquired if the project site at Manchester Square is included in the LAX Specific Plan. Without this project being included in this plan, LADBS/LAFD would not be able to approve any of the proposed mitigation plans. Lisa Trifiletti of LAWA joined the meeting at the request of Mr. Tomcheck and provided a briefing on land use background on this project. She stated that Manchester Square is in fact part of the LAX Specific Plan, and the environmental impact report (EIR) would be released next April. LAWA is in the process of amending many of their entitlements to include trips and parking caps. It is recognized that LAWA is proceeding with the design of the ConRAC "at-risk" since the EIR has not been approved, but LAWA consciously made this decision because of the long term importance of this project and the criticalness for timely delivery of this project.

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18. David Lee, Architect with TranSystems, noted that this will be the first of a series of code review meetings that are anticipated to occur. A meeting in late August is anticipated to review more specific proposed mitigation plan, with a refined plan to be presented in October. The Design Team would like to receive conceptual approval of the mitigation plan by this November. The Design Team is committed to delivering a 15% concept design of the project to LAWA by this December and completing 30% concept by spring of 2016.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster

A2: Meeting Presentation

LAX
Los Angeles World Airports

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MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	July 10, 2015
	Los Angeles International Airport	Time:	10:00 am – 11:30 am
Re::	LADBS and LAFD Meeting	Location:	LAWA Admin Building East, Room 210

Name	Representing	Telephone Number	Email Address	Present
Dean Ulrich	L.A. City Fire Department	(424) 646-8299	Dean.ulrich@lacity.org	
Marcus Law	L.A. City Fire Department	(213) 272-8353	Marcus.law@lacity.org	
Braxton Clark	L.A. City Fire Department		Braxton.clark@lacity.org	
Oscar Scott	L.A. City Fire Department		Oscott@lawa.org	
Lily Teng	LADBS		Lily.teng@lacity.org	[signature]
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Tim Griffith	LADBS	213-792-8197	Tim.Griffith@lacity.org	TG
Pat Tomcheck	LAWA	(424) 646-5192	ptomcheck@lawa.org	[signature]
Fatima Hashim	LAWA	(424) 646-5173	fhashim@lawa.org	[signature]
Jeff Jarvis	TranSystems	(602) 681-0401	jgjarvis@transystems.com	[signature]
David Lee	TranSystems	(510) 835-9916	dklee@transystems.com	DKL
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Dan O'Connor	Aon Fire Protection	(847) 442-6566	Dan.Oconnor@aon.com	[signature]
Rosa Doran	RAW International	(213) 622-4993	rdoran@rawinternational.com	[signature]
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Neil MacAloney	Stantec Consulting Inc.	(603) 206-7554	Neil.MacAloney@stantec.com	NM
Gregory Stevens	LA City Fire	213 978 3728	gregory.stevens@lacity.org	✓

Agenda

1. Introductions
2. Project Team
3. Project Background
4. ConRAC and Quick Turn-Around Facilities
5. Indoor Fueling and Code Mitigating Features
6. Building and Fire Code Considerations
7. Project Approval Process

July 10, 2015 LAFD and LADBS Meeting

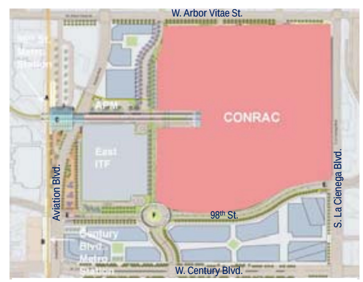
Project Team

- LAWA – Program Management
- TranSystems – Architect of Record
- Stantec Consulting – Fuel Systems Engineer
- Aon Fire Protection – Fire Protection Engineer
- RAW International – Permitting Assistance

Project Team

Landside Access Modernization Program (LAMP) Includes:

- Consolidated Rental Car Facility (ConRAC)
- Intermodal Transit Facilities (ITF)
- Automated People Mover (APM) Stations
- Metro Station Connections



Proposed Development at Manchester Square

Project Background

Benefits for Airport

- Improved Passenger Experience
- Improved Traffic Flow
- Reduced Curb Congestion
- Operational Efficiencies
- Improved Land Use

Project Background

Project Schedule

- Programming Completed in May 2015
- 15% Schematic Design to be Completed by Dec 2015
- 30% Conceptual Design to be Completed by April 2016
- 100% Final Design to be Completed in 2017
- Construction Start Anticipated in 2018
- ConRAC Construction Completion Anticipated in 2022
- ITF and APM Construction Completion Anticipated in 2023

Project Background

Proposed Consolidated Rental Car Facility (ConRAC)

- Customer Service Building (CSB)
- 3 Levels of Ready/Return Garage
- 3 Levels of Idle Storage Garage
- 3 Levels of Quick Turn-Around (QTA)
  - Fuel, Vacuum, Car Wash and Light Maintenance
- At-Grade Service Yard

Proposed ConRAC Facility

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

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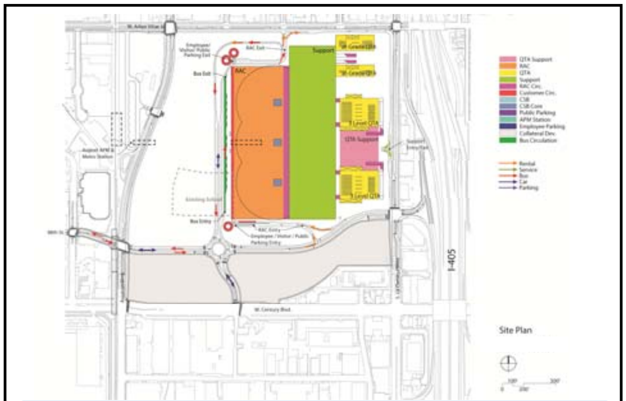

Proposed ConRAC Facility

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

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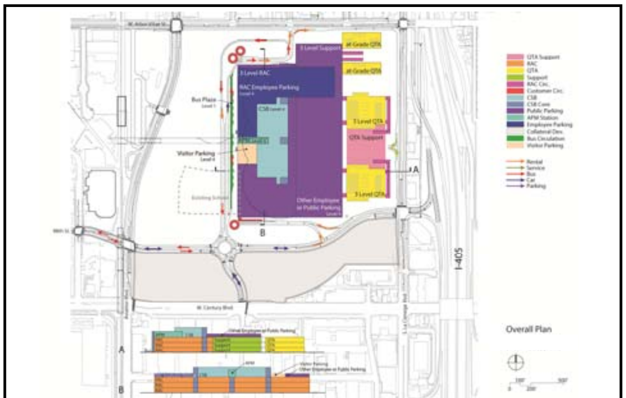

Proposed ConRAC Facility

Consolidated Rental Car Facility at Los Angeles International Airport

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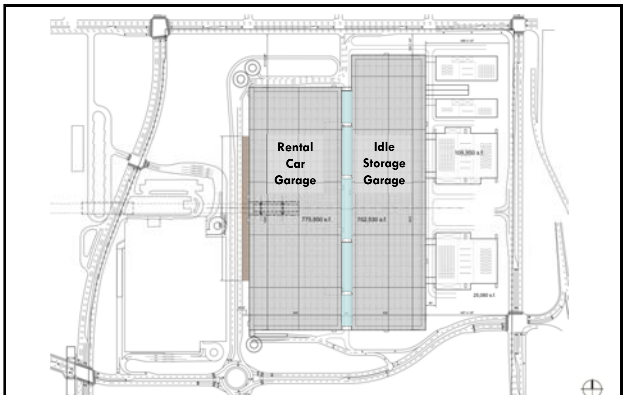

Rental Car & Idle Storage Garages

Consolidated Rental Car Facility at Los Angeles International Airport

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Quick Turn-Around Area

- Provides Infrastructure for the Back-of-House Operation
- Processes Returned Cars for Immediate Rental (Fueling, Vacuuming and Washing)
- Performs Scheduled Preventative Maintenance (Oil Changes, Safety Checks and Tire Repairs)
- Typical Turn-Around Process Takes 12 – 15 Minutes

Proposed QTA Facility

Consolidated Rental Car Facility at Los Angeles International Airport

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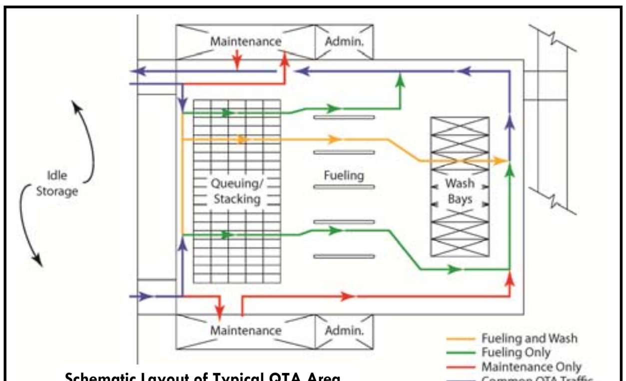

Schematic Layout of Typical QTA Area

Proposed QTA Facility

Consolidated Rental Car Facility at Los Angeles International Airport

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Benefits of Multi-Level Fueling at a ConRAC

- Increased Operational Efficiencies
- Proximity of QTA to Rental Cars – Reduced Travel Distances
- No Level Change from Rental Cars to QTA
- Secured Operations

Multi-Level Fueling Facilities

Constructed Multi-Level Fueling Facilities

- San Jose (Operational Since 2010)
- Miami (Operational Since 2010)
- Providence (Operational Since 2010)
- Burbank (Operational Since 2014)

Multi-Level Fueling Facilities Under Construction

- Austin (to be Completed in 2015)
- San Diego (to be Completed in 2015)
- San Antonio (to be Completed in 2018)
- Chicago (to be Completed in 2019)

Multi-Level Fueling Facilities In Design

- Tampa

Multi-Level Fueling Facilities

Code Requirements

- 2014 Los Angeles Fire Code Section 2301.4 Requires Indoor Motor Fuel-Dispensing Facilities to Comply with NFPA 30A
- NFPA 30A Sections 7.3.6.5 and 7.3.6.6 Limit Motor Fuel-Dispensing Operations to:
  - Street Level of a Building
  - Not More Than Four Motor Fuel-Dispensing Stations Total
  - Fuel-Dispensing Stations to be Within 50 Feet of the Exterior Walls of the Building

Indoor Fueling Requirements

Performance-Based Approach

- Proposed Approach to Mitigate the Code Departures:
  - Identify the Presumed Code Objectives
  - Identify Multiple and Redundant Levels of Safeguards and Protection Features to Address Each of the Code Objectives
  - Incorporate the Mitigating Features Using an Integrated Approach to Create a Facility that Meets Code Expectations for Property Protection, Life Safety and Will Accommodate Fire Department Operations

Code Mitigating Features

Proposed Mitigating Features

1. Effective Fixed Fire Suppression Over Fuel Dispensing Area
2. Expanded Electrical Hazard Area
3. Dispenser Area Exhaust Ventilation System
4. Fire Resistive Rated Construction
5. Appropriate Fire Department Vehicle and Personnel Access and Staging Areas for Responders
6. System Shutdown, Controls and Annunciators Available at Multiple Responder Access Points

Code Mitigating Features

Proposed Mitigating Features (Continued)

7. Additional Emergency Stop Devices, Annunciation and Integration
8. Double-Walled, Industrial Grade Piping Run in Fire Rated Raceways/Chases
9. Trained Operators Only Allowed to Operate the Fueling Systems
10. Programmed Dispensing Limits Per Authorization
11. Integrated Drainage and Fire Suppression System
12. Controlled Dispensing Area Floor Penetrations

Code Mitigating Features

Building and Fire Code Considerations

- Use and Occupancy Classifications
- Construction Type, Allowable Heights and Areas
- Building and Fire Separations
- Fire Protection Systems
- Means of Egress

Construction Type

- Type I-A for open-air garages & CSB
- Type I-B allowed for sprinklered QTA building – F-1
- Fire-Resistance Rating Requirements (CBC Table 601)
  - 3 hour frame , 2 hour floor for Type I-A
  - 2 hour frame , 2 hour floor for Type I-B
- Unlimited height/area allowed per CBC Table 503 for
  - Open-air garages – S-2
  - Customer Service Center – B
  - QTA facility – F-1
  - APM, Fixed Guideway Transit Station – A

Use and Occupancy Classifications

- Business Group B: Customer Service Building and Administration Areas
- Moderate-Hazard Factory Industrial Group F-1: Automobile Processing (Rental Car QTA Areas)
- Low-Hazard Storage Group S-2: Open Parking Garages (Rental Car Ready/Return and Idle Storage)
- Fixed Guideway Transit System Group A: Automated People Mover Station

Occupancy Classification Basis for QTA

- Per LA Fire Code - Motor Fuel Dispensing facilities are Mercantile Group M, *but the QTA is different*
  - Not accessible to the public
  - Processing of cars is a factory-like operation
  - Multiple and redundant safeguards/precautions to prevent /control fire
  - Risks are similar / comparable, but not necessarily as great as other factory/industrial settings (e.g. spray paint operations, woodworking, refuse incineration) that require safeguards for related risks
- Conclusion – F-1 occupancy classification is appropriate for QTA use

Required Building and Fire Separations

- Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance (CBC Table 602)
  - QTA , To achieve 0 hour walls need 30 ft. FSD
  - Open-air garage, To achieve 0 hour walls need 10 ft. FSD
- Maximum Area of Exterior Wall Openings Based on Fire Separation Distance (CBC Table 705.8)
  - QTA , To achieve unlimited openings need 20 ft. FSD
  - Open-air garage, To achieve unlimited openings need 10 ft. FSD

Fire Protection Systems

- Open-Air Parking Structures – freely ventilated structure with low hazard parking operation does not require sprinklers
- Group B Occupancy: Sprinklers required if occupancy load of >30, located 55 ft. or more above lowest level of fire department vehicle access
- Group F-1 Occupancy: Automatic Sprinkler System is required
- APM/Transit Station Group A Occupancy: Sprinklers not required if open station or platforms with three open sides

Sprinkler Systems for QTA

- Enclosed Parking structures – Ordinary Hazard I
- Case could be made for Ordinary Hazard 2 – Repair Garages, Resin applications, plastics fabrication, distilleries
- Proposed for QTA is Extra Hazard 1 – 0.3 gpm/ft2
  - Printing with inks having FP < 100º F
  - combustible hydraulic fluid use areas
- LA fire code - retail sales of flammable/combustible liquids up to 7500 gallons allowed using OH-2 density

Building and Fire Code Considerations

Means of Egress

- Design Occupant Loads to be Calculated Based on Maximum Floor Area Allowances Per Occupant (CBC Table 1004.1.2)
- Exit Access Travel Distance (CBC Table 1016.2)
  - Group A, APM/Transit station: must meet three objectives
    - Platform clearing time of 4 min.
    - Reach point of safety in 6 min.
    - Maximum of 300 ft. to point of safety
  - Group B Occupancy without/with Sprinklers: 200/300 Feet
  - Group F-1 Occupancy with Sprinklers: 250 Feet
  - Group S-2 Occupancy without Sprinklers: 300 Feet

Building and Fire Code Considerations

Approval Agency Organizational Chart

- LAFD – Key Contact: Dean Ulrich
- LADBS – Key Contact: Lily Teng
- Who Else Should We Talk to?

Project Approval Process

Request for Periodic Code Review Meetings

- Aug 2015 – Proposed Mitigation Plan
- Oct 2015 – Refined Mitigation Plan
- Nov 2015 – Mitigation Plan Conceptual Approval

Project Approval Process

ISSUED FOR DISTRIBUTION – SEPTEMBER 23, 2015

LAX ConRAC – Los Angeles Department of Building & Safety and Fire Department Review Meeting

Meeting Date: Wednesday, September 16, 2015, 9:00 am – 10:15 am PDT
Location: Room 210, LAWA Administration East Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to provide members of the Los Angeles Department of Building and Safety (LADBS) and Los Angeles Fire Department (LAFD) an update to the LAX Consolidated Rental Car Facility (ConRAC) project.

Information/Data Package submitted to LADBS/LAFD prior to this meeting is included as Attachment A2. A copy of the meeting presentation is included as Attachment A3. The items discussed are noted below.

Items in **Bold Font** represent action items to which the design team or LAWA will respond.

1. Pat Tomcheck (LAWA) opened the meeting by noting that the ConRAC facility will be the east terminus of the proposed Automated People Mover (APM) system, which is the critical link for the landside access modernization program at LAX. In fact, the majority of the APM ridership will be ConRAC users.
2. Jeff Jarvis (TranSystems) noted that the Design Team will be preparing specific code modification proposals [associated with the QTA fueling] for submittal to LADBS and LAFD in a couple of weeks. This meeting would help the team by providing direction on areas of concern that reviewing agencies may have on this project, such that the team would be better able to focus on addressing those issues in the submittal documents.
3. Mr. Jarvis noted that there have been changes to the conceptual design of the Quick Turn Around (QTA) area since our previous meetings in June and July. The QTA is the part of the ConRAC facility in which returned rental cars are fueled, washed and maintained. Since our last meeting, the Design Team has completed further analysis of the QTA, including dynamic modeling of vehicular and employee movements to improve the efficiency of the building. As a result, the configuration of the building components has evolved. The proposed site layout is shown on Slide 5, which consists of a three-level structure accommodating primarily fuel and wash functions on all levels, another three-level structure accommodating full QTA functions on the ground level and light maintenance functions on the elevated levels, and a two-level QTA facility accommodating full QTA functions on both levels.
4. The project site will be developed to accommodate a number of car carriers for in-fleeting and out-fleeting of rental car vehicles, as well as fuel trucks and delivery vehicles for the QTA operation.
5. An information/data package comprising of summary of code applications, fire protection features and fueling system safety features for ConRAC facilities at other airports was submitted to LADBS and LAFD as background information, followed by supplemental information of code appeals and approvals by other jurisdictions. Lily Teng (LADBS) acknowledged receipt of these documents and noted that there was a lot of information presented that still need to be digested. Ms. Teng indicated that it would be very helpful to have a summary sheet to include code requirements for each jurisdiction and modifications provided that were above and beyond minimum code requirements for these other facilities. **ACTION: The TranSystems Team will put together this summary sheet.**
6. RB Laurence (Stantec) noted that this team was not the designer of record for all of the facilities presented, so information on certain aspects of some projects may not be available. Mr. Jarvis indicated that the team can provide contact information for designers of the other facilities if that would be helpful.

ISSUED FOR DISTRIBUTION – SEPTEMBER 23, 2015

7. Mr. Laurence described the proposed operational and fueling systems' design safeguards that will be provided at the QTA facility to provide equivalency for code limitations on fueling on street-level, within 50 feet of the building perimeter and a maximum of four fueling positions. For the upcoming Request for Modifications, analysis will include description on why restrictions apply and the mitigations that will be provided to achieve code equivalency.
8. Vidar Landa (Aon Fire Protection) indicated that Extra Hazard Group 1 wet pipe sprinkler system will be proposed at all fueling areas within the QTA, and that other QTA areas which are outside of the fuel islands, such as wash bays and administration areas, will be proposed as Ordinary Hazard Group 1 wet pipe sprinkler system. Other proposed features include fire alarm system with manual pull stations and automatic fuel system shut-off upon activation.
9. The QTA will be designed to provide a distance separation sufficient to qualify it as a separate building. Mr. Jarvis noted that current concept drawings show 60-foot distance separating the Idle Storage Support Building from the QTA Building.
10. Mr. Landa indicated that proposed building occupancy use-groups include Group B for the customer service building (CSB), Group S-2 for open parking garages, Group F-1 for the QTA, and Group A for the APM transit station. Automatic sprinkler protection is not required for Group S-2 and B buildings or at Group A transit station with three open sides. A question on the appropriate occupancy classification of the CSB came up, as it could be treated similar to an airport terminal, which would be Group A. Dan O'Connor (Aon Fire Protection) noted that the CSB lobby is different in that there is typically very short period of dwell within a rental car customer lobby, without the typical occupancy times associated with an airport terminal. Ms. Teng noted that these occupancy group classifications will need to be reviewed and confirmed by the Building Department, which the Design Team fully acknowledged.
11. Mr. Tomcheck indicated that the primary focus for the Design Team is the multi-level QTA since it is viewed as the most challenging component of the ConRAC facility. The APM and the ConRAC projects will be developed as design/build procurement packages. Ms. Teng noted that the Building Department views the ConRAC as one project, even though there could be five or more separate buildings within a single project. In addition, securing commitments on features of the buildings within the overall project would be helpful to the approval of the QTA code modification request.
12. Hani Malki (LAFD) asked the team what type of analysis was done for the other similar QTA facilities. Mr. Laurence responded that these involve qualitative analyses of presumed code risks.
13. David Myers (LAFD) noted that flame detectors would seem to be a good idea and should be added. Mr. Laurence agreed that this is a good feature to activate fuel shut-off, but he would not recommend it for sprinkler activation.
14. Mr. Jarvis thanked all the participants for coming to this meeting and noted that the team will prepare a draft package of the code modifications request for submittal to LADBS and LAFD by early October.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (2 pages)
A2: Information/Data Package (13 pages)
A3: Meeting Presentation (16 pages)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	September 16, 2015
	Los Angeles International Airport	Time:	9:00 am – 10:00 am
Re::	LADBS and LAFD Meeting	Location:	LAWA Admin Building East, Room 210

Name	Representing	Telephone Number	Email Address	Present
Lily Teng	LADBS	(213) 482-6871	Lily.teng@lacity.org	Y.
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Gregory Stevens	LAFD	(213) 978-3728	Gregory.stevens@lacity.org	
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DAVID MYERS	LAFD	(213) 482-6908	david.myers@lacity.org	
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Ann Chavez	Aon FPE	213) 630-1364	ann.chavez@aon.com	

Project	ConRAC Programming and Planning		Date:	September 16, 2015
	Los Angeles International Airport		Time:	9:00 am – 10:00 am
Re::	LADBS and LAFD Meeting		Location:	LAWA Admin Building East, Room 210

Name	Representing	Telephone Number	Email Address	Present
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Vidar Landa	Aon Fire Protection	(213) 630-1376	Vidar.Landa@aon.com	VL
Rosa Doran	RAW International	(213) 622-4993	rdoran@rawinternational.com	RD
Neil MacAloney	Stantec Consulting Inc.	(603) 206-7554	Neil.MacAloney@stantec.com	NM
RB Laurence, Jr.	Stantec Consulting Inc.	(603) 206-7559	ronald.laurence@stantec.com	[illegible]
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Los Angeles International Airport
Consolidated Rental Car Facility

Summary of Code Applications, Fire Protection Features and Fueling System Safety Features for Consolidated Rental Car Facilities (ConRACs) at Major Airports

Information / Data Package for the
Los Angeles Department of Building & Safety
Los Angeles Fire Department

September 4, 2015

Prepared for

Prepared by

Aon Fire Protection Engineering Corp.

Summary of Code Applications, Fire Protection Features and Fueling System Safety Features for Consolidated Rental Car Facilities (ConRACs) at Major Airports

This document is a summary of both existing Consolidated Rental Car Facilities (ConRACs) that are built and operating and several more recently projects that are approved and under construction. This document has been developed at the requests of the *Los Angeles Department of Building & Safety* and the *Los Angeles Fire Department.* This document provides the following information in the following order.

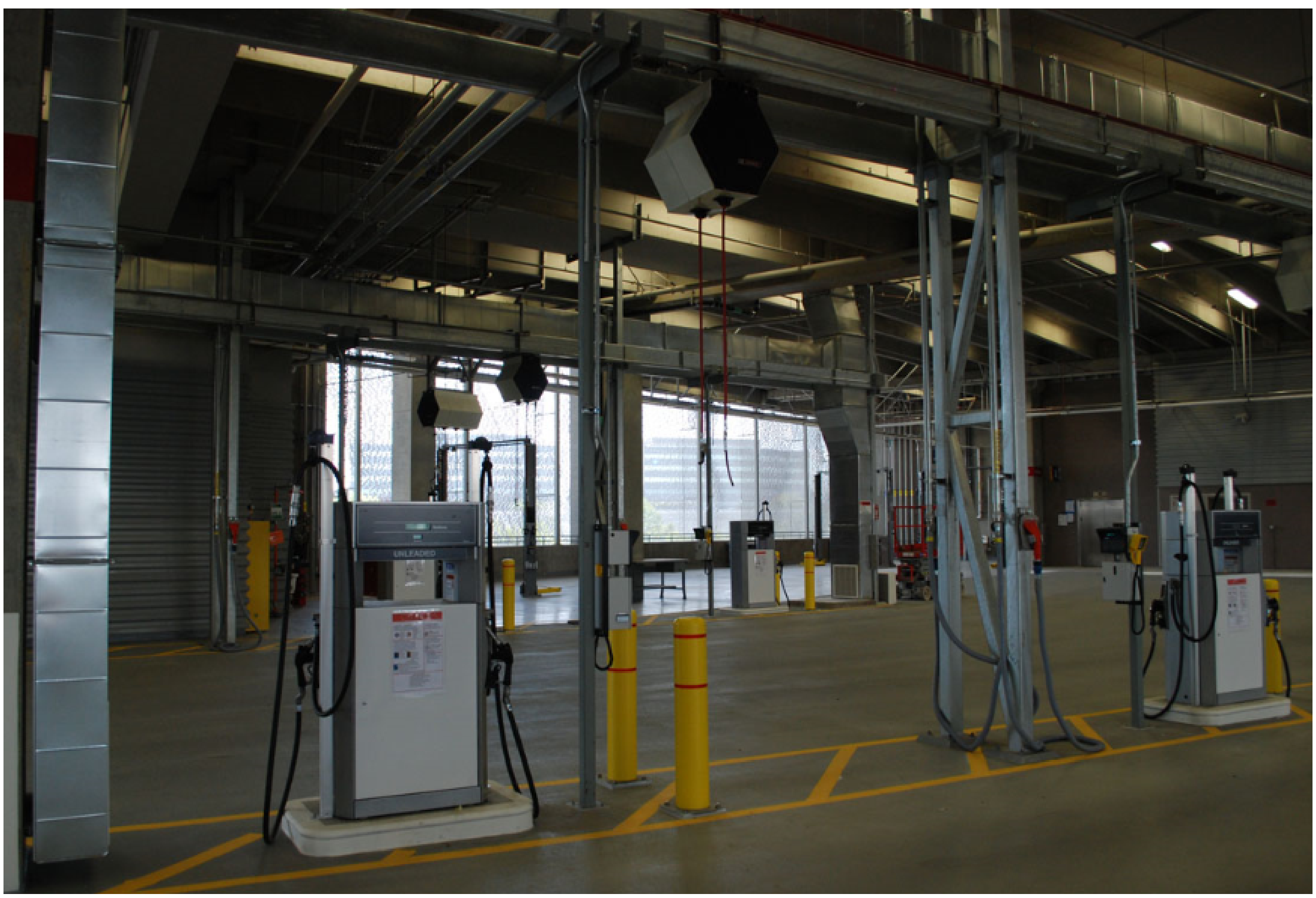
Project Illustrations – Photos and/or graphic illustrations of the projects are provided. These graphics are provided to assist the reader to understand the scale and organization of various elements of the Con RAC facilities. A key element of a ConRAC facility is the Quick-Turn-Around or QTA operation for processing rental cars. The QTA building or area is for cleaning, oil changes and refueling of rental cars. Heavy vehicle repair/maintenance work historically has not been permitted or desired in a QTA facility.

Table 1 – this Table provides a data summary of several facilities which includes basic code and project approval facts, occupancy classification facts, building height /area facts and fueling system facts (# dispensers, fuel storage).

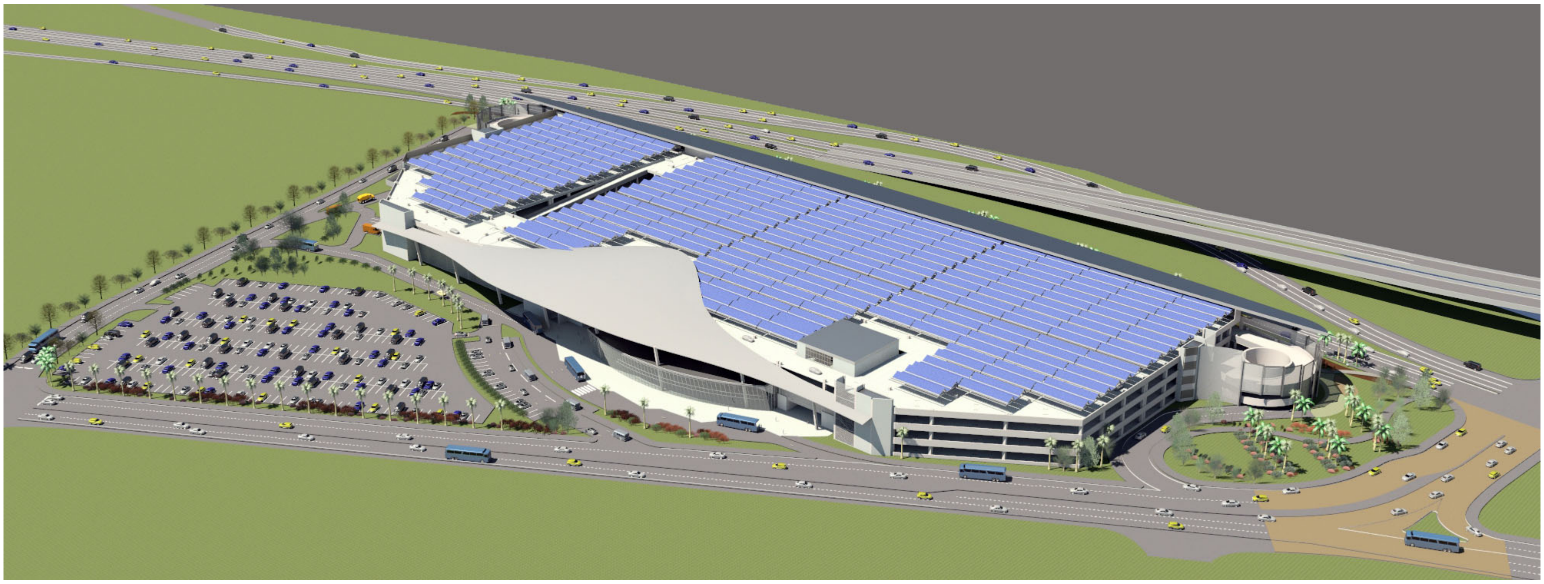
Table 2 – this Table provides additional details regarding the mixed or separated occupancy status of various projects and whether or not fire separation by distance and or fire barriers is incorporated in the design. Also, key fire protection information for the QTA fueling areas is listed.

Table 3 – this table provides specific details regarding the QTA operational and fueling systems' design safeguards. The table indicates for each facility, which of 20 possible safeguards is incorporated in each facility design.

San Jose International Airport

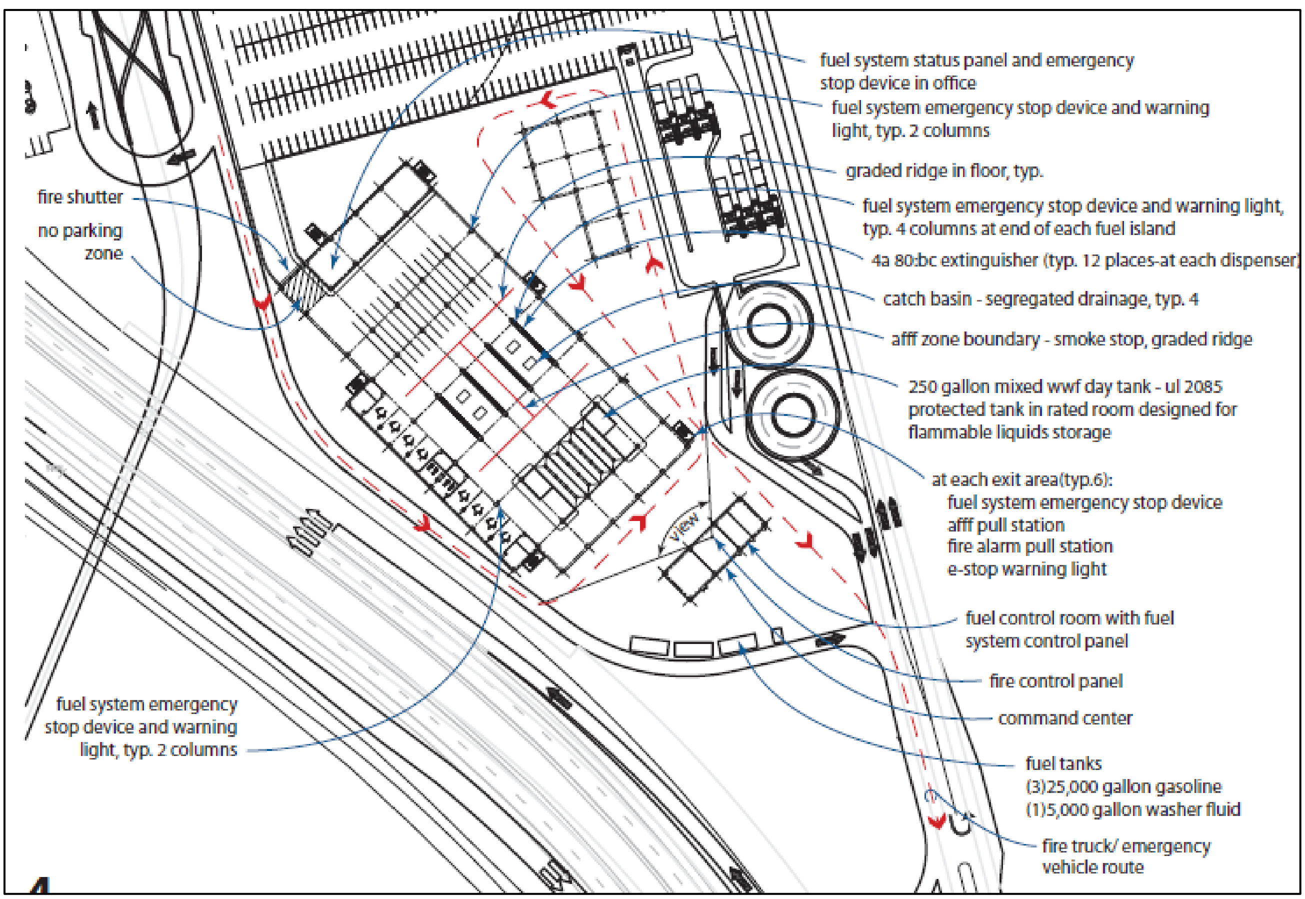


San Diego International Airport (Concepts)

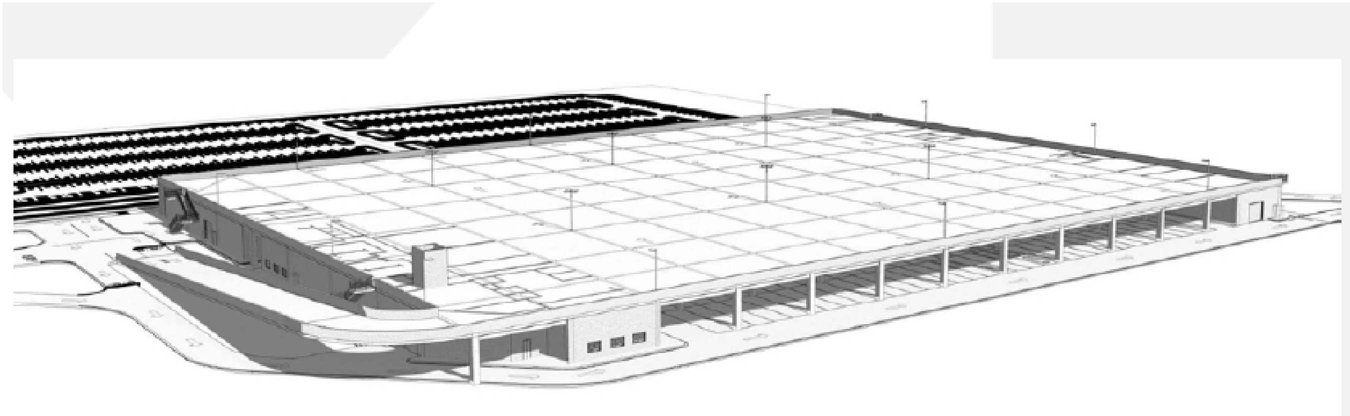


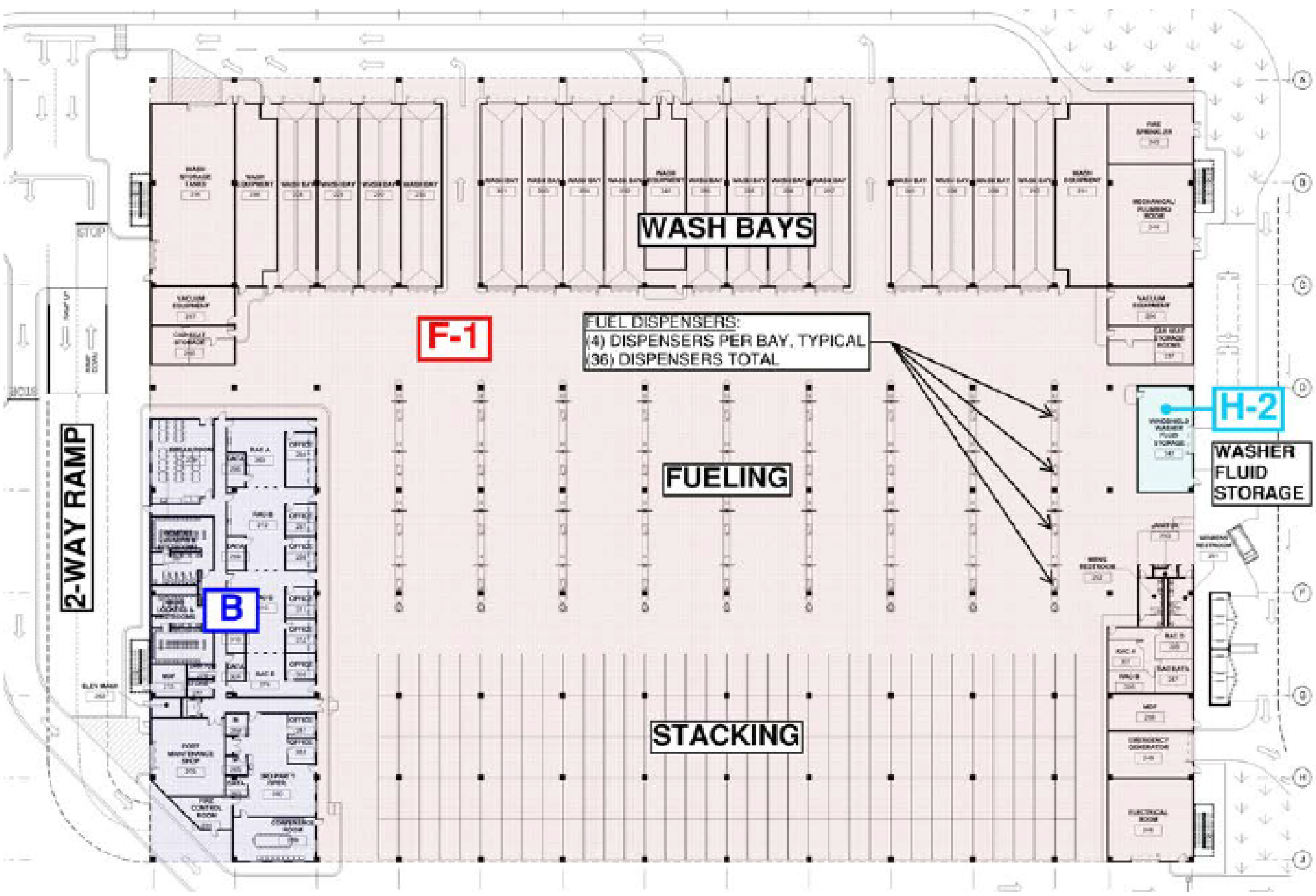
Warwick/Providence, Rhode Island

Chicago O'Hare International Airport (concepts)

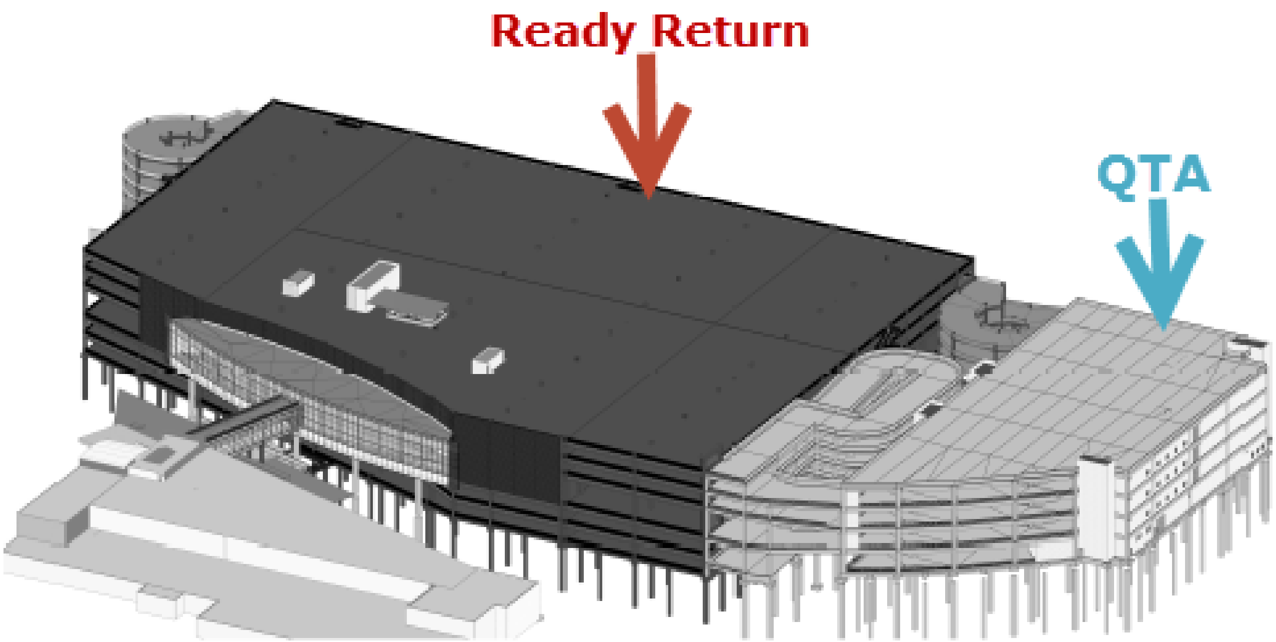


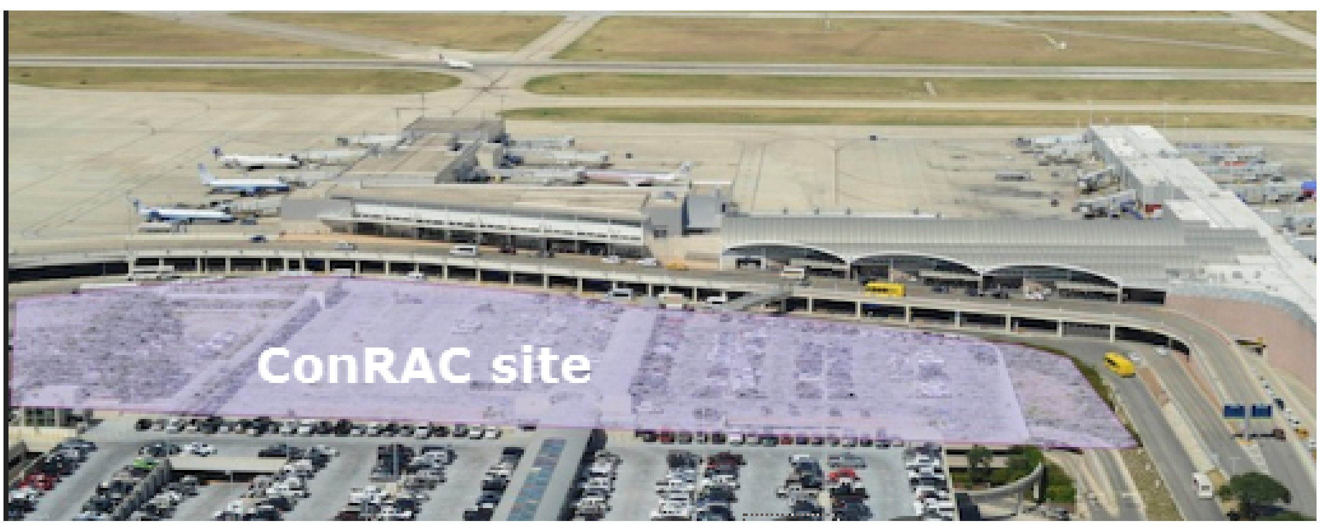
Portland International Airport (concepts)





San Antonio International Airport (concepts)





Miami International Airport

Table 1 - Data Summary of Seven QTA Facilities – Basic Code, Building Facts and Fueling System Facts - 9/3/2015

Location	*Applicable Codes*	*Basis of Approval*	*Occupancy Classification*	*Building Height & Area*	*Naturally Ventilated or Enclosed*	*Construction Type*	*# of Fueling stations –per floor and total*	*Underground storage tanks*	*Car wash bays (CWB) Window washer fluid dispensing (WWFD) Light Maintenance (LM)*
San Jose International Airport	2001 California Building Code (UBC 1997)	Alternate materials, designs and methods clause	Group S-3 , Parking Garage (Note: per UBC 1997 an S-3 garage included repair garages and those having motor fuel dispensing stations)	4 levels, 51,800 ft ^{2} /floor, Fueling on Levels 2,3,4	Naturally ventilated	Type I – fire Resistive	12 dispensers/floor 21 nozzles/floor 36 total dispensers	Three -12,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
San Diego International Airport	2010 California Building Code and Fire code (IBC 2009) & NFPA 30A	Alternate materials, designs and methods clause	Group F-1, Moderate Hazard , Factory/Ind. (fueling/wash areas) Group H-2, Windshield washer fluid room	4 levels parking, Fueling on Levels 2,3,4	Naturally ventilated	Type IA – fire resistive	12 dispensers/floor 24 nozzles/floor 36 total dispensers	Three -25,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
Chicago O'Hare International Airport	2015 Chicago Building Code (proprietary code)	Committee on Building Standards and Tests – 3rd party review/approval process	Storage & Service Garage –H3 (Note: H-3 is NOT a high hazard occupancy in Chicago code)	3 stories 90,000 ft ^{2} /floor, fueling on Levels 1,2,3	Naturally ventilated	Type IA – fire resistive	24 dispensers/floor 72 total dispensers	Three -25,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
San Antonio International Airport	2012 IBC , IFC (w/amendments) & NFPA 30A	Code Modification Request (CMR) process	Group S-1, Moderate Hazard Storage (Note: submitted as F-1 Factory/Industrial then Revised by City to S-1)	4 stories 58,000 ft ^{2} /floor, fueling on Levels 2,3,4	Naturally ventilated	Type IA – fire resistive	18 dispensers/floor 54 total dispensers	Three -25,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
Warwick, RI TF Green Airport	2007 Rhode Island State Building Code (2006 IBC) 2008 Rhode Island Uniform Fire Code (NFPA 1 2003) & NFPA 30A	Alternate materials, designs and methods clause	Group M, Mercantile	3 Levels, 54,700 ft ^{2} total (the three levels are located on a built-up foundation in a staggered arrangement)	Naturally ventilated	Type IIB – unprotected noncombustible (Note: 2-hour rating for floor slab & supporting floor columns of fuel platform)	7 dispensers/floor –L3 6 dispensers/floor –L4,5 19 total dispensers	Three -20,000 Gallon tanks	CWB – Yes, not in the QTA building WWFD – Yes LM - No

Table 1 - Data Summary of Seven QTA Facilities – Basic Code, Building Facts and Fueling System Facts - 9/3/2015									
Location	***Applicable Codes***	***Basis of Approval***	***Occupancy Classification***	***Building Height & Area***	***Naturally Ventilated or Enclosed***	***Construction Type***	***# of Fueling stations –per floor and total***	***Underground storage tanks***	***Car wash bays (CWB) Window washer fluid dispensing (WWFD) Light Maintenance (LM)***
Portland International Airport	2014 Oregon Structural Specialty Code (2012 IBC) 2014 Oregon Fire Code (2012 IFC) 2012 NFPA 30A	Alternate materials, designs and methods clause	Group F-1, Moderate Hazard , Factory/Ind. (fueling/wash areas) Group H-2, Windshield washer fluid room	1-story with parking on roof 158,000 ft ^{2} /floor	Naturally ventilated	Type IA – fire resistive	36 dispensers on ground floor 72 nozzles on ground floor	Four – 20,000 Gallon tanks	CWB – Yes WWFD – Yes LM - No
Miami International Airport	Unknown	Alternate materials, designs and methods clause	Unknown	4 levels w/ roof parking, Fueling on Levels 1,2,3; 211,000 ft ^{2} /floor	Some natural ventilation	Type I – fire resistive; 4-hour structural frame and floors	20 dispensers/floor 60 dispensers total 120 nozzles total	Four – 45,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
LAX Proposed	2014 Los Angeles Building Code [Based on 2013 California Building Code (Based on 2012 IBC)] 2014 Los Angeles Fire Code [Based on 2013 California Building Code (Based on 2012 IFC)] NFPA 30A	Alternate materials, designs and methods clause	Group F-1, Moderate Hazard , Factory/Ind. (fueling/wash areas)	Facility may be one large structure, or split into two multi-level structures and ground Level QTAs providing Total QTA area of 705,000 ft ^{2} Multi-level structures would provide fueling, Fueling on Levels 1,2, and 3.	Naturally ventilated	Type IA – fire resistive	30 dispensers/floor 60 nozzles/floor (Note: “floor” means all floor area if designed as split multi-level structures) 90 dispensers total 180 nozzles total (estimated)	Six to seven – 40,000 Gallon tanks (estimated)	CWB – Yes WWFD – Yes LM - Yes

Table 2 - Data Summary of Seven QTA Facilities – Fire Separation , Fire Protection and Alarm Systems - 9/3/2015

Location	*Status of Sprinklers in Ready Return/Parking Structure*	*Distance & Fire Rating Separation Facts*	*QTA Fire Protection - Principal Design Features*	*QTA Fire alarm Systems*
San Jose International Airport	Facility combined as QTA, parking garage and Customer Service Center designed as a mixed occupancy, fully sprinklered building.	QTA integrated with parking garage without fire separations, both areas classified as same occupancy (S-3 parking garage); QTA separated by 78 ft. from parking garage, but with connecting ramps & no fire separation.	**Sprinklers:** Wet sprinkler system at fueling area. (based on criteria of NFPA 13) **Criteria:** Ordinary Hazard Group 2, 0.2 gpm/ft^2 over 3000 ft^2 **Standpipes:** Manual wet standpipes.	Audible and visual devices in the fueling area. Voice evacuation message and PA override capability.
San Diego International Airport	Facility designed using non-separated mixed occupancy approach resulting in sprinklers throughout parking & QTA areas.	QTA separated from ready return area by vehicle bridges spanning 66 ft.	**Sprinklers:** Wet sprinkler system at fueling area **Criteria:** Ordinary Hazard Group 2, as required for motor vehicle repair, 0.2 gpm/ft^2 over 1500 ft^2 **Standpipes:** In stairwells and additional hose connections within 130 ft. of all fueling stations	Heat and smoke detection provided for fueling area and arranged to stop dispensing of fuels. Audible and visual devices in the fueling area.
Chicago O'Hare International Airport	No Sprinklers – RR/Parking structure complies as open air parking facility	QTA considered separate building due to distance separation (range 30-50 ft.) and 4-hour fire wall at ramp connection <u>only.</u>	**Sprinklers:** Deluge foam/water sprinkler system at fueling area **Criteria:** 0.17 gpm/ft^2 over coverage area **Standpipes:** Manual dry at stair enclosures	Manual pull stations throughout, rate compensated heat detection for deluge system activation in fueling areas, sprinkler waterflow. Any fire alarm device activates horns and strobes and fuel systems shut down.
San Antonio International Airport	Sprinklers provided in RR/Parking structure due to AHJ interpretation that CSC is assembly occupancy on Level 4. (Note: Code requires all levels below assembly occupancy to be sprinklered)	QTA considered separate building due to distance separation and 3-hour fire wall at ramp connection <u>only</u>. Separation from garage drive ramp is 13 ft. Separation from garage ext. wall to QTA ext. wall is 110 Ft.	**Sprinklers:** Dry/double interlock preaction foam/water sprinkler system at fueling area **Criteria:** 0.16 gpm/ft^2 over 5000 ft^2 **Standpipes:** Manual dry	Manual pull stations throughout, heat detection for preaction system activation in fueling areas, sprinkler waterflow. Any fire alarm device activates horns and strobes and fuel systems shut down.
Warwick, RI TF Green Airport	No Sprinklers – RR/Parking structure complies as open air parking facility	QTA considered separate building due to distance separation (15 ft.) with structurally independent bridges, 2-hour wall/doors at garage exterior wall.	**Sprinklers:** Deluge foam/water system at fueling area **Criteria:** 0.16 gpm/ft^2 over coverage area **Standpipes:** Manual dry	Manual pull stations, rate compensated heat detection for deluge system activation in fueling areas, sprinkler waterflow. Any fire alarm device activates alarms and strobes and fuel systems shut down.
Portland International Airport	No sprinklers for roof parking of the QTA (2nd Level); Ground level of QTA is protected by sprinklers	Entire facility is the QTA operation, no adjoining/adjacent parking structure.	**Sprinklers:** Dry system at fueling area **Criteria:** 0.4 gpm/ft^2 over 2500 ft^2 **Standpipes:** Wet & extended to roof	Heat detection (165°F) at fueling, parking and queuing areas to activate "alarm" condition. Fire alarm interfaced to cause fuel system shutdown upon sprinkler waterflow or heat detection.
Miami International Airport	Sprinkler protection throughout the QTA and adjacent garage	QTA adjoins garage with vehicle access by ramps	**Sprinklers:** Overhead and floor level foam deluge system at fueling area **Criteria:** 0.10 to 0.15 gpm/ft^2 over coverage area **Standpipes:** At egress stairs and as necessary throughout	Ultraviolet/infrared flame detection and 212°F heat detection for fueling area; Manual pull stations , voice communication and visual alarms
LAX Proposed	Sprinkler protection throughout the QTA facility. Open- air parking facility to be separate building.	QTA to be provided with distance separation sufficient to qualify as separate building. Bridges /Ramps will connect to parking structure.	**Sprinklers:** Wet sprinkler system at fueling area. **Criteria:** Extra Hazard Group 1, 0.3 gpm/ft^2 over 2500 ft^2 **Standpipes:** Manual wet or dry standpipes.	Manual pull stations throughout, and sprinkler waterflow alarms. Any fire alarm device activates horns and strobes and fuel systems shut down.

Table 3 - Summary of Seven QTA's - Operational and Fueling Systems' Design Safeguards

FACILITY	Trained operators	Vehicle barriers \ bollards at fuel islands	Emergency shut-off devices	Fire alarm system shut-down	Floor isolation valves	Sloped floors for drainage \ drainage system	Mechanical ventilation at fueling area	Natural ventilation features	Electrical systems per hazardous area class in fueling zones	Underground double-wall storage tanks	Aboveground double-walled piping/Secondary Containment	Aboveground Fuel pipe leak detection	2-hr fire resistance rated chase or shafts for piping	Fuel dispenser on elevated pads \ raised fuel island	Breakaway hose couplings	Shear \ fire valves at base of fuel dispenser	Variable frequency drive pumps	Fuel dispensing programmed limit (e.g. 30 gallons)	Seismic sensor to shut down the fueling system	Oil tanks in fire resistance rated compartment
San Jose International Airport	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Chicago O'Hare International Airport	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
San Antonio International Airport	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warwick, RI TF Green Airport	✓	✓	✓	✓		✓	❶	✓	✓	✓	✓	✓	❶	✓	✓	✓	✓	✓		❹
Portland International Airport	✓	✓	✓	✓	❷	✓	✓	✓	✓	✓	❷	❷	✓	✓	✓		✓	✓	✓	❹
Miami International Airport	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		❸	✓	✓	✓				
San Diego International Airport	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
LAX - Proposed Features	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

❶ This facility has large degree of openness similar to gas station with canopies at grade level, and no piping in a building.
❷ Ground level facility
❸ 4-hour fire resistance rated chases
❹ No Oil Tanks

Table 3 - Operational and Fueling Systems' Design Safeguards

Agenda – September 16, 2015

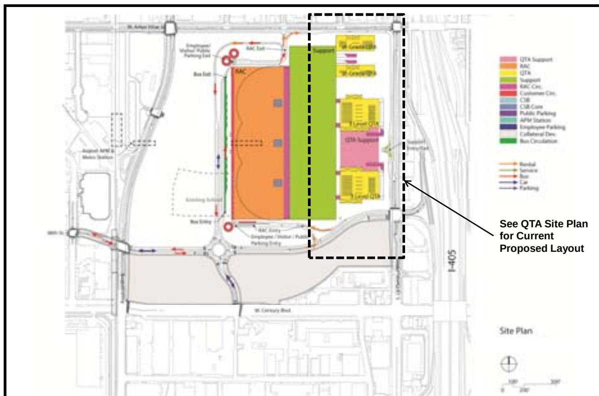
1. Purpose of Meeting
2. ConRAC Site and QTA Design Developments
3. Relevant Project Examples of Other Indoor, Multi-Level Fueling Facilities
4. Proposed Mitigating Features at the QTA
5. Anticipated Project Schedule
6. Initial Feedback?

LADBS and LAFD Review Meeting

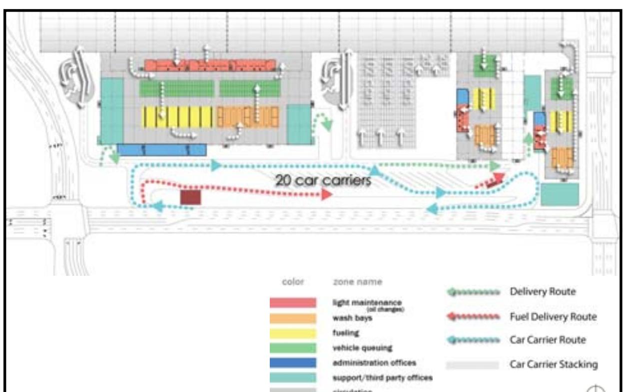
Purpose of Meeting

- Present Proposed Design
- Receive Concurrence with Current Direction

Purpose of Meeting

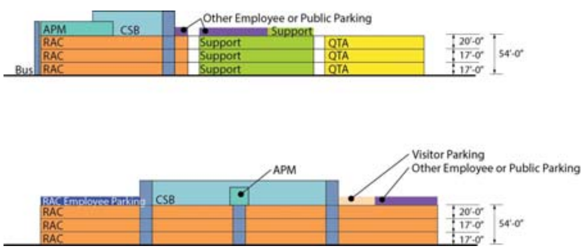


ConRAC Site Plan (Presented July 2015)



QTA Site and First Level Plan

QTA Level 2 and 3 Floor Plan



Building Sections

Table 1 - Data Summary of Seven QTA Facilities – Basic Code, Building Facts and Fueling System Facts - 9/3/2015

Location	Applicable Codes	Basis of Approval	Occupancy Classification	Building Height & Area	Naturally Ventilated or Enclosed	Construction Type	# of Fueling stations –per floor and total	Underground storage tanks	Car wash bays (CWB) Window washer fluid dispensing (WWFD) Light Maintenance (LM)
San Jose International Airport	2001 California Building Code (UBC 1997)	Alternate materials, designs and methods clause	Group S-3, Parking Garage (Note: per UBC 1997 an S-3 garage included repair garages and those having motor fuel dispensing stations)	4 levels, 51,800 ft² /floor, Fueling on Levels 2,3,4	Naturally ventilated	Type I – fire Resistive	12 dispensers/floor 21 nozzles/floor 36 total dispensers	Three -12,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
San Diego International Airport	2010 California Building Code and Fire code (IBC 2009) & NFPA 30A	Alternate materials, designs and methods clause	Group F-1, Moderate Hazard , Factory/Ind. (fueling/wash areas) Group H-2, Windshield washer fluid room	4 levels parking, Fueling on Levels 2,3,4	Naturally ventilated	Type IA – fire resistive	12 dispensers/floor 24 nozzles/floor 36 total dispensers	Three -25,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
Chicago O'Hare International Airport	2015 Chicago Building Code (proprietary code)	Committee on Building Standards and Tests – 3rd party review/approval process	Storage & Service Garage –H3 (Note: H-3 is NOT a high hazard occupancy in Chicago code)	3 stories 90,000 ft² /floor, fueling on Levels 1,2,3	Naturally ventilated	Type IA – fire resistive	24 dispensers/floor 72 total dispensers	Three -25,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
San Antonio International Airport	2012 IBC , IFC (w/amendments) & NFPA 30A	Code Modification Request (CMR) process	Group S-1, Moderate Hazard Storage (Note: submitted as F-1 Factory/Industrial then Revised by City to S-1)	4 stories 58,000 ft² /floor, fueling on Levels 2,3,4	Naturally ventilated	Type IA – fire resistive	18 dispensers/floor 54 total dispensers	Three -25,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
Warwick, RI TF Green Airport	2007 Rhode Island State Building Code (2006 IBC) 2008 Rhode Island Uniform Fire Code (NFPA 1 2003) & NFPA 30A	Alternate materials, designs and methods clause	Group M, Mercantile	3 Levels, 54,700 ft² total (the three levels are located on a built-up foundation in a staggered arrangement)	Naturally ventilated	Type IIB – unprotected noncombustible (Note: 2-hour rating for floor slab & supporting floor columns of fuel platform)	7 dispensers/floor –L3 6 dispensers/floor –L4,5 19 total dispensers	Three -20,000 Gallon tanks	CWB – Yes, not in the QTA building WWFD – Yes LM - No

Relevant Project Examples

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Miami International Airport	Unknown	Alternate materials, designs and methods clause	Unknown	4 levels w/ roof parking, Fueling on Levels 1,2,3; 211,000 ft² /floor	Some natural ventilation	Type I – fire resistive; 4-hour structural frame and floors	20 dispensers/floor 60 dispensers total 120 nozzles total	Four – 45,000 gallon tanks	CWB – Yes WWFD – Yes LM - Yes
LAX Proposed	2014 Los Angeles Building Code [Based on 2013 California Building Code (Based on 2012 IBC)] 2014 Los Angeles Fire Code [Based on 2013 California Building Code (Based on 2012 IFC)] NFPA 30A	Alternate materials, designs and methods clause	Group F-1, Moderate Hazard , Factory/Ind. (fueling/wash areas)	Facility may be one large structure, or split into two multi-level structures and ground Level QTAs providing Total QTA area of 705,000 ft² Multi-level structures would provide fueling, Fueling on Levels 1,2, and 3.	Naturally ventilated	Type IA – fire resistive	30 dispensers/floor 60 nozzles/floor (Note: "floor" means all floor area if designed as split multi-level structures) 90 dispensers total 180 nozzles total (estimated)	Six to seven – 40,000 Gallon tanks (estimated)	CWB – Yes WWFD – Yes LM - Yes

Relevant Project Examples

Table 2 - Data Summary of Seven QTA Facilities – Fire Separation , Fire Protection and Alarm Systems - 9/3/2015

Location	Status of Sprinklers in Ready Return/Parking Structure	Distance & Fire Rating Separation Facts	QTA Fire Protection - Principal Design Features	QTA Fire alarm Systems
San Jose International Airport	Facility combined as QTA, parking garage and Customer Service Center designed as a mixed occupancy, fully sprinklered building.	QTA integrated with parking garage without fire separations; both areas classified as same occupancy (S-3 parking garage); QTA separated by 78 ft. from parking garage, but with connecting ramps & no fire separation.	**Sprinklers:** Wet sprinkler system at fueling area (based on criteria of NFPA 13) **Criteria:** Ordinary Hazard Group 2, 0.2 gpm/ft² over 3000 ft² **Standpipes:** Manual wet standpipes.	Audible and visual devices in the fueling area. Voice evacuation message and PA override capability.
San Diego International Airport	Facility designed using non-separated mixed occupancy approach resulting in sprinklers throughout parking & QTA areas.	QTA separated from ready return area by vehicle bridges spanning 66 ft.	**Sprinklers:** Wet sprinkler system at fueling area **Criteria:** Ordinary Hazard Group 2, as required for motor vehicle repair, 0.2 gpm/ft² over 1500 ft² **Standpipes:** In stairwells and additional hose connections within 150 ft. of all fueling stations	Heat and smoke detection provided for fueling area and arranged to stop dispensing of fuels. Audible and visual devices in the fueling area.
Chicago O'Hare International Airport	No Sprinklers – RR/Parking structure complies as open air parking facility	QTA considered separate building due to distance separation (range 30-50 ft.) and 4-hour fire wall at ramp connection only.	**Sprinklers:** Deluge foam/water sprinkler system at fueling area **Criteria:** 0.17 gpm/ft² over coverage area **Standpipes:** Manual dry at stair enclosures	Manual pull stations throughout, rate compensated heat detection for deluge system activation in fueling areas, sprinkler waterflow. Any fire alarm device activates horns and strobes and fuel systems shut down.
San Antonio International Airport	Sprinklers provided in RR/Parking structure due to AHJ interpretation that CSC is assembly occupancy on Level 4. (Note: Code requires all levels below assembly occupancy to be sprinklered)	QTA considered separate building due to distance separation and 3-hour fire wall at ramp connection only. Separation from garage drive ramp is 13 ft. Separation from garage ext. wall to QTA ext. wall is 110 ft.	**Sprinklers:** Dry/double interlock preaction foam/water sprinkler system at fueling area **Criteria:** 0.16 gpm/ft² over 5000 ft² **Standpipes:** Manual dry	Manual pull stations throughout, heat detection for preaction system activation in fueling areas, sprinkler waterflow. Any fire alarm device activates horns and strobes and fuel systems shut down.
Warwick, RI TF Green Airport	No Sprinklers – RR/Parking structure complies as open air parking facility	QTA considered separate building due to distance separation (15 ft.) with structurally independent bridges, 2-hour wall/doors at garage exterior wall.	**Sprinklers:** Deluge foam/water system at fueling area **Criteria:** 0.16 gpm/ft² over coverage area **Standpipes:** Manual dry	Manual pull stations, rate compensated heat detection for deluge system activation in fueling areas, sprinkler waterflow. Any fire alarm device activates alarms and strobes and fuel systems shut down.
Portland International Airport	No sprinklers for roof parking of the QTA (2nd Level); Ground level of QTA is protected by sprinklers	Entire facility is the QTA operation, no adjoining/adjacent parking structure.	**Sprinklers:** Dry system at fueling area **Criteria:** 0.4 gpm/ft² over 2500 ft² **Standpipes:** Wet & extended to roof	Heat detection (165 °F) at fueling, parking and queuing areas to activate "alarm" condition. Fire alarm interfaced to cause fuel system shutdown upon sprinkler waterflow or heat detection.
Miami International Airport	Sprinkler protection throughout the QTA and adjacent garage	QTA adjoins garage with vehicle access by ramps	**Sprinklers:** Overhead and floor level foam deluge system at fueling area **Criteria:** 0.10 to 0.15 gpm/ft² over coverage area **Standpipes:** At egress stairs and as necessary throughout	Ultraviolet/infrared flame detection and 212 °F heat detection for fueling area; Manual pull stations , voice communication and visual alarms
LAX Proposed	Sprinkler protection throughout the QTA facility. Open- air parking facility to be separate building.	QTA to be provided with distance separation sufficient to qualify as separate building. Bridges /Ramps will connect to parking structure.	**Sprinklers:** Wet sprinkler system at fueling area. **Criteria:** Extra Hazard Group 1, 0.3 gpm/ft² over 2500 ft² **Standpipes:** Manual wet or dry standpipes.	Manual pull stations throughout, and sprinkler waterflow alarms. Any fire alarm device activates horns and strobes and fuel systems shut down.

Relevant Project Examples

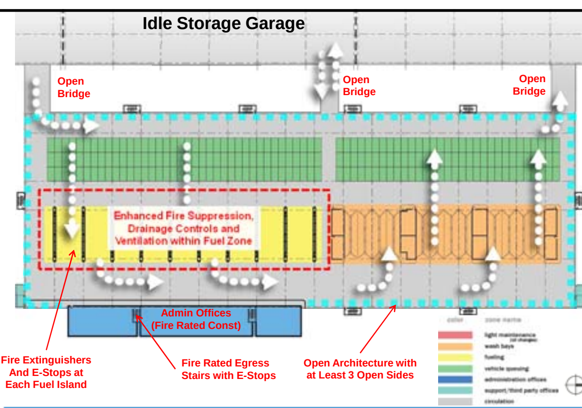
Table 3 - Summary of Seven QTA's - Operational and Fueling Systems' Design Safeguards

FACILITY	Trained operators	Vehicle barriers \ bollards at fuel islands		Emergency shut-off devices	Fire alarm system shut down	Floor isolation valves		Sloped floors for drainage \ drainage system		Mechanical ventilation at fueling area	Natural ventilation features		Electrical systems per hazardous area class in fueling zones		Underground double-wall storage tanks	Aboveground double-walled piping/Secondary Containment	Aboveground fuel pipe leak detection	2-hr fire resistance rated chase or shafts for piping		Fuel dispenser on elevated pads \ raised fuel island	Breakaway hose couplings	Shear \ fire valves at base of fuel dispenser	Variable frequency drive pumps	Fuel dispensing programmed limit (e.g. 30 gallons)		Seismic sensor to shut down the fueling system		Oil tanks in fire resistance rated compartment
San Jose International Airport	✓	✓		✓				✓		✓	✓		✓		✓	✓		✓		✓	✓	✓	✓	✓		✓		
Chicago O'Hare International Airport	✓	✓		✓	✓	✓		✓		✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓
San Antonio International Airport	✓	✓		✓	✓	✓		✓		✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓
Warwick, RI TF Green Airport	✓	✓		✓	✓			✓		❶	✓		✓		✓	✓	✓	❸		✓	✓	✓	✓	✓				❹
Portland International Airport	✓	✓		✓	✓	❷		✓		✓	✓		✓		✓	❷	❷	✓		✓	✓		✓	✓		✓		❹
Miami International Airport	✓	✓		✓	✓	✓		✓		✓	✓		✓		✓	✓		❸		✓	✓	✓						
San Diego International Airport	✓	✓		✓	✓	✓		✓		✓	✓		✓		✓	✓	✓	✓		✓	✓	✓		✓		✓		
LAX - Proposed Features	✓	✓		✓	✓	✓		✓		✓	✓		✓		✓	✓	✓	✓		✓	✓	✓		✓		✓		✓

- ❶ This facility has large degree of openness similar to gas station with canopies at grade level, and no piping in a building.
- ❷ Ground level facility
- ❸ 4-hour fire resistance rated chases
- ❹ No Oil Tanks

Table 3 - Operational and Fueling Systems' Design Safeguards

Relevant Project Examples



Proposed Safeguards and Protections

Proposed Mitigating Features

1. Effective Fixed Fire Suppression Over Fuel Dispensing Area
2. Expanded Electrical Hazard Area
3. Dispenser Area Exhaust Ventilation System
4. Fire Resistive Rated Construction
5. Appropriate Fire Department Vehicle and Personnel Access and Staging Areas for Responders
6. System Shutdown, Controls and Annunciators Available at Multiple Responder Access Points

Code Mitigating Features

Proposed Mitigating Features (Continued)

7. Additional Emergency Stop Devices, Annunciation and Integration
8. Double-Walled, Industrial Grade Piping Run in Fire Rated Raceways/Chases
9. Trained Operators Only Allowed to Operate the Fueling Systems
10. Programmed Dispensing Limits Per Authorization
11. Integrated Drainage and Fire Suppression System
12. Controlled Dispensing Area Floor Penetrations

Code Mitigating Features

Anticipated Project Schedule

- 15% Schematic Design to be Completed by Dec 2015
- 30% Conceptual Design to be Completed by April 2016
- 100% Final Design to be Completed in 2017
- Construction Start Anticipated in 2018
- ConRAC Construction Completion Anticipated in 2022
- ITF and APM Construction Completion Anticipated in 2023

Anticipated Project Schedule

Initial Feedback from LADBS and LAFD

- Questions and Comments?
- Concerns?
- Process Going Forward?

Feedback from LADBS and LAFD

ISSUED FOR DISTRIBUTION – DECEMBER 14, 2015

LAX ConRAC – Los Angeles Department of Building & Safety and Fire Department Review Meeting

Meeting Date: Wednesday, November 18, 2015, 9:00 am – 10:45 am PST
Location: Room 210, LAWA Administration East Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to provide members of the Los Angeles Department of Building and Safety (LADBS) and Los Angeles Fire Department (LAFD) an update to the LAX Consolidated Rental Car Facility (ConRAC) project and to review a revised draft of the Request for Modification of Fire Code Ordinance associated with indoor, multi-level fuel dispensing.

Information/Data Package submitted to LADBS/LAFD prior to this meeting is included as Attachments A2 and A3. The items discussed are noted below.

Items in **Bold Font** represent action items to which the design team, LAWA, LADBS or LAFD will respond.

1. David Lee (TranSystems) indicated that the design team has provided a revised draft of the Request for Modification addressing comments received from LAFD and LADBS last month. In addition, the QTA mitigations table, modified to be specific to LAX ConRAC facility and updated to include code provisions, is also ready for review.
2. Because David Myers (LAFD) was not in attendance at the previous meeting, RB Laurence (Stantec) described the major systems proposed for the QTA Buildings, including distribution systems for gasoline, windshield washer fluid, and motor oil, as well as safety features including emergency stop devices, fire suppression, expanded electrical hazard area and enhanced fire rated construction.
3. Mr. Myers asked if a foam fire suppression system has been used in other QTA facilities and whether this was considered for this facility. Mr. Laurence responded that, with one exception, foam fire suppression system has primarily been used in colder climates because wet-pipe sprinkler systems, which do not freeze in warmer climates like LA, are the appropriate agent to fight the primary fire load of the vehicle and they allow water to be released immediately. Foam systems can take from 45 to 60 seconds to charge before they dispense.
4. The largest QTA floor will be equipped with 30 fuel dispensers (60 fuel positions). Typically, a vehicle will be parked at one of the fuel positions for 12 to 15 minutes, but the actual time on fueling this vehicle will only be 2 to 3 minutes, as the average returned rental vehicle requires only 3 or 4 gallons to fill. The remainder of the time is for the vehicle service agent to vacuum the interiors, check the windshield washer fluid and tire pressure. Statistically, only about 20% of the fuel dispensers would be used simultaneously. However, Mr. Myers requested for a hazard analysis of 60 vehicles being fueled at once. Mr. Myers also asked whether smoking by employees has been addressed. **ACTION: Project Team will include an analysis to show that even with 60 vehicles being fueled at once, the concentration of fumes is below a hazardous condition. This analysis will be included in the final RFM.**

5. Mr. Laurence noted that there is no Stage II vapor recovery requirement for this facility, as rental car fleet is 100% equipped with onboard refueling vapor recovery (ORVR) system that captures fuel vapors during refueling.
6. Design considers a worst case scenario of 25-gallon spill, as controlled by the programmed fuel dispensing limits of 25 gallons per authorization. This worst case scenario would represent a condition where the nozzle is on the ground and held open.
7. All above ground gasoline piping inside buildings and outside of fueling areas will be enclosed in a 2-hour rated chase. It is assumed that fuel in double-walled pipe is not in a controlled area and not subject to the maximum allowable quantity of the control area calculations. Figure 10, typical indoor gasoline piping, was prepared per request by Jameson Lee (LADBS) from previous meeting. ACTION: Mr. Myers indicated that classification of the fuel chase will need to be reviewed further by LAFD.
8. A 250-gallon washer fluid day tank is considered and will be located inside a flammable liquid room. Windshield washer fluid consisting of premixed blend of 50/50 methanol and water (84± degree flash point) is used and is distributed in Schedule 40, welded, stainless steel piping. All fluid transfer is controlled by emergency stop shutoff system.
9. Emergency stop devices are provided at the end of each fuel island row, in each fueling area management office, at each major egress point, and within each fire command room. Manual activation of an E-stop button will result in shutdown of the floor, while activation by seismic sensors or by the master actuator available to the third party fuel manager will result in a master shutdown of the entire facility. ACTION: Mr. Myers noted that fuel shutdown sequence (at a floor versus entire building) will need further review.
10. The location of the Fire Command Room has not been determined, but it is likely to be located in an out-building in the northeast or southeast corner of the site. ACTION: Design Team will provide additional information regarding the location of the proposed Fire Command Room.
11. The fueling system is being designed with 4" piping; although Mr. Laurence stated that they could possibly be reduced to 3" diameter piping. There is leak detection tape proposed on the outside of the pipes. Mr. Myers stated that there is a need to address the quantities of fuel in the chase enclosures. For indoor fueling systems, the typical size pipe would be 1" or 1-1/2" dia.
12. There are 6 underground storage tanks proposed; two for each floor of the QTA Building. Motor oil would be stored in protected above ground tanks.
13. Vidar Landa (Aon Fire) noted that Jameson Lee has previously asked the team to review whether use of water curtain around fuel dispensing area would be beneficial. Mr. Landa does not believe that water curtain would not be necessary for protection as the fuel dispensing areas will already be protected by enhanced fire suppression system consisting of Extra Hazard Group 1 wet pipe sprinkler system over fuel dispensing areas.
14. Open architecture (as defined in NFPA 30A) and fuel dispensing area ventilation systems will be provided. David Lee noted that some adjustments of QTA Level 1 were made to allow for more of the perimeter to be open, meeting or exceeding building code definition of an open parking garage. It was noted that this open perimeter is in addition to the vehicle exhaust ventilation system.
15. A question was asked on the applicable code edition that this project will be required to use. Lily Teng (LADBS) noted that in order for this project to be submitted under the current 2014 Los Angeles Fire Code and 2014 Los Angeles Building Code, the team must submit a life safety package to initiate the parallel review process on or before December 31, 2016.

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16. Mr. Laurence noted that an additional request from the rental car industry was the incorporation of heavy maintenance (major repair work requiring defueling, body work and accident damage). Ms. Teng questioned whether this would fall under a prohibited use under the current specific plan and indicated that occupancies for these areas will need to be reviewed separately.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

A2: Revised Draft Request for Modification dated November 4, 2015, with Figure 10, Attachment 11 and Attachment 12 (23 pages)

A3: QTA Code Requirements and Mitigations Table for LAX ConRAC (1 page)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	Consolidated Rental Car Facility	Date:	November 18, 2015
	Los Angeles International Airport	Time:	9:00 am – 11:00 am
Re::	ConRAC/QTA Review	Location:	LAWA Admin Building East, Room 210

Name	Representing	Telephone Number	Email Address	Present
Jameson Lee	LADBS	(213) 482-6856	Jameson.lee@lacity.org	
Lily Teng	LADBS	(213) 482-6871	Lily.teng@lacity.org	
Marcus Law	LAFD	(213) 272-8353	Marcus.law@lacity.org	
David Myers	LAFD	(213) 482-6908	David.myers@lacity.org	
Hani Malki	LAFD	(213) 482-6936	Hani.malki@lacity.org	
Fatima Hashim	LAWA	(424) 646-5173	fhashim@lawa.org	
Pat Tomcheck	LAWA	(424) 646-5192	ptomcheck@lawa.org	
Robert Falcon	LAWA	(424) 646-5848	rfalcon@lawa.org	
Vidar Landa	Aon Fire Protection	(213) 630-1376	Vidar.Landa@aon.com	
RB Laurence, Jr.	Stantec Consulting Inc.	(603) 206-7559	ronald.laurence@stantec.com	
David Lee	TranSystems	(510) 835-9916	dklee@transystems.com	

LAX ConRAC
QTA Code Requirements and Mitigations Table

	Code Requirements (LAFC and NFPA	Code Description	Proposed LAX	LAX Code Compliance and/or Mitigations□
Motor Fuel Dispensing Code Requirements	NFPA 30A - 5.2.4	**Gasoline Piping Chase.** All piping inside buildings but outside the motor fuel dispensing area shall be enclosed within a horizontal chase or a vertical shaft used only for this piping. Vertical shafts and horizontal chases shall be constructed of materials having a fire resistance rating of not less than 2 hours.	**Exceeds**	Exceeds code requirement by having indoor fuel piping in a 2 hr rated chase in all areas of the building (only required by code when pipe is outside fueling areas) and also by the addition of steel containment piping. See factor GG below.
	LAFC 2306.7.3	**Dispenser Mounting.** Dispensers will shall be protected against physical damage by mounting on a concrete island 6 inches or more in height.	**Meets**	Dispensers will be on islands and protected with bollards as required by code. Dispensers will not be located where they can be struck by an out-of-control vehicle descending a ramp or other slope.
	LAFC 2306.7.4	**Emergency Shutoff Valve.** Automatic emergency shutoff valves designed to close in the event of a fire or impact shall be properly installed in the liquid supply line at the base of each dispenser.	**Meets**	Approved emergency shutoff valves will be provided for each dispenser
	LAFC 2306.7.5.1	**Breakaway Devices.** Dispenser hoses shall be equipped with a listed emergency breakaway device designed to retain liquid on both sides of a breakaway point.	**Meets**	Breakaways will be provided on all dispenser hoses
	LAFC 2303.2	**Emergency Disconnect Switches.** Emergency electrical disconnects provided in locations not less than 20 ft and not more than 100 ft from fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be installed at an approved location.	**Exceeds**	Exceeds code requirement by the additional emergency stop buttons (approximately 83 emergency stop devices will be provided when only 10 are required to meet code required distances), additional emergency stop initiation sources (UV/IR flame detection), and integration of emergency stop with non-gasoline systems. See factor EE below.
	LAFC 2301.5	**Electrical Hazard Areas.** Electrical hazard areas IAW the California Electrical Code. Dispensers have 20 ft hazard area from grade to 18 in above grade.	**Exceeds**	Electrical hazard area expanded laterally and also 18 inches below floor. Exceeds code requirement having an expanded electrical hazard area. In addition to the laterally expansion provides a greater restriction on potential ignition sources, the area will be expanded 18 inches below the floor. See factor BB below.
Indoor Fueling Code Requirements	NFPA 30A - 7.3.3 (LABC 1016.2)	**Means of Egress.** In a motor fuel dispensing facility that is located inside a building or structure, the required number, location, and construction of means of egress shall meet all applicable requirements for special purpose industrial occupancies, as set forth in NFPA 101, Life Safety Code. (Standards from LABC 1016 applied)	**Exceeds**	Provided number of exits (South: 10 provided vs. 8 required, North: 4 provided vs. 3 required) and aggregate egress capacity (South: 480 inches provided vs. 352 inches required, North: 192 inches provided vs. 132 inches required) exceed the minimum code requirements. In addition, the egress stair construction will exceed that required by code (2-hour provided vs. 1-hour required). See HH and MM below.
	NFPA 30A - 7.3.5.2	**Fire Protection.** Where required, an automatic fire suppression system shall be installed in accordance with the appropriate NFPA standard, manufacturer's instructions, and the listing requirements of the systems.	**Exceeds**	Exceeds code with wet pipe sprinkler Extra Hazard Group 1 system with 0.3 gpm/square foot over 2,500 square feet at fueling areas. See AA below.
	NFPA 30A - 7.3.6.1	**Separation.** The fuel dispensing area shall be separated from all other portions of the building by walls, partitions, floors, and floor–ceiling assemblies having a fire resistance rating of not less than 2 hours.	**Meets**	2-hour fire rating will be provided to separate fuel dispensing areas from office areas. In addition, the QTAs will be located 60 feet away from the adjacent Support Building (i.e., no fire-rating required between QTAs and Support Building).
	NFPA 30A - 7.3.6.2	**Interior Finish.** Interior finish shall be of noncombustible materials or of approved limited-combustible materials, as defined in NFPA 220, Standard on Types of Building Construction.	**Meets**	Interior finish will meet code requirement
	NFPA 30A - 7.3.6.3	**Doors and Windows.** Door and window openings in fire-rated interior walls shall be provided with listed fire doors having a fire protection rating of not less than 1 1/2 hours. Doors shall be self-closing. They shall be permitted to remain open during normal operations if they are designed to close automatically in a fire emergency by means of listed closure devices. Fire doors shall be installed in accordance with NFPA 80, Standard for Fire Doors and Other Opening Protectives. They shall be kept unobstructed at all times.	**Meets**	Doors and windows will meet the code requirement.
	NFPA 30A - 7.3.6.4	**Duct Openings.** Openings for ducts in fire-rated interior partitions and walls shall be protected by listed fire dampers. Openings for ducts in fire-rated floor or floor–ceiling assemblies shall be protected with enclosed shafts. Enclosure of shafts shall be with wall or partition assemblies having a fire resistance rating of not less than 2 hours. Openings for ducts into enclosed shafts shall be protected with listed fire dampers.	**Meets**	Partitions and fire-rated floors protected per code
	NFPA 30A - 7.3.6.5	**Proximity of Fueling Area to Exit**. The fuel dispensing area shall be located at street level, with no dispenser located more than 15 m (50 ft) from the vehicle exit to, or entrance from, the outside of the building.	**Does not meet.**	Does not meet. Dispensers will be located up to the third floor (2 floors above the code limit), and vehicles will have an exit distance of up to 600 feet.
	NFPA 30A - 7.3.6.6	**Vehicle Limits.** The fuel dispensing area shall be limited to that required to serve not more than four vehicles at one time.	**Does not meet.**	Does not meet. Fuel dispensing area will be able to serve up to: South QTA: 162 fuel positions (42 on level 1, 60 on level 2, 60 on level 3) North QTA: 30 fueling positions (30 on level 1)
	NFPA 30A - 7.3.6.7	**Ventilation.** A mechanical exhaust system that serves only the fuel dispensing area shall be provided. (shall not apply to a fuel dispensing area located inside a building if two or more sides of the dispensing area are open to the building exterior.)	**Exceeds**	Exceeds by having open architecture exceeding requirements of open parking garages and mechanical ventilation. See mitigating factor FF below.
	NFPA 30A - 7.3.6.8, LAFC 2301.4.1	**Liquidtight Floor.** The floor of the dispensing area shall be liquidtight. Where Class I liquids are dispensed, provisions shall be made to prevent spilled liquids from flowing out of the fuel dispensing area and into other areas of the building by means of curbs, scuppers, special drainage systems, or other means acceptable to the authority having jurisdiction.	**Exceeds**	Exceeds by including features above the minimum requirement of a liquid tight floor and curbs. Includes the liquidtight floors, grading, and drainage systems. See mitigating factor KK below.
	LAFC 2306.2.2	**Aboveground Tanks Located Inside Buildings.** Aboveground tanks for the storage of Class I, II, and IIIA liquid fuels are allowed to be located in buildings. Such tanks shall be located in special enclosures complying with 2306.2.6, in a liquid storage room or a liquid storage warehouse complying with Chapter 57, or shall be listed and labeled as protected aboveground tanks in accordance with UL 2085.	**Exceeds**	Aboveground tanks that store Class IC Flammable (WWF) liquids will be in UL 2085 protected tanks and located in a 2-hr fire rated liquid storage room. Additionally, Class IIIB combustible liquids (Lube Oil and Used Oil) will be in UL 2085 protected tanks (even though requirement does not extend to Class IIIB liquids).

Mitigating Factor	Additional Mitigating Factors Description	Justification of Mitigating Factor
AA	**Enhanced fire suppression provided.** Wet pipe sprinklers will be provided with an Extra Hazard Group 1 system over expanded fueling areas, and an Ordinary Hazard Group 1 system at other areas of the QTA.	Enhanced systems provide greater water and suppression ability than required by code. Additionally the wet sprinkler systems deliver water immediately and reduce the time required to deliver water to a fire compared to the minimum required dry fire suppression system
BB	**Expanded electrical hazard area.** The traditional hazard area of a radius of 20 feet from each dispenser from the floor to 18 inches will be increased to the limits of the fuel dispensing areas. In addition, the hazard areas have been extended to 18 inches below the floor.	The extension of the electrical hazard area laterally limits potential ignition sources in the vicinity of the fueling area. Additionally, the extension below grade will require all lighting fixtures below the fueling areas to be rated for Class 1, Division 2. This will reduce the possibility for an ignition if a spill were to occur.
CC	**Warning lights.** Emergency Stop actuation will activate warning lights on the QTA floors.	Warning lights provide advanced notification of an emergency stop to personnel on the QTA floors so that appropriate emergency procedures can be
DD	**Emergency responder controls at dedicated fire control rooms.** Fire control rooms will have full access to emergency system shutdown controls.	Fire control rooms will provide quick access for emergency responders that arrive on site to shut down systems. Additionally they rooms will provide monitoring of the QTA buildings.
EE	**Additional emergency stop buttons, integration and initiation.** The facility will have approximately 83 emergency stop devices when only 10 are required. The system will be integrated with non-gasoline systems and have additional initiation sources.	Emergency stop system will be actuated by additional sources to include ultraviolet/infrared flame detection and seismic switches. The emergency stop system will also de-energize the vacuum systems, isolate the compressed air system, isolate the motor oil systems, and isolate the windshield washer fluid dispensing systems to limit additional hazards or the migration of hazards during a shutdown event
FF	**Open architecture and Ventilation.** Area will be open to the outside except for exterior walls associated with office, support, and maintenance areas, and fuel dispensing area ventilation will be provided.	Exhaust ventilation systems are not required by code when two or more sides of the area are open to the exterior. The exhaust ventilation system will provide air movement across dispensing area to dissipate any flammable vapors. With the open area, operators will be able to easily identify and mitigate any hazardous situations and allow occupants to easily identify the shortest path to exits.
GG	**Double Walled, Monitored Piping in a 2-Hr Chase.** Double-walled, industrial grade, leak monitored, steel aboveground piping in 2-hour fire-rated enclosures both in and outside of the fueling area.	Piping in chases throughout the building provide a fire-resistant construction beyond what is required by code. The double-walled piping acts as secondary containment, reducing the chance for a failure to spread flammable fuels. Leak detection tape inside the double-walled aboveground piping will detect fuel that may leak from the primary pipe and will initiate an emergency stop, limiting fuel that may leak on aboveground floors.
HH	**Additional egress paths.** There will be more exit stairs provided than required by code.	The provided number of exits and exit capacity exceed that required by code. Combined, these features result in a design that reduce the time required for occupant evacuation and a design that affords greater safety to firefighters responding to a fire event.
II	**Trained Operators.** Trained operators will only be allowed to operate dispensers	Trained operators add a level of safety above the general public. Trained operators are expected to know how to respond to an emergency and how to safely egress from the building. Trained operators reduce the potential for spills and reduce the severity of an incident.
JJ	**Dispensing Limits.** Dispensing is programmed to be limited to 25 gallons per transaction	Controlled fuel dispensing limits the maximum amount of fuel that can be expected during a spill
KK	**Integrated drainage.** Graded floor and drains will direct any spilled fuel to an oil water separator	Any spills will be routed to underground drainage and restricted from leaving the dispensing area.
LL	**Fail-safe isolation points.** Gasoline, windshield washer fluid, and compressed air systems will each have multiple isolation points controlled by normally-closed, fail-safe solenoid valves.	Hazardous systems will be isolated in the event of a power failure or emergency stop actuation.
MM	**Egress stairs enhanced fire-rated construction. 2**-hour fire resistive construction will be provided instead of the 1-hour fire resistive construction required, even though these stairs serve only three stories.	This enhanced egress stair construction will provide greater protection for building occupants and firefighter personnel.
NN	**QTA Building enhanced fire resistive construction.** 1-A fire resistive construction will be provided for the QTAs instead of the type 1-B required	An increased fire-rating on the structural frame will provide superior protection against structural failure during a fire

November 4, 2015

Request for Modification of Fire Code Ordinance
City of Los Angeles
Los Angeles Fire Department
Construction Services Unit
221 N. Figueroa Street, 3rd Floor
Los Angeles, CA 90012

Re: Request for Modification - Indoor Fuel Dispensing
Los Angeles International Airport
Proposed Consolidated Rental Car Facility
Los Angeles, California

Dear Fire Code Official,

Los Angeles World Airports (LAWA) intends to develop a new Consolidated Rental Car Facility (ConRAC) near the Los Angeles International Airport (LAX) at a 130-acre site known as Manchester Square. The building will consolidate multiple rental car facilities that are spread throughout the area into a single, multi-level facility. Consolidating these multiple facilities into a single facility increases the operational efficiency of the rental car companies while providing an improved passenger experience, reducing traffic, and substantially improving land use in the airport area. This ConRAC project is an integral part of the Landside Access Modernization Program (LAMP) which promises to provide a much needed upgrade to the landside core of the airport. See Figures 1 through 6 for vicinity map, proposed project site, and floor plans.

Critical to the rental car operation is the need to efficiently transform returned (dirty) cars into rentable (clean) cars. This process happens in areas of the ConRAC known as the Quick Turn Around (QTA) building(s) which require indoor fueling capabilities. The large number of indoor fueling positions inside of QTAs has not been anticipated in fire and building codes and this document serves as a request for modification of fire codes to safely permit indoor fueling at the scale required to be effective. Specifically, NFPA 30A, the Code for Motor Fuel Dispensing Facilities and Repair Garages, which is referenced by the Los Angeles Fire Code, limits indoor motor fuel dispensing facilities to the street level of a building, to not more than required to fuel four vehicles, and that dispensers must be located to within 50 feet of an entrance or exit to the building.

ConRACs with multi-level QTAs are a relatively new building type with nine other such facilities having been built or are in various stages of development in the United States (San Jose, Miami, Providence, Burbank, Austin are operating, and Tampa, San Diego, Chicago, and San Antonio are in design and/or construction). While ConRAC designs vary by location, their associated QTAs all require the fueling of large numbers of vehicles inside buildings. Most of these other locations have required appeals from fire and building codes that limit the location and quantity of indoor fueling positions.

Multi-level QTAs are critical to the success of ConRAC facilities for the following reasons:

- Multi-level QTAs allow the path between the returned vehicle to the QTA and back to a ready stall to be as short as possible, by locating the QTA operation on the same level

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as the ready/return areas. Benefits include reduced fuel consumption and emissions, reduced property footprint, and higher labor efficiency.

- Multi-level QTAs allow each rental car company to provide a secured perimeter around their respective operation, since returned vehicles no longer need to be transported to an at-grade QTA facility farther away. Benefits include reduced vehicle theft, higher labor efficiency, and increased workplace safety.

This narrative provides background information to understand the layout of the planned ConRAC at the Los Angeles International Airport, its intended use, and the code analysis that has been performed as the basis of this Request for Modification of Building Ordinances.

Introduction:

The LAX ConRAC will consist of a Ready/Return Building, a Support Building, and two QTA Buildings (Figure 2). Each of these buildings will be separate from the other buildings but are connected to adjacent buildings via structurally independent bridges.

The Ready/Return Building is a 4-level structure with an approximate area of 811,000 square feet per floor. Rental car parking will be provided on Levels 1, 2, and 3. Public and employee parking, APM station and customer service areas will be provided on Level 4.

The Support Building is a 4-level structure with an approximate area of 688,000 square feet per floor. The Support Building will have rental car parking on Level 1, 2, and 3. Rental car parking and public parking will be provided on Level 4.

Two separate QTA Buildings are anticipated to be provided for this project. These two multi-level QTA buildings will be connected to the Support Building via bridges. The public is not allowed in the QTA areas.

QTA facilities are an integral part of the successful operation of ConRACs. QTA facilities consolidate “turn around” operations from returned rental cars to prepare them for rental again. Vehicle queuing allows for cars to be lined-up while waiting for their turn to be fueled or washed. Vehicles in the fueling areas are inspected, fueled with gasoline, replenished with windshield washer fluid and tire air, vacuumed and cleaned. Vehicles are then passed through a car wash. This turn-around process typically takes between 12 to 15 minutes. Vehicles that require preventative maintenance or minor repairs are pulled from this process and serviced in maintenance bays located in the QTAs. QTAs are built with the internal infrastructure to provide fuel, windshield washer fluid, and lube oil to the required areas.

The administration office area comprises dispatch workstations and fuel manager’s offices, restrooms, locker room, break rooms, storage and support areas. The administration office areas are located in close proximity of the fuel dispensing areas to allow dispatchers and managers to observe fueling activities and the ability respond to an incident expeditiously.

A summary of the components anticipated to be provided at each of the two QTA buildings is presented in the table below:

	Number of Levels	Number of Fueling Positions	Number of Wash Bays	Number of Light Maintenance Bays
North QTA Approximate Footprint Dimensions of 319' x 292' Approximate Area = 225,000 SF	**3**	**30 Total** 24 Proposed Positions and 6 Future Positions on Level 1 None on Level 2 None on Level 3	**5 Total** 5 on Level 1 None on Level 2 None on Level 3	**48 Total** 8 on Level 1 20 on Level 2 20 on Level 3
South QTA Approximate Footprint Dimensions of 276' x 684' Approximate Area = 550,000 SF	**3**	**162 Total** 42 on Level 1 60 on Level 2 60 on Level 3	**32 Total** 8 on Level 1 12 on Level 2 12 on Level 3	**15 Total** 15 on Level 1 None on Level 2 None on Level 3

Applicable Code

- 2014 Los Angeles Fire Code (based on 2013 California Fire Code (based on 2012 International Fire Code))
- 2014 Los Angeles Building Code (based on 2013 California Building Code (based on 2012 International Building Code))
- 2012 NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages

Code Issue:

The QTAs are indoor motor fuel dispensing structures with flammable/combustible liquids in closed piping systems and liquid storage in aboveground protected tanks or underground tanks. Gasoline will be enclosed within closed piping systems and fire-rated shafts. These piping systems will include the mitigating factors described below to provide safe conditions to dispense the flammable and combustible liquids.

The North and South QTAs will be considered mixed use occupancy buildings and will be designed in accordance with LABC Sections 508 and 509. While the QTAs will be constructed of Type IA construction and could be considered as non-separated occupancies per LABC Section 508.3, the QTAs will be designed as separated occupancies per LABC Section 508.4.

In addition, any incidental uses (e.g., storage rooms over 100 square feet) will be designed for conformance to LABC Section 509.

Although LABC Section 309.1 classifies motor-fuel dispensing facilities as Group M occupancies, the main occupancy of the QTAs will be considered as Group F-1 per LABC Section 306.2. A Group F-1 occupancy classification results in a more conservative design approach and is more appropriate for a QTA than a Group M occupancy classification, which is intended for retail functions such as a public gas station. This is due to the QTA's factory-like operations, safeguards to prevent and control fires, and non-public access. The Group F-1 occupancy classification will be assigned to the fueling, maintenance, wash bay, vehicle queuing and circulation areas within the two QTAs (see Figures 1 through 9). The administrative and support/third party office areas shown in Figures 1 through 9 will be classified as Group B occupancies. Any QTA room or area listed in LABC Table 509 will be considered and designed as incidental uses.

Since the quantities of flammable (IB and IC) and combustible liquids (IIIB) used in open/closed systems within the F-1 occupancy areas will not exceed the maximum allowable quantities per control area (LABC Table 307.1(1)), an H occupancy classification is not appropriate for these areas of the two QTAs. However, an H-2 occupancy classification will be considered for the storage room containing the washer fluid day tank and for the liquid transition room as the maximum allowable quantities are exceeded within these two rooms.

Flammable liquids in the QTA include gasoline (Class IB) and windshield washer fluid (WWF, Class IC) which is a premixed blend of 50/50 methanol and water. Combustible liquids include lube oil and used oil (both Class IIIB). The flammable and combustible liquids (with exception of used oil collection caddies) in the QTA are contained in systems that only dispense when dispensing nozzles are manually actuated by QTA personnel. Liquids in these systems are considered to be in "Closed Systems" due to this containment and that these liquids are not continuously open to the atmosphere during normal operations. In addition to the closed-system piping, portions of flammable and combustible liquid systems will be in enclosures that provide a 2-hour fire resistive construction. It is the intent of the 2-hour fire resistive construction to separate the flammable liquid piping from the main QTA floor occupancy. As with the liquids within the H-2 liquid storage rooms, the liquid inside 2-hour fire resistive enclosures is not considered to count towards the Maximum Allowable Quantity (MAQ) of the control areas associated with the Group F-1 occupancy of the QTA. A summary of the fire resistant construction methods for the flammable and combustible liquids in the QTA is summarized on the table below. Figure 10 depicts a typical indoor gasoline piping layout.

It is assumed that each QTA floor constitutes two control areas – one control area includes the F-1 occupancy of the QTA operating area. It is within this control area for which the maximum allowable quantities of flammable liquids apply. The second control area consists of the liquid storage room and rated piping enclosures.

Fluid System	Class of Liquid	Type of System (Open/Closed)	Fire-resistant construction providing separation for liquids not contributing to MAQ
Gasoline	IB	Closed	Aboveground piping outside dispensers (vertical and horizontal) routed in 2-hour, fire resistive chase. Piping for 1st floor underground.
Windshield Washer Fluid (WWF)	IC	Closed	Vertical piping routed in 2-hour, fire resistive chase. Aboveground Protected day tanks and Protected bulk storage tanks have a 2-hour fire-rated construction and will be located in an H-2 liquid storage room..
Lube Oil	IIIB	Closed	Protected tanks have a 2-hour fire-rated construction.
Used Oil	IIIB	Open and Closed	Protected tanks have a 2-hour fire-rated construction.

The anticipated quantities of flammable and combustible liquids in the North and South QTA's are listed in the sections below.

Anticipated Quantities of Class IB and IC Fluid in Closed Systems in QTA Buildings

Quantities in the tables below represent anticipated quantities of flammable liquids (Class IB and IC) that will be present in the building footprint of both the South and North QTA buildings. The liquids anticipated are gasoline and WWF. Liquids that are underground or in 2-hour rated enclosures are counted separately and are considered to not contribute towards the Maximum Allowable Quantity (MAQ) limits for the occupancy from LAFC Table 5003.1.1(1). Flammable liquids below do not include quantities outside the building footprint. Liquids outside of the building footprint include the gasoline USTs (anticipated 300,000 gallons underground storage), WWF USTs (anticipated 20,000 gallons underground storage), and underground gasoline and WWF piping. All quantities assume tanks and piping are filled with the maximum amount of liquid that they are capable of holding.

South QTA Flammable Liquids

South QTA. Closed System Flammable Liquids Contributing to MAQ (Class IB and IC)	1st Floor	2nd Floor	3rd Floor
Gasoline in Dispensers (IB) (1.15 gal ea (1st floor), 1.42 gal ea (2nd & 3rd floor))	24 gal (21 dispensers)	43 gal (30 dispensers)	43 gal (30 dispensers)
Gasoline in Hoses (IB) (0.41 gallons per 18' hose)	17 gal (42 hoses)	25 gal (60 hoses)	25 gal (60 hoses)
WWF in Steel Aboveground Piping (IC) (2961' of 1/2", 3/4", and 1" piping)	25 gal	36 gal	36 gal
WWF Hose reels (IC) (0.5 gal per 50' reel)	11 gal (21 reels)	15 gal (30 reels)	15 gal (30 reels)
Total Flammable Liquids (Class IB and IC) Per Floor	**77 gal**	**119 gal**	**119 gal**
Maximum Allowable Quantity (LAFC 5003.1.1(1))	**240 gal**	**240 gal**	**240 gal**
Maximum Allowable Quantity (LABC 414.2.2)	**240 gal**	**180 gal**	**120 gal**

South QTA. Closed System Flammable Liquids <u>Not</u> Contributing to MAQ (Class IB and IC)	1st Floor	2nd Floor	3rd Floor
Gasoline in DW Underground FRP Piping (IB) (1132' in 3" diameter pipe)	415 gal	none	none
Gasoline in DW Aboveground Steel Piping (IB) (3,978' of 4" diameter pipe in 2-hr rated chase)	1,472 gal	1,124 gal	none
WWF in Steel Pipe in Riser (IC) (192' of 2" pipe in 2-hr fire chase)	31 gal	none	none
WWF in Day Tanks (IC) 2-hr fire rated/Protected day tanks in H-2 liquid storage room.	250 gal	250 gal	250 gal
Flammable Liquids in 2-hour fire rated enclosures per floor.	**2,168 gal**	**1,374 gal**	**250 gal**

North QTA Flammable Liquids

North QTA. Closed System Flammable Liquids Contributing to MAQ (Class IB and IC)	1st Floor	2nd Floor	3rd Floor
Gasoline in Dispensers (IB) (1.15 gal each)	17 gal (15 dispensers)	none	none
Gasoline in Hoses (IB) (0.41 gallons per 18' hose)	12 gal (30 hoses)	none	none
WWF in Steel Aboveground Piping (IC) (857' of 1/2", 3/4", and 1" piping)	27 gal	none	none
WWF Hose reels (IC) (0.5 gal per 50' reel)	8 gal (15 reels)	none	none
Total Flammable Liquids (Class IB and IC) Per Floor	**64 gal**	**0 gal**	**0 gal**
Maximum Allowable Quantity (LAFC 5003.1.1(1))	**240 gal**	**240 gal**	**240 gal**
Maximum Allowable Quantity (LABC 414.2.2)	**240 gal**	**180 gal**	**120 gal**

North QTA. Closed System Flammable Liquids <u>Not</u> Contributing to MAQ (Class IB and IC)	1st Floor	2nd Floor	3rd Floor
Gasoline in DW Underground FRP Piping (IB) (722' in 3" diameter pipe)	265 gallons	none	none
WWF in Protected Storage Tank (IC) 2-hr fire rated/Protected day tanks in H-2 liquid storage room.	3,000 gallons	none	none
Flammable Liquids in 2-hour fire rated enclosures per floor.	**3,265 gal**	**0 gal**	**0 gal**

Anticipated Quantities of Class IIIB Fluid in Open and Closed Systems in QTA Buildings

The tables below represent the anticipated quantities of combustible liquids (IFC Class IIIB) that will be present in the North and South QTA buildings. All quantities assume tanks and piping are filled with the maximum amount of liquid that they are capable of holding.

South QTA Combustible Liquids

South QTA. Closed and Open System Combustible Liquids in Building (Class IIIB)	1st Floor	2nd Floor	3rd Floor
Lube Oil in Protected Aboveground Storage Tank	5000 gal	none	none
Lube Oil in Steel Piping (2929' of 2" piping)	477 gal	none	none
Lube Oil in Hose Reels (0.35 gallons per 1/2" diameter 35' reel)	6.3 gal (18 reels)	none	none
Used Oil in Protected Aboveground Storage Tank	5000 gal	none	none
Used Oil in Steel Piping (1746' of 2" piping)	285 gal	none	none
Used Oil in Collection caddies (open system) (25 gallons each)	375 gal (15 caddies)	none	none
Total Combustible Liquids (Class IIIB) Per Floor	**10,769 gal Closed 375 gal Open**	**Total 2nd: 0 gal**	**Total 3rd: 0 gal**
Maximum Allowable Quantity (LAFC 5003.1.1(1))	**Unlimited (Open and Closed)**	**Unlimited (Open and Closed)**	**Unlimited (Open and Closed)**

North QTA Combustible Liquids

North QTA. Closed and Open System Combustible Liquids in Building (Class IIIB)	1st Floor	2nd Floor	3rd Floor
Lube Oil in Protected Aboveground Storage Tanks	15000 gal	none	none
Lube Oil in Steel Piping (5188' of 2" piping)	164 gal	330 gal	352 gal
Lube Oil in Hose Reels (0.35 gallons per 1/2" 35' reel)	2.8 gal (8 reels)	8.4 gal (24 reels)	8.4 gal (24 reels)
Used Oil in Protected Aboveground Storage Tank	15000 gal	none	none
Used Oil in Steel Piping (3184' of 2" piping)	113 gal	198 gal	209 gal
Used Oil in Collection caddies (open system) (25 gallons each)	200 gal (8 caddies)	500 gal (20 caddies)	500 gal (20 caddies)
Total Combustible Liquids (Class IIIB) Per Floor	**30,280 gal Closed 200 gal Open**	**536 gal Closed 500 gal Open**	**569 gal Closed 500 gal Open**
Maximum Allowable Quantity (LAFC 5003.1.1(1))	**Unlimited (Open and Closed)**	**Unlimited (Open and Closed)**	**Unlimited (Open and Closed)**

NFPA 30A Provision for Indoor Fueling

The Los Angeles Fire Code, Section 2301.4 requires indoor motor fuel dispensing facilities to comply with NFPA 30A, the “Code for Motor Fuel Dispensing Facilities and Repair Garages.”

NFPA 30A permits indoor fueling, but Sections 7.3.6.5 and 7.3.6.6 limit motor fuel dispensing operations to:

- the street level of a building,
- to not more than that required to serve four vehicles at one time, and
- fuel dispensers to be within 50 feet of a vehicle exit or entrance to the building

Operations inside of the planned QTA buildings require a greater number of fueling positions than allowed by code and fueling on floors higher than street level.

The restrictions on indoor fueling from NFPA 30A were considered and adopted by the first NFPA Technical Committee in the early 1980’s. Attachment 11 contains the related sections of the "NFPA 1980 Fall Meeting Technical Committee Reports", which shows the specific proposals, actions and substantiation of the NFPA 30 Committee at that time. The documentation from 1980 is somewhat vague as to the basis for the limitation in NFPA 30 (1981 edition) and now NFPA 30A. To further explore the basis for the NFPA 30A limitations the QTA fueling system engineer, Ronald Laurence, inquired about the history to Mr. Robert Benedetti, NFPA Principal Flammable Liquids Engineer. Mr. Benedetti's response, included in Attachment 12, notes the following with regard to the "four vehicle service restriction":

This particular restriction has been a part of NFPA 30A since its inception in 1984. The same restriction appears in NFPA 30A's predecessor, Chapter 7 of the 1981 edition of NFPA 30. The restriction to "four vehicles at one time was added then as part of a more comprehensive rewrite of the provisions for service stations inside buildings. The substantiation statement for this rewrite, in the Fall 1980 Technical Committee Reports, does not explain why the restriction was added.

The scope of Chapter 7 of NFPA 30-1981 reads: "This chapter applies to automotive and marine service stations and to service stations located inside buildings." There is no reference to fleet operations anywhere in this chapter, so I can only conclude that the restriction applies solely to a retail operation. Given that a retail operation would, by its nature, involve the general public and would inherently involve reduced control of the environment, the restriction is probably understandable.

The best known history of the indoor fueling restriction on NFPA 30A is this response. Mr. Benedetti's response indicates that the restriction was put in place to address public retail service stations and was not related to non-public, fleet facilities. For this reason, the design team believes the NFPA 30A restrictions were not intended to preclude the type of facility and non-public fueling operations that will be conducted at the LAX ConRAC QTA facilities.

Although the intention of NFPA 30A may not have been to address this type of QTA facilities, the restrictions on indoor fueling exist which requires this request for modification of Fire Code ordinances. The purpose of this request is the following:

1. To identify the code basis as to why the code limits fuel dispensing operations to street level with a limitation of four motor fuel dispensing operations and be within 50 feet of the vehicle entrance or exit to the building.

2. To provide mitigating safety factors above and beyond the minimum code requirements to safely permit motor fuel dispensing operations at levels above street level, above the limit of four motor fuel dispensing operations, and greater than 50 feet from a vehicle entrance or exit to the building.

Discussion / Justification:

Code Basis

The code basis is as follows for why the Building Code and Fire Code limits fuel dispensing operations to the street level of a building structure, to a maximum of four dispensing operations, and within 50 feet of a vehicle entrance or exit to the building (each Code Basis is followed by a corresponding Mitigating Factor(s) associated with each such basis):

1. Additional time is required for emergency responders to reach a hazard or fire. When fuel dispensing operations are located on levels other than the ground floor, emergency responders requires greater time and ground support to reach upper levels (Requirements F and G, Additional Mitigating Factors AA, DD, FF, HH, and MM).

2. Additional time is required for occupants to reach an exit from fueling areas. Buildings with multiple floors have greater travel distances and take longer to transit to reach an exit (Requirements E, F, and G, Additional Mitigating Factors AA, CC, DD, EE, FF, HH, II, and MM).

3. Increased risk to occupied spaces below fueling areas from uncontained fuel spills/leaks. When fuel dispensing operations are located above other levels there is the potential for a fire to spread to lower levels (Requirements C, D, E, G, and M, Additional Mitigating Factors AA, BB, FF, GG, II, JJ, KK, and LL).

4. Increased risk to occupied spaces above from petroleum fires. Additional fuel dispensing areas on floors other than street level increase the risk of fire spreading to upper levels of a building (Requirements A, C, D, E, G, and M, Additional Mitigating Factors AA, BB, FF, GG, II, JJ, KK, LL, and MM).

5. Increased risk of fuel vapors concentrating in a building with the addition of indoor fuel dispensing areas. (Requirements L, M, and N, Additional Mitigating Factors BB, FF, and MM).

6. Increased risk due to additional floor area that may be exposed to potential ignition sources (Requirements L, M, and N, Additional Mitigating Factors BB, FF, and MM).

7. Higher potential for structural endangerment from petroleum fires with increased amount of fueling positions (Requirements A, C, D, E, G, I, J, J, and M, Additional Mitigating Factors AA, EE, FF, GG, II, JJ, KK, LL, and NN).

8. Increased risk due to increase in volume of flammable liquids inside a building that could contribute to a hazardous event (Requirements C, E, G, and M, Additional Mitigating Factors AA, BB, EE, FF, GG, II, JJ, KK, and LL).

Code Requirements and Additional Mitigating Factors

The following sections describe both the code required features and additional mitigating factors that will be provided to mitigate the code bases above associated with indoor fueling. Many of the existing code requirements that will inherently be included in the design will provide features that will help mitigate risks associated with indoor fueling and are included in this discussion. In addition to the code required features, mitigating factors will be provided that both increase the effectiveness of the code requirements or provide new features that go above and beyond what is required by code to provide a level of safety greater than specified by the code to ensure the safety of occupants.

Code Minimum Safety Features for Fueling and Indoor Fueling:

Although there are many code requirements for fueling, below is a summarized list of a few of the key requirements that will be implemented per code. These requirements inherently reduce many of the hazards associated with fueling both indoors and outdoors.

A. Aboveground gasoline piping inside buildings and outside of fueling areas will be enclosed in a 2-hour rated chase (NFPA 30A 5.2.4). See mitigating factor GG below.

B. Dispensers will be located on raised islands or protected with bollards (LAFC 2306.7.3, NFPA 30A 6.3.4).

C. Emergency shutoff valves will be provided for each dispenser with thermally actuated valves that close in a crash or with fire exposure (LAFC 2306.7.4, NFPA 30A 6.3.9).

D. Emergency breakaway devices will be provided on each dispensing hose that retain liquid on both sides in the event of a drive-off (LAFC 2306.7.5.1, NFPA 30A 6.5).

E. Emergency electrical disconnects for fuel dispensing systems will be provided in locations that are not less than 20 feet and not more than 100 feet from dispensers (LAFC 2303.2, NFPA 30A 6.7). See mitigating factor EE below.

F. Means of egress shall meet NFPA 101 (NFPA 30A 7.3.3, Standards from LABC 1016 applied). See mitigating factor II below.

G. Automatic fire suppression system installed where required (NFPA 30A 7.3.5.2). See mitigating factor AA below.

H. Fuel dispensing area separated from other portions of the building by a 2-hour fire rating (NFPA 30A 7.3.6.1).

I. Interior finish of fueling area is non-combustible or of limited combustible materials (NFPA 30A 7.3.6.2).

J. Doors and windows in rated interior walls will have self-closing fire-rated doors with a 1.5-hour fire rating (NFPA 30A 7.3.6.3).

K. Ducts in fire-rated interior partitions will be protected by fire dampers, and ducts through fire-rated floors are protected with 2-hour rated shafts (NFPA 30A 7.3.6.4).

L. A mechanical exhaust system that is interlocked with dispensers is required for indoor fueling areas in closed buildings with less than two sides open to the exterior (NFPA 30A 7.3.6.7).

M. Floor of dispensing area will be liquid-tight and openings beneath dispensers are sealed such that liquids spilled will not be able to flow to other areas of the building (LAFC 2301.4.1, NFPA 30A 7.3.6.8).

N. Electrical hazard areas will be provided in accordance with the California Electric Code (LAFC 2301.5). See mitigating factor BB below.

Additional Mitigating Factors:

In addition to the code minimum requirements for motor vehicle fueling and indoor fueling listed above, the following additional mitigating factors will provide a level of safety above and beyond the minimum to mitigate the hazards identified in the code basis for the restrictions on indoor fueling. This summarized list will be described in greater detail in the following section.

AA. Enhanced fire suppression provided above that which is required by code for a F-1 occupancy. Wet sprinkler systems designed as Extra Hazard Group 1 with 0.3 gpm/ft^2 over 2,500 square feet will be provided at fueling areas.

BB. Electrical hazard area expanded laterally and also to 18 inches below the floor.

CC. Warning lights throughout QTA buildings actuated upon emergency stop.

DD. Emergency responder controls provided at dedicated fire control room(s).

EE. Additional emergency stop buttons, additional emergency stop initiation sources (including ultraviolet/infrared flame detection), and integration of emergency stop with non-gasoline systems.

FF. Open architecture and fuel dispensing area ventilation systems will be provided in the QTA buildings. Area will be open to the outside except for exterior walls associated with office space and maintenance bays.

GG. Double-walled, industrial grade, leak monitored, steel aboveground piping in 2-hour fire-rated enclosures both in and outside of the fueling area.

HH. Additional egress paths above which are required by code.

II. Trained operators only operating fuel dispensers.

JJ. Programmed dispensing limits.

KK. Integrated drainage.

LL. Multiple fail-safe isolation points throughout hazardous systems.

MM. Egress stairs will have an enhanced level of fire-rated construction.

NN. Enhanced level of fire resistant building construction.

Additional Mitigating Factors Description

The following is a description of the additional mitigating factors listing above. The mitigating factors are proposed to provide a level of equivalency equal to or greater than specified by the code for the code basis (Each Mitigating Factor is followed by a corresponding Code Basis associated with each factor):

AA. Enhanced fire suppression over the fuel dispensing area will be provided. The building will be fully sprinklered. An Extra Hazard Group 1 wet pipe sprinkler system will be provided over expanded fueling areas and an Ordinary Hazard Group 1 wet pipe sprinkler system will be provided at other areas of the QTA. A wet sprinkler system delivers water immediately and reduces the time required to deliver water to a fire compared to a dry fire suppression system (Code Basis 1, 2, 3, 4, 7, and 8).

BB. An expanded electrical hazard area beyond the minimum distances required by code will be provided. The electrical code specifies a fixed radius around fuel system components where fuel vapors can be expected within which special protections are required which can prevent electrical components from being ignition sources. The traditional hazard area of a radius of 20 feet from each dispenser from the floor to 18 inches above will be increased to the limits of the fuel dispensing area (See Figures 7 and 8). In addition, the hazard areas have been extended to 18 inches below the floor. By extending the hazard area below the floor, we are proposing that all lighting fixtures below the fueling area are rated for Class 1, Division 2 (Code Basis 3, 4, 5, 6, and 8)

CC. Warning lights throughout QTA buildings actuated upon emergency stop. Warning lights provide advanced notification of an emergency stop to personnel on the QTA floors so that appropriate emergency procedures can be followed (Code Basis 2).

DD. Emergency responder controls will be provided at a dedicated fire command center located in an outbuilding on the east side of the North QTA. The fire command center will provide quick access for emergency responders that arrive on site to have full access to emergency system shutdown controls. The main fire alarm control panel will be located in the fire command center, while annunciator panels will be provided on Level 1 of the North and South QTAs. The annunciator panels provided within the North and South QTAs will each have the ability to monitor the alarm conditions of the other QTA building. The annunciator panels serving the North and South QTAs will be installed in location approved by the fire department (See Figure 9 for fire alarm matrix) (Code Basis 1 and 2).

EE. Additional emergency stop devices, additional emergency stop initiation sources, and integration with non-gasoline systems will be provided. The facility will have approximately 83 emergency stop devices in locations indicated on Figures 7 and 8. These actuators will be located at the end of each fuel island row, in each fueling area management office, at each major egress point, and within each fire command room. The emergency stop will also be initiated by seismic sensors, fire alarm inputs, critical leak alarms, and ultraviolet/infrared flame detectors. In addition to securing the gasoline system, the emergency stop system will also de-energize the vacuum systems, isolate the compressed air system, isolate the motor oil systems, and isolate the windshield washer fluid dispensing systems. The shutdown of these systems is provided to limit additional hazards or the migration of hazards during a shutdown event (See Figure 9 for fire alarm matrix) (Code Basis 2, 7, and 8).

FF. Open Architecture and fuel dispensing area ventilation systems will be provided. Exhaust ventilation systems are not required by code when two or more sides of the area are open to the exterior. The exhaust ventilation system will provide air movement across dispensing area floors to dissipate any build-up of flammable vapors (See Figures 7 and 8). Additionally, the QTA buildings, for practical purposes, will resemble open parking garages, with the following openness provided at the perimeter (openings in exterior walls on a tier defined as not less than 20 percent of the total perimeter wall area of each tier):

<u>North QTA:</u>
Level 1: More than 60% of Perimeter Open
Level 2: More than 80% of Perimeter Open
Level 3: More than 80% of Perimeter Open

<u>South QTA</u>
Level 1: More than 40% of Perimeter Open
Level 2: More than 70% of Perimeter Open
Level 3: More than 70% of Perimeter Open

Significant portions of the building perimeter will be open except for exterior walls associated with offices, car wash bays, support areas, and maintenance bays. Operators will be able to easily identify and quickly mitigate any hazardous situations. It will also allow occupants to easily identify the shortest path to exits to avoid a fire condition (Code Basis 1, 2, 3, 4, 5, 6, 7, and 8).

GG. Double-walled, aboveground, industrial grade, steel piping will be routed in 2-hour, fire-rated raceways/chases for piping both inside and outside of the fueling area. NFPA 30A only requires single-walled piping and a 2-hour chase is only required when indoor piping is outside a fueling area. In this QTA, fuel piping will be routed inside the fire-rated chase both inside and outside of fueling areas, providing fire resistant construction in more areas than required by code. The double-walled piping itself will act as a secondary containment feature, reducing the chance for a pipe failure to spread flammable fuels to other areas of the building. Leak detection tape inside the double-walled aboveground piping will detect any fuel that may leak from the primary pipe and will initiate an emergency stop. This feature limits fuel that may leak on aboveground floors and initiates a response at the first indication of an indoor leak. Additionally, the pipe installation and testing protocol will exceed the requirements of ASME B31.3 for process piping of this type (Code Basis 3, 4, 7, and 8).

HH. Levels 2 and 3 of the North QTA will have a total occupant load per floor of approximately 200 people, while Levels 2 and 3 of the South QTA will have a total occupant load per floor of approximately 450 people. These occupant loads were determined assuming occupant load factors of 500 (similar to a warehouse facility) and 100 square feet per person for all areas considered as Group F-1 and B, respectively (see Figures 1 through 9 for a summary of floor areas). Thus, based solely on the number of occupants, the minimum number of exits required for the North and South QTAs would be 2. In addition, the minimum egress stair capacity required for the North and South QTAs would be 88 inches (i.e., two 44 inch wide stairs) and 135 inches (i.e., two 68 inch wide stairs), respectively. As the North and South QTAs will be provided with access to four and ten 48-inch wide exit stairs, respectively, the aggregate egress capacity provided for each of the two QTAs will exceed the minimum capacity required by the LABC (based on the occupant load per floor only). Combined, the greater number of exits and exit capacity within the North and South QTAs will reduce the time required for occupant evacuation. The design will also exceed the minimum requirements of the LABC/LAFC Chapter 10. In addition, the greater number of exit stairs provided will reduce the firefighter response time and enhance the safety afforded to firefighters. (Code Basis 1 and 2)

II. Only trained operators are allowed to operate fuel dispensers. Trained operators add a level of safety above that which can be expected by the general public. Trained operators are expected to know how to respond to an emergency and how to safely egress from the building. Trained operators reduce the potential for spills and reduce the severity of an incident. Trained operators are only authorized to operate the fuel system after completing a training course. Operator's authorization can be revoked at any time. The Los Angeles Fire Department will be requested to review the training course (Code Basis 2, 3, 4, 7, and 8).

JJ. Programmed fuel dispensing limits of 25 gallons per authorization will be provided. Controlled fuel dispensing would limit the maximum amount of fuel that can be expected during a spill (Code Basis 3, 4, 7, and 8).

KK. Integrated drainage, including containment will be provided. The highest floor elevation is provided at the edge of the fuel area to restrict any potential fuel spill from leaving the dispensing area. Also, the floor will be graded to direct any spilled fuel and/or water to floor drains where it will travel to sanitary via an oil water separator (Code Basis 3, 4, 5, 6, 7, and 8).

LL. Multiple fail-safe isolation points will be present on each of the hazardous systems. Gasoline, windshield washer fluid, and compressed air systems will each have multiple isolation points controlled by normally-closed, fail-safe solenoid valves which will close in the event of power failure or emergency stop actuation (Code Basis 3, 4, 7, and 8).

MM. Enhanced fire-rated construction separations will be provided such that all exit stair shafts will be of 2-hour fire resistive enclosed construction, even though these stairs are only serving three stories. This enhanced construction can provide greater protection for building occupants and firefighter personnel (Code Basis 1, 2, and 4).

NN. Enhanced, type 1-A fire resistive construction will be provided for the QTAs instead of the type 1-B required for a Group F-1 occupancy of the planned height and floor area. This enhanced construction type will provide a 3-hour fire-resistive frame and structural walls as opposed to the 2-hour rating that is required. An increased fire-rating on the structural frame will provide superior protection against structural failure during any chance of fire (Code Basis 7). In addition, the QTAs will be designed as separated occupancies per LABC Section 508.4 instead of non-separated as permitted by LABC Section 508.3.The Group B administrative and support/third party office areas will be separated from the F-1 occupancy areas by two-hour fire-resistance rated fire barriers.

Conclusion:

This document has provided code mitigations for the multi-level Rental Car Quick Turn Around facilities. Although NFPA 30A limits indoor motor vehicle fueling to the street level, no more than 50 feet from an entrance or exit from the building, and to no more positions than required to fuel 4 vehicles, a number of mitigating factors have been described that provide a level of equivalency equal to or greater than specified by the code to ensure the safety of occupants.

It is the design team's opinion that the presented performance-based mitigating factors, and code mandated fire protection and life safety features proposed provide a level of equivalency equal to or greater than specified by the code and offset the code basis for limiting the motor fuel dispensing operations to street level, with four motor fuel dispensing operations, and fuel dispensing to within 50 feet of a vehicle entrance or exit to the building.

Sincerely,

AON FIRE PROTECTION ENGINEERING CORPORATION

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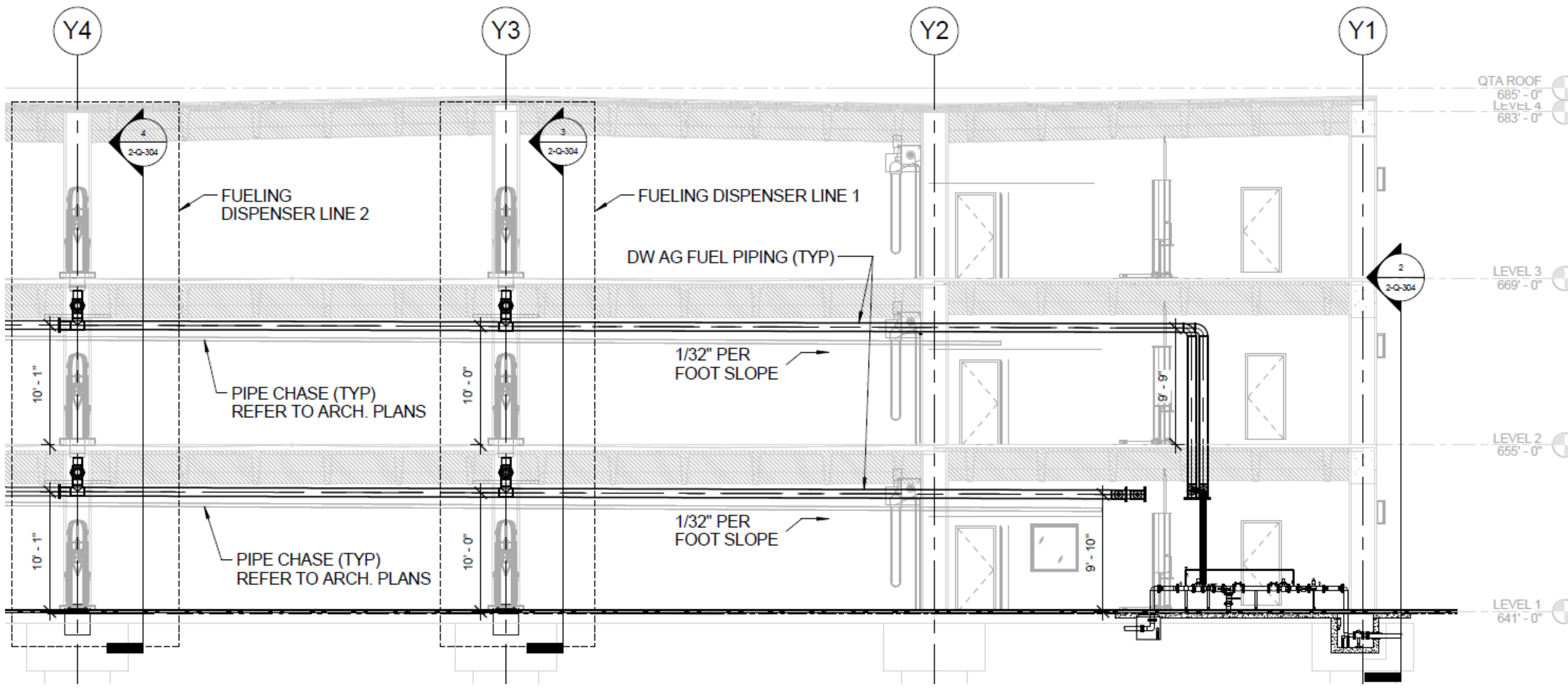
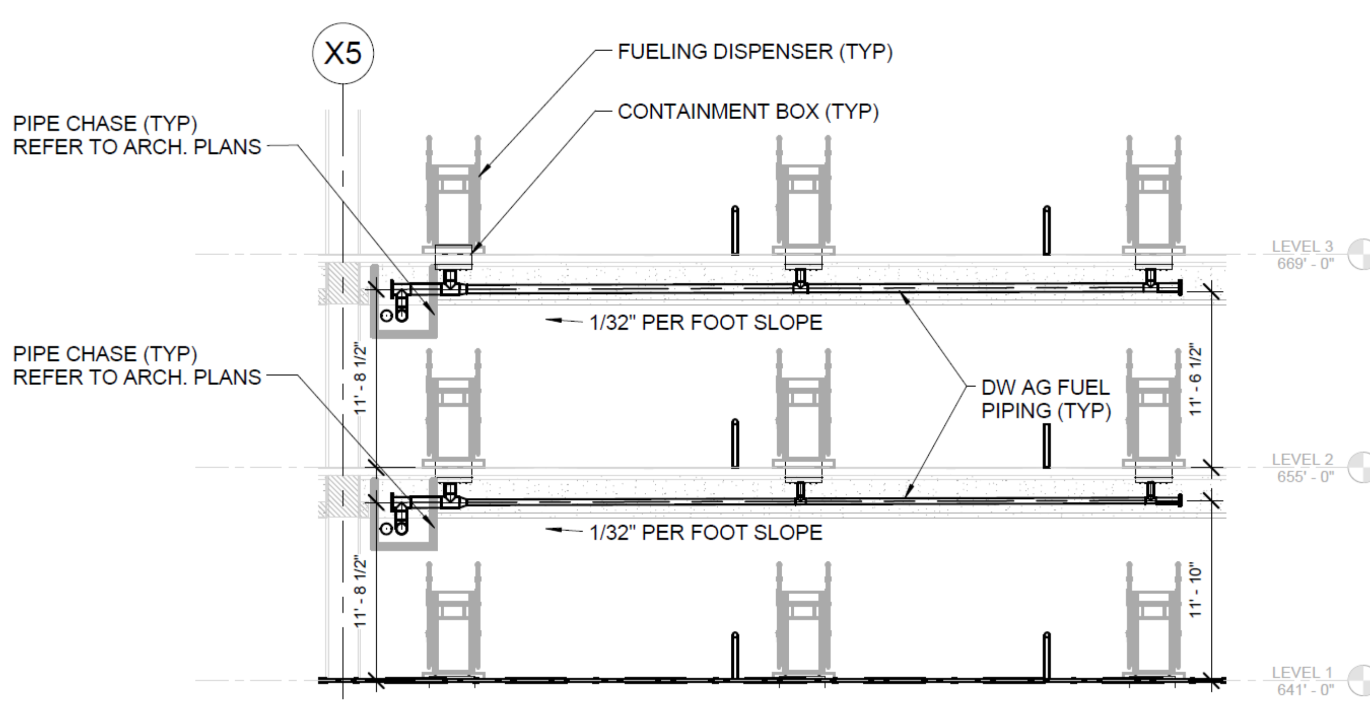


Typical Indoor Gasoline Piping (Side View)



Typical Indoor Gasoline Piping (Front View)

LIBRARY

TCR-80-F

1980 Fall Meeting

Technical Committee Reports

This document contains code change to NFPA 30, that was first allowance for dispensing in buildings

A Compilation of NFPA Technical Committee Reports for Public Review and Comment Prior to April 28, 1980, and Consideration at the NFPA Fall Meeting Town and Country Hotel San Diego, CA, November 17-20, 1980

Please Bring to the Fall Meeting

NFPA

National Fire Protection Association, Inc.
470 Atlantic Avenue, Boston, MA 02210

14M-2-80-SM

Printed in U.S.A.

6-3.4.3 When bottom loading a tank vehcile, the coupling between the liquid loading hose or pipe and the truck piping shall be by means of a dry disconnect coupling.
6-3.5 Connections to the plant vapor control system shall be designed to prevent the escape of vapor to the atmosphere when not connected to a tank vehicle.
6-3.6 Vapor processing equipment shall be separated from aboveground tanks, warehouses, other plant buildings, loading and unloading facilities, or nearest line of adjoining property that can be built upon, by a distance of at least 25 ft. Vapor processing equipment shall be protected against physical damage by remote location or by the provision of guard rails, curbs, or fencing.
SUBSTANTIATION: The Committee felt that the subjects of vapor control and top and bottom loading needed additional addressing in Chapter 6. These additions will accomplish that objective.
COMMITTEE ACTION: Accept.

30- 48 - (6-4.5.4): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Delete this paragraph. Renumber subsequent paragraphs accordingly. Change reference in 6-4.5.5 from 6-4.5.4 to 3-6.1.
SUBSTANTIATION: The Committee feels that this paragraph is redundant, in that it is already covered completely in Chapter 3.
COMMITTEE ACTION: Accept.

30- 49 - (6-8.1): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Listed portable fire extinguishers of appropriate size, type and number shall be provided. NFPA 10, Standard for Portable Fire Extinguishers, provides information on this subject. At least one extinguisher with a minimum classification of 20-B shall be provided at each loading or unloading facility. Where piped water is available, ready-connected hose in size appropriate for the water supply shall be provided at locations where fires are likely to occur.
SUBSTANTIATION: The Committee felt that this wording is congruous with the wording and thinking in other chapters of NFPA 30.
COMMITTEE ACTION: Accept.

30- 50 - (6-8.2 & 6-8.3): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Add new paragraph 6-8.2 to read as follows:
"All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency."
"6-8.3 Bulk Plants and Terminals shall have a written emergency procedure plan. The plan shall be designed to minimize the hazard to the public and to plant employees in the event of a fire or other emergency conditions. The plan shall be posted, or located in a strategic and accessible location. Plant personnel assigned to emergency duties shall be trained in these duties."
SUBSTANTIATION: These additional paragraphs are needed, in the Committee's opinion, to amplify the need for adequate fire control in bulk plants and terminals.
COMMITTEE ACTION: Accept.

30- 51 - (Chapter 7): Reject
SUBMITTER: Arthur E. Ahl, East Northport Fire District, NY
RECOMMENDATION: Hose lengths for delivery of Class I Liquids, if not already limited in some instances, shall be no longer than 25 ft in length and pump and shut off switch should be in view of dispensing person at all times.
SUBSTANTIATION: Hose lengths should be spelled out for dispensing areas. Abuses of lengths of hose form dispensing unit to vehicle being filled are flagrant at many locations: Bus Company's, School Bus Co.'s, Utility Co., fleet garages, Private Co., fleet garages, Garbage Removal Co.'s, etc. Some limit should be imposed to prevent dangers which are numerous...Excessive lengths of hose in some instances greater than 150 ft. There is no way for dispenser to monitor if hose has been ruptured. Exposure to the following harzards are great. Run over by moving vehicles, entanglement with moving vehicles, intentional cutting of hose, heating devices in cold weather, starting and running of other vehicles in area. Charging of batteries, tripping over hose lines and I am sure anyone could add to the list.
If the above proposal is not correctly submitted I would appreciate any help from the Committee of Flammable Liquids to make the above proposal a reality.

COMMITTEE ACTION: Reject.
COMMITTEE COMMENT: The Committe felt the second part of the Proponent's request, namely having the pump and shut-off in view at all times, to be impossible of accomplishment. The first part, placing a limit on hose length, would be arbitrary. If proper care is taken, and safeguards observed, the length of the hose will not necessarily pose a hazard, in the Committee's opinion.

30- 52 - (7-2.1.2): Accept
SUBMITTER: Technical Committee on General Storage of FLammable Liquids
RECOMMENDATION: Change first sentence to read:
"Above ground tanks, located at a bulk plant, shall not be connected by piping to service station underground tanks."
SUBSTANTIATION: This change was deemed necessary to reduce the likelihood of overfilling underground tanks where bulk storage might result in excessively large spills.
COMMITTEE ACTION: Accept.

30- 53 - (7-2.1.4): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: API Publication 1621 - Recommended Practice for Bulk Liquid Stock Control at Retail Outlets provides information on this subject.*
*Available from American Petroleum Institute, 2101 L Street Northwest, Washington, DC 20037.
SUBSTANTIATION: This reference is recommended as preferable to specifying mandatory leak testing of tanks and piping in situations where it is felt that measures in addition to these specified in 7-2.1.4 should be taken.
COMMITTEE ACTION: Accept.

30- 54 - (7-3.2.6 New): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Add new paragraph as follows:
"A Vapor Return Pipe inside the dispenser housing shall have a shear section or flexible connector so that liquid emergency shut-off valve will function as described in 7-3.2.5."
SUBSTANTIATION: This wording is needed to help insure the functioning of the emergency shut-off valve in the event of impact.
COMMITTEE ACTION: Accept.

30- 55 - (7-4.3.3): Reject
SUBMITTER: George P. Byrne, Gasoline Pump Manufactures Assoc.
RECOMMENDATION: Entire text of secton with recommended additional wording in quotations:
7-4.3.3 A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket or normal position with respect to the dispensing unit and the swith on this dispensing unit is manually actuated, "or automatically actuated provided that means is included to prevent operating the nozzle lever until after the dispensing nozzle is removed from its bracket or normal position." This control shall also stop the pump when all nozzles have been returned, either to their brackets or to the normal non-dispensing position.
SUBSTANTIATION: Presently, considerable difference exists in the manual actuating means for dispensers of different manufacturers resulting in a degree of untrained operator confusion.
Safety would be enhanced by providing a standard operating sequence for user operation of dispensers from one manufacturer to another, from service station to service station.
COMMITTEE ACTION: Reject.
COMMITTEE COMMENT: The Committee felt that the proposed change does not enhance safety, nor does it provide a manual shut-off at the dispenser.

CODE CHANGE TO ALLOW DISPENSING INSIDE BUILDINGS

30- 56 - (7-5 New): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Delete present 7-4.1 and 7-4.2, and insert new paragraphs. Establish new Section 7-5, renumber present text accordingly, beginning with present Section 7-5, which becomes Section 7-6. Present 7-4.3, 7-4.4, and 7-4.5 remain as is.
7-1.1 New first sentence in place of present first sentence:
"This chapter applies to automotive and marine service stations, and to service stations located inside buildings."
Defintions, page 14: After Marine Service Station definiton, add the following new definition:
"Service Station Located Inside Buildings shall mean that portion of an automotive service station located within the perimeter of a building or building structure. The service station may be enclosed or partially enclosed by the building walls, floors, ceilings, or partitions, or may be open to the outside. The service station dispensing area shall mean that area of the service station required for dispensing of fuels to motor vehicles. Dispensing of fuel at manufacturing, assembly, and testing operations is not included within this definition."

7-2.2.3 Delete the words "at or below grade level" in line 2 of this paragraph.
"7-4 Fuel Dispensing System.
7-4.1 Location of Dispensing Devices and Emergency Power Cutoff.
7-4.1.1 Dispensing devices at an automotive service station shall be so located that all parts of the vehicle being served will be on the premises of the service station. Openings beneath enclosure shall be sealed to prevent the flow of leaking fuel to lower building spaces. Dispensing devices at marine service stations may be located on open piers, wharves, or floating docks or on shore or on piers of the solid fill type and shall be located from other structures so as to provide room for safe ingress and egress of craft to be fueled. Dispensing units shall be in all cases at least 20 ft from any activity involving fixed sources of ignition. Dispensing devices located inside buildings shall comply with Section 7-5.
7-4.1.2 A clearly identified and easily accessible switch(es) or circuit breaker(s) shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency.
7-5 Service Stations Located Inside Buildings.
7-5.1 General.
7-5.1.1 A service station is permitted inside a building subject to approval of the authority having jurisdiction.
7-5.1.2 The service station shall be separated from other portions of the building by wall, partition, floor, or floor ceiling assemblies having a fire resistance rating of not less than 2 hours.
7-5.1.3 Interior finish of service stations shall be constructed of noncombustible or approved limited-combustible materials.
7-5.1.4 Door and window openings in interior walls shall be provided with listed 1 1/2 hour (B) fire doors. Doors shall be self-closing, or may remain open during normal operations if they are designed to close automatically in a fire emergency by provision of listed closure devices. Fire doors shall be installed in accordance with NFPA 80, Standard for Fire Doors and Windows.
7-5.1.5 Fire doors shall be kept unobstructed at all times. Appropriate signs and markings shall be used.
7-5.1.6 Openings in interior partitions and walls for ducts shall be protected by listed fire dampers. Openings in floor or floor - ceiling assemblies for ducts shall be protected with enclosed shafts. Enclosure of shafts shall be with wall or partition assemblies having a fire resistance rating of not less than two hours. Openings in enclosed shafts, for ducts, shall be protected with listed fire dampers.
7-5.2 Dispensing Area.
7-5.2.1 The dispensing area shall be located at street level and within 20 ft of the vehicle exit to or entrance from the outside of the building.
7-5.2.2 Dispensing shall be limited to the area required to serve not more than 4 vehicles at one time.
7-5.3 Ventilation.
7-5.3.1 Forced air heating, air conditioning, and ventilating systems serving the service station area shall not be interconnected with any such systems serving other parts of the building. Such system shall be installed in accordance with the provisions of NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.
7-5.3.2 A mechanical exhaust system shall be provided to serve only the dispensing area. This system shall be interlocked with the dispensing system such that air flow is established before any dispensing unit can operate. Failure of air flow shall automatically shut down the dispensing system.
7-5.3.3 The exhaust system shall be designed to provide air movement across all portions of the floor, and to prevent the flow of flammable vapors beyond the dispensing area. Exhaust inlet ducts shall not be less than 3 in. nor more than 12 in. above the floor. Exhaust ducts shall not be located in floors, or penetrate the floor of the dispensing area, and shall discharge to a safe location outside the building.
7-5.3.4 The exhaust system shall provide ventilation at a rate of not less than 1 cu ft per minute per sq ft of dispensing area.
7-5.3.5 Exhaust system shall be installed in accordance with the provisions of NFPA 91, Standard for Blower and Exhaust Systems.
7-5.3.6 The provisions of 7-5.3.2, 7-5.3.3, 7-5.3.4, and 7-5.3.5 do not apply to a service station located inside a building if 2 or more sides of the dispensing area are open to the building exterior such that natural ventilaton can normally be expected to dissipate flammable vapors.
7-5.4 Piping.
7-5.4.1 Piping systems shall comply with the provisions of Chapter 3.
7-5.4.2 All fuel and flammable vapor piping inside buildings but outside the service station area, shall be enclosed within a horizontal chase or a vertical shaft used only for this piping. Vertical shafts and horizontal chases shall be constructed of materials having a fire resistance rating of not less than 2 hours.
7-5.5 Drainage Systems.
7-5.5.1 Floors shall be liquid tight. Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems.

BASIS FOR CODE CHANGE

7-5.5.2 Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separators.
SUBSTANTIATION: The Committee felt that the subject of service stations inside buildings should be addressed in detail and the proposed changes do precisely that. A conflict which had existed with NFPA 88A, Parking Structures, will be reconciled by the inclusion of the proposed changes.
COMMITTEE ACTION: Accept.

30- 57 - (7-7.1.1, 7-7.1.2, 7-7.1.5, 7-7.3.2, & 7-7.4.8): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: New wording:
"7-7.1.1 A listed automatic closing type hose nozzle valve, with or without latch open device shall be provided on island type dispensers used for the dispensing of Class I Liquids.
7-7.1.2 If a hose nozzle valve is provided with a latch open device other than recommended by the valve manufacturer, the valve shall conform to the applicable requirements of Section 19 of the Standard for Valves for Flammable Fluids, UL 842-1974.
7-7.1.5 A hose nozzle valve used for dispensing Class I Liquids into a container shall be manually held open during the dispensing operation."
7-7.3.2 Place a period at the end of the word "attendant" on Line 5, and delete the wording beyond the period.
7-7.4.8 Delete.
SUBSTANTIATION: The Committee felt that the exclusion of latch open devices could not be justified in the specific locations specified by the above sections of the Code. There has been no accumulation of data over the past several years to indicate that the latch open device would cause a problem. In addition, nozzles have been illegally chocked-open by a number of devices, all unauthorized, which can cause an even greater potential for hazard.
COMMITTEE ACTION: Accept.

30- 58 - (7-7.1.2, 7-7.3.2, & 7-7.4.8): Accept in Principle
SUBMITTER: William J. Howard, Warren, MI
RECOMMENDATION: Change wording "without a latch open device" to read, "with or without a latch open device."
SUBSTANTIATION: Statistical data does not support the prohibition of latch open devices at self-service dispensing units.
COMMITTEE ACTION: Accept in Principle.
COMMITTEE COMMENT: The Committee has made changes which have accomplished what the Proponent suggests. (See Committee Comment on Proposal No. 57.)

30- 59 - (7-7.3.3): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Dispensing of liquids at private locations, where the dispensing equipment is not open to the public, does not require an attendant or supervisor. Such locations may include card or key controlled dispensers.
SUBSTANTIATION: This wording is the same as that contained in the Tentative Interim Amendment approved by the Standards Council on March 29, 1978. The change had been deemed necessary in order to recognize a practice which had existed for some time, and with which no known untoward experience has been demonstrated. No documentation exists to indicate that this type operation is more or less safe than other methods of dispensing and operating service stations.
COMMITTEE ACTION: Accept.

30- 60 - (9-4): Accept
SUBMITTER: Technical Committee on General Storage of Flammable Liquids
RECOMMENDATION: Chapter 9 - Fire Control Additions.
9-4 Fire Control.
9-4.1 same as present 9-4.4
9-4.2 same as present 5-8.1
9-4.3 same as present 5-9.1
9-4.4 same as present 9-4.1
9-4.5 same as present 9-4.2
9-4.6 same as present 9-4.3
9-4.7 same as present 5-5.6
9-4.8 An emergency control organization consistent with provided equipment and available personnel shall be established, and appropriate procedures specified, to cope with fire or other emergencies. Plant personnel assigned to the emergency control organization shall be trained in their duties.
9-4.9 An approved means for prompt notification of fire to those within the plant and the public fire department available shall be provided.
COMMITTEE ACTION: Accept.
COMMITTEE COMMENT: The Committee wanted to add provisions to the section on Fire Control to impart greater importance to that secton.

TECHNICAL QUESTIONS

Good day, Mr. Laurence:

Essentially, your question asks for the history of Paragraph 7.3.6.6 of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, which reads:

> "The fuel dispensing area shall be limited to that required to serve not more than four vehicles at one time.
>
> Exception: At a fleet vehicle motor fuel dispensing facility inside a building, where only Class II and Class III liquids are dispensed, the number of vehicles serviced at any one time shall be permitted to be increased to 12."

This particular restriction has been a part of NFPA 30A since its inception in 1984. The same restriction appears in NFPA 30A's predecessor, Chapter 7 of the 1981 edition of NFPA 30. The restriction to "four vehicles at one time was added then as part of a more comprehensive rewrite of the provisions for service stations inside buildings. The substantiation statement for this rewrite, in the Fall 1980 Technical Committee Reports, does not explain why the restriction was added.

The scope of Chapter 7 of NFPA 30-1981 reads: "This chapter applies to automotive and marine service stations and to service stations located inside buildings." There is no reference to fleet operations anywhere in this chapter, so I can only conclude that the restriction applies solely to a retail operation. Given that a retail operation would, by its nature, involve the general public and would inherently involve reduced control of the environment, the restriction is probably understandable.

A fleet-type operation would likely be a more controlled environment and exposure to the general public not as great.

Please understand that this response is a personal opinion and does not constitute a Formal Interpretation of NFPA, as noted below and as described in Section 6 of NFPA's *Regulations Governing Committee Projects*. It is not to be relied upon to definitively determine compliance with any laws, ordinances, rules, or regulations. To determine legal compliance, you should refer to the appropriate authority having jurisdiction or seek legal advice. It is not intended, nor should it be relied upon, to provide professional consultation or services. To determine the adequacy or safety of any device or installation, you should consult with an appropriate professional.

I hope this response is helpful. If you have a follow-up question related to this inquiry, please reply to this email. If you have another question on a separate topic or a different document, please return to the document information pages and submit your new question(s) by clicking on the "Technical Questions" tab.

R. P. Benedetti

cc 30A/IFI

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Create Date: 4/20/2012
Contact: Ronald Laurence

Subject: Limitations on Indoor Fueling

Question for NFPA: Is there any basis for the limitation on 4 fueling positions, beyond a general desire to limit fire loads?

In the Code development history, was there a particular type of facility (e.g. retail vs. fleet) or environment (e.g. urban vs. industrial) which was of concern to the committee which was the basis for the limitation to 4 fueling positions?

Realizing that mitigations would be necessary in either case, would it be appropriate to apply these limiations in an equivalent fashion to multi-level rental car facilities in non-urban areas, as would be applied to retail facilities in urban areas?

ISSUED FOR LAWA REVIEW – APRIL 13, 2016

LAX ConRAC – Los Angeles Department of Building & Safety and Fire Department Review Meeting

Meeting Date: Thursday, April 7, 2016, 1:00 pm – 2:00 pm PDT
Location: Room 210, LAWA Administration East Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the submitted Fire Code Request for Modification (RFM) for the indoor, multi-level fuel dispensing at the QTA Buildings of the ConRAC facility. The items discussed are noted below.

1. Both the Los Angeles Fire Department (LAFD), David Myers, and the Los Angeles Department of Building and Safety (LADBS), Lily Teng, were represented at this meeting and provided their review comments and input for the project.

2. Mr. Myers provided the following comments:
   a. Emergency stop devices shall provide system shutdown for the entire QTA building, not just shutdown by floor.
   b. The RFM shall be made clear that design and installation of underground storage tanks will comply with State Water Resources Control Board regulations.
   c. Gasoline vapor analysis shall be updated to include calculations for an additional scenario to consider emissions and flammable concentration on the QTA floor during the maximum design spill of 25 gallons.
   d. Discussion of occupancy use groups shall be removed from the Fire Code RFM, as this ultimately needs to be reviewed and approved by the LADBS.

   Requested changes shall be implemented and the RFM re-submitted to LAFD. ACTION: The Design Team to prepare a revised Fire Code RFM and submit to LAFD for approval.

3. RB Laurence (Stantec) indicated that since fuel piping inside the building will be double-walled and located inside two-hour fire-rated chases, the fuel is not considered to count towards the maximum allowable quantity (MAQ) of flammable liquids within the control areas of the QTA. Mr. Myers questioned this assumption and commented that the chases for the fuel piping would not be located per requirements for Group H-2 rooms (with exterior access).

4. Ms. Teng noted that life safety drawings will need to be provided for review before occupancy use groups can be determined. If the QTA areas are required to be classified as Group H-2 occupancy, there may be implications to allowable floor areas and maximum egress travel distances. Code modifications may need to be proposed under a separate building code RFM to achieve code equivalency.

5. A meeting was scheduled for 12:30 pm on Wednesday, May 4th to further discuss occupancy use group classification and review preliminary life safety drawing package and a draft version of the proposed building code RFM. ACTION: The Design Team to prepare a draft Building Code RFM for review during the May 4th meeting.

ISSUED FOR LAWA REVIEW – APRIL 13, 2016

6. Ms. Teng noted that both the piping inside chase and the chase will need to be supported by seismic holding system and be braced. The Design Team noted that they have encountered this condition at other projects, where bracing was provided at every 24".

7. Ms. Teng noted that the City of Los Angeles has assigned personnel to assist with fire hydrant and water service inquiries for airport projects. Terrence O'Connell is available to meet at the airport every Tuesday at 9:00 am (appointments can be scheduled in advance).

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	Consolidated Rental Car Facility	Date:	April 7, 2016
	Los Angeles International Airport	Time:	1:00 pm – 2:00 pm
Re::	Review of Request for Modification	Location:	LAWA Admin Building East, Room 210

Name	Representing	Telephone Number	Email Address	Present
Jameson Lee	LADBS	(213) 482-6856	Jameson.Lee@lacity.org	
Lily Teng	LADBS	(213) 482-6871	Lily.teng@lacity.org	✓
Marcus Law	LAFD	(213) 272-8353	Marcus.law@lacity.org	
David Myers	LAFD	(213) 482-6908	David.myers@lacity.org	
Hani Malki	LAFD	(213) 482-6936	Hani.malki@lacity.org	
Fatima Hashim	LAWA	(424) 646-5173	fhashim@lawa.org	
Pat Tomcheck	LAWA	(424) 646-5192	ptomcheck@lawa.org	
Robert Falcon	LAWA	(424) 646-5848	rfalcon@lawa.org	RF
Vidar Landa	Aon Fire Protection	(213) 630-1376	Vidar.Landa@aon.com	V.L.
RB Laurence, Jr.	Stantec Consulting Inc.	(603) 206-7559	ronald.laurence@stantec.com	
David Lee	TranSystems	(510) 835-9916	dklee@transystems.com	DKL
Yun-Jong Ok	TranSystems	(267) 546-0093	yjok@transystems.com	YJO

ISSUED FOR DISTRIBUTION – MAY 18, 2016

LAX ConRAC – Los Angeles Department of Building & Safety and Fire Department Review Meeting

Meeting Date: Wednesday, May 4, 2016, 12:30 pm – 2:00 pm PDT
Location: Room 224B, LAWA Administration East Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to follow-up on the submittal of the fire code request for modification (RFM), review the design development of the QTA Buildings, and discuss occupancy classification and life safety compliance issues. The items discussed are noted below.

1. David Myers (LAFD) acknowledged that the fire code RFM for indoor fueling has been received electronically and that his previous comments appear to have been addressed. LAFD will require two hard copies with original signatures to be submitted. David Lee (TranSystems) noted that he will provide signed copies of the RFM to Pat Tomcheck (LAWA), who will then officially submit to LAFD for approval.

2. The topic of occupancy classification was discussed. LABC establishes motor fuel dispensing facilities as a M occupancy, but this is not appropriate for this project as M occupancies are retail occupancies for the public. While the code may suggest an H-2 occupancy as gasoline is a Class IB flammable liquid and dispensed at more than 15 psi, the Design Team also believes that this is not appropriate based upon the common use of motor fueling operations. In addition, there are many exceptions that exist in the LABC that exclude a variety of flammable liquids uses from classification as a Group H occupancy, such as in hazardous process material (HPM) or semiconductor fabrication facilities. Lily Teng of LADBS noted that semiconductor fabrication facilities are inherently very different from a vehicle fuel and wash facility because semiconductor fabrication facilities require a very controlled environment.

3. RB Laurence (Stantec) noted that the Design Team has compiled a summary of the existing approved indoor fueling facilities in the United States and their assigned occupancies. Of the 14 existing facilities, 12 of them are classified as either F-1 or S occupancy, with one classified as M occupancy and only one, in Miami, that is classified as an hazardous occupancy (Group E, Division 2 under the South Florida Building Code). This was one of the first indoor fueling facilities and has approximately 120 fuel positions. Mr. Myers questioned whether the size of the Miami facility may have resulted in its hazardous occupancy classification. Mr. Laurence believes that it may have to do with that facility being one of the first and not having as good of understanding of how this type of facilities would operate when it was designed and approved in the mid-2000's.

4. Mr. Laurence explained that every fuel dispenser is independent and therefore the failure scenario is also independent. While the probability of a failure is higher (because of the higher number of fuel dispensers present), this does not increase the magnitude of failure as there is a very remote chance of two incidents happening at the same time. Mr. Myers disagreed and opined that the consequence is higher due to the additional fuel available.

5. Ms. Teng noted that the request from the previous meeting was for the Design Team to prepare an analysis to look at the three possible options for occupancy classification and summarize code compliance challenges for each of the scenarios:

    a. Scenario 1: assume that the QTA Buildings will be classified as H-2 occupancy.
    b. Scenario 2: assume that the QTA Buildings will be classified as F occupancy, with fuel piping chases classified as H-2 occupancy.
    c. Scenario 3: assume that the QTA Buildings will be classified as F occupancy, with fuel piping exempt from a Group H classification as part of a closed piping system that contains flammable liquids used for operation of equipment.

    ACTION: Design Team to prepare requested analysis of the three possible scenarios and summarize code requirements and limitations of current design for each.

6. The Design Team presented copies of the progress life safety drawings for the group's review. Yun-Jong Ok (TranSystems) noted that these drawings are work in progress and that the team is still working on completing the 30% schematic design drawings at this stage.

7. Ms. Teng asked what type of motor vehicle repair will be allowed inside the maintenance bays. Mr. Lee noted that only minor motor vehicle repairs will be allowed inside the maintenance bays.

8. Mr. Myers noted that windshield washer fluid (WWF) day tanks shall be stored in rooms with 2-hour rated construction and noted as H-2 Flammable Liquids Rooms on the life safety drawings. Mr. Laurence noted that rental car industry standard is a premixed blend of 50/50 methanol and water, which conflict with recent CARB/South Coast Air Quality Management District's (SCAQMD) rule that WWF with more than 1% methanol cannot be sold in LA County. One the details of the rule are clarified, an exception to this rule may need to be requested by the rental car industry. It is also possible that only non-flammable washer fluid will be dispensed. At this point, however, the system will be designed for flammable washer fluid.

9. Vidar Landa (Aon Fire) asked Mr. Myers to clarify on requirements on the standpipe system demand. Mr. Myers noted that it is not required to flow at the city pressure if it is a dry standpipe. However, 100 psi is required at the roof if it is a wet standpipe system. Further reviews of this will be provided by mechanical code reviewer at LADBS.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	Consolidated Rental Car Facility	Date:	May 4, 2016
	Los Angeles International Airport	Time:	12:30 pm – 2:00 pm
Re::	Review of Request for Modification	Location:	LAWA Admin Building East, Room 224B

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Appendix 5.1 RAC Industry Facility Design Workshops Minutes and Presentations

TranSystems

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LAX CONSOLIDATED RENTAL CAR FACILITY
RAC INDUSTRY MEETING 1
April 24, 2014

Attending:
Scott Goldstein – Enterprise
Peter VanValkenburg – Enterprise
Jim Reid – Budget
Jeff Mirkin – Budget
Arnold Goehring – Fox
Lorie Tallarico – Avis
Joe Olivera – Advantage
Rick Christensen – Advantage
Fatima Hashim – LAWA
Pat Tomcheck – LAWA
Steve Martin – LAWA
Debbie Bowers – LAWA
Christopher Koontz – LAWA
Diego Alvarez – LAWA
Greg Wellman – Parsons Brinkerhoff (PB)
Doug Steen – TranSystems
Jeff Jarvis – TranSystems

Presentation notes

LAWA – Pat Tomcheck

- <u>LAWA review of ConRAC Project History at LAX</u>

- PB/LAWA are developing alternatives for ground transportation improvements between the proposed ConRAC and the Central Terminal Area. The team is updating the Board of Airport Commissioners as to their progress on May 5th.
- An Intermodal Transportation Center is proposed midway between the ConRAC and the Central Terminal Area (CTA), with an Automated People Mover (APM) connecting the facilities
- The goal of the ConRAC study is to determine sufficient information regarding the facility to begin the project-level Environmental Impact Report
- The previous ConRAC study recommended Manchester Square over Lot C as the preferred location for various reasons, including proximity to freeway network
- The Crenshaw Light Rail Line is under construction. It will run along the west side of Aviation Boulevard.
- The ConRAC study will also explore options to connect the APM with the Crenshaw light rail line

- <u>Single level busing discussion(independent project from ConRAC)</u>

- The single level bussing project will review vertical circulation capacity, zone locations and pedestrian wayfinding
- Enterprise is concerned about walking distances from baggage claim to the bus pick up zone
- There is a moving walkway at BUR and PVD to address walking distances with different metrics for different areas
- The single level busing study is looking at the possibility of having one industry (off-airport parking, rent-a-cars, or hotels) single level bus on the upper level and one industry single level bus on the lower level
- Car rental preference for single level busing is on the upper level
- Wayfinding between baggage claim; terminal check-in and shuttle zones will be key to the success, and can be challenging depending on the industry. Wayfinding would be the easiest if the off-airport parking shuttles were to single-level bus on the upper level
- If one industry were to single level bus on the upper level, approximately 300' – 400' feet of commercial curb could be reassigned for another use on lower level
- No dedicated space on upper level currently – it will have to be identified by striping and signing
- Car rental with larger buses and more frequent pick up and stops, has a larger impact than the other bus systems
- Roadway repair to be completed in 2016 for upper level areas. It is recommended that single level busing not be implemented until that construction is complete

TSC – Jeff Jarvis

- Invitation to car rental companies to review and visit their sites was not enthusiastically accepted
- Rental car companies will form their own conclusions about the viability of the ConRAC project
- LAX may have the largest of all ConRACs, due to complexity of the site and size of market
- The ConRAC needs a comprehensive solution addressing customer service and operational efficiency
- Some Manchester Square property may not be used for the ConRAC or its circulation system and could be used for other functions
- Issues/lessons learned from prior studies:
    - $10 CFC was not adequate to cover all things the rent-a-car industry would have liked to include in the ConRAC, review in light of today's operational volumes and the best we can do with amount of CFC's collected
    - Currently there is no significant community opposition to landside improvement plan under the Specific Plan Amendment Study (which includes the proposed ConRAC in Manchetser Square); only concern is airside component of SPAS
    - LAWA is in settlement negotiations with litigants
    - Most of the properties in Manchester Square have been purchased by LAWA under voluntary acquisition program (site plan presented)
    - The charter school in Manchester Square is on LAUSD property
- Common bus would not work with existing rental car locations, even with a phased project development

- A ConRAC will bring positive effects at terminals regarding traffic, but neighborhood shuttler traffic could be a negative given traffic will be focused on one concentrated location, as opposed to current traffic which is spread out over larger areas
- SPAS didn't consider all construction impacts such as how roadway capacity will be affected while construction of other areas is ongoing
- Single level busing is really only a temporary stop gap, until APM is developed, in any case
- SPAS horizon study year is 2025.
- Current estimate is 5 -7 years to build APM
- Car rental companies need to consider their ongoing property situations, with leases and improvements
- The goal is to get the sequence of events right, then can telescope the schedule in or out as required
- Getting environmental permits locked in will be key
- Environmental permits are generally valid for about 5 years, to construction initiation
- Air quality impacts could change schedule of this and other projects
- Environmental approvals only get tougher over time, now is the time to start
- We may be able to extend the permits, if needed
- Rental cars could be left with nothing, or Lot C, if the opportunity in Manchester Square is not secured
- LAWA wants to bring more certainty and clarity now, so the rental car companies can make long term plans
- The project could not be completed before 2020
- Industry preference is to control their own business and do their own thing. It is a step back in many ways to move into a consolidated facility. This is particularly true in terms of guaranteed ability for control of customer service
- RAC representatives stated that common O&M has been very expensive at other ConRACs with 3rd party facility and fuel management. The industry voiced their concern that they would not be able to cover these costs with the existing $10/transaction CFC at LAX.
- There are no operational costs offset other than busing, unlike other locations where there were severe shuttling costs, supplemental lots and the like
- Many of the existing service facilities will likely remain as satellite support
- For some, the current configuration has less shuttling than the possible future configuration
- The rental car industry is skeptical of economics of this project
- Not all remote sites will remain available, although there may be other opportunities for new sites
- The facility will be sized based on a 90th to 95th percentile operating condition
- Brand families often prefer to preserve individual brand identity in rental and return areas and have combined operations in the storage and QTA areas
- Sizing methodology will examine both independent operations and combined brand family operations as book ends. Final size will be in between.
- Market growth (planning horizon) will come from the airport
- The concept should maximize flexibility for future market shifts
- The program will be based on transactions, not what facilities currently exist

- The industry would like to build the maximum that we can, but not over, based on budget/affordability
- $10/transaction, CFC, not at level yet of $10/day, would result in more ability to provide facility needs
- Joe Olivera believes that the ConRAC may be a $800 - $900 M facility and require higher CFCs
- Steve Martin and Debbie Bowers will review the financial/business side and develop an understanding of the restrictions and limitations
- The industry would like the CFC to cover bond sale, bus, debt service and reserves
- The previous studies went into schematics – current team will take that work into account
- There have been changes in the planned transportation connections since the prior study that require a new examination of the concept
- Facility to be flexible to cover movement of vehicles, moving fleet at off peak rather than at peak traffic hours
- Grade level overflow parking/other uses was available for lease in prior studies, similar to LAS
- Costs associated with moving vehicles back and forth between the new ConRAC and the existing service facilities was a major concern of the previous study
- Areas adjacent to Manchester Square are not residential and therefore not likely to resist the ConRAC
- Noise and light from the conrac may be a concern to residences. The closest residential area is on other side of the freeway or other industrial areas
- LAWA will need to work with Caltrans for improved connection to northbound 405
- Northbound 405 is largest challenge, southbound has existing convenient ramps directly east of Manchester Square
- Proposed ground transportation plans anticipate an improved connection to the 105 between LaCienega and Aviation Boulevards.
- Ground transportation circulation improvements may be constructed in phases
- Current APM route is neither 98th or 96th streets
- Project Schedule May 5th, results of ground transportation improvement program update will be posted on the LAWA web site after they have been shared with the Aviation Board
- 3rd Tuesday should work for the regular monthly industry meeting, to replace BUR (after July)
- Propose Monday June 16th for a web meeting
- Set August 19th for the next in person meeting at LAX (1000 – 1200 PDT)
- Generally don't start meetings until 10:00 am
- TSC will set up dial in for June 16 meeting, run from PHX
- For Avis, post 2025 opening would be best

Meeting ended at approximately 1200 PDT
These notes were prepared by TranSystems and represent together with the presentations themselves our understanding of what was discussed. Please send any edits with 5 days of receipt to jqjarvis@transystems.com

Los Angeles International Airport
Consolidated Rental Car Facility

Rental Car Industry Meeting # 1

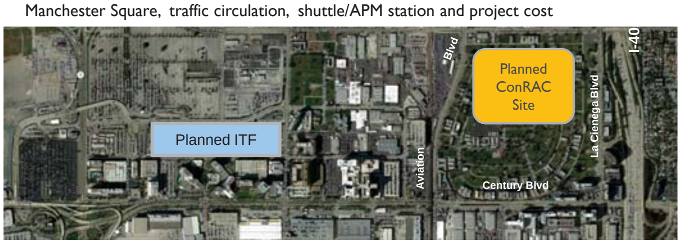
Los Angeles World Airports
Board of Airport Commissioners
April 24, 2014

Outline

- Project History of LAX ConRAC
- Proposed ConRAC Location
- Transportation Planning and Programming at LAX
- Benefits of a ConRAC at LAX
- Top Rental Car Markets at US Airports
- ConRAC Project Management
- Single Level Busing

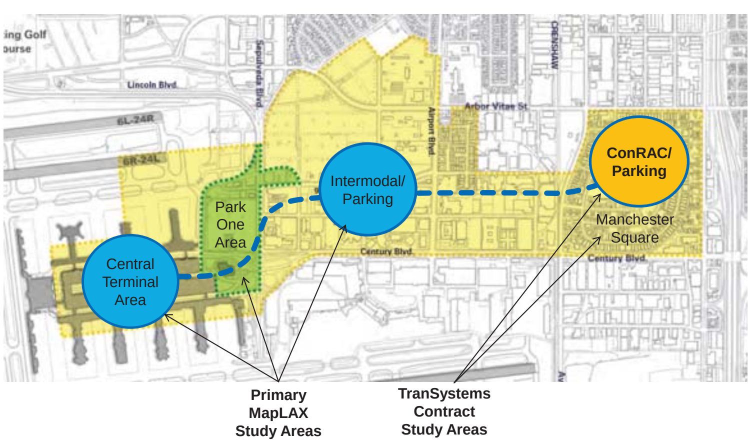
Project History of LAX ConRAC

- **2004** - LAX Master Plan (Alternative D) was approved by LA City Council with the ConRAC proposed in public parking Lot C
- **2005/06** - Advanced project planning for Lot C site revealed building and operational challenges; opposition from industry
- **2009** – Alternative Site Analysis Study recommends Manchester Square over Lot C
- **20__** - Customer Facility Charge for rental cars takes effect at LAX
- **2013** - Completion of EIR for Specific Plan Amendment Study; selection of preferred alternative with ConRAC in Manchester Square
- **2014** – Planning and programming work for the ConRAC including size and configuration within Manchester Square, traffic circulation, shuttle/APM station and project cost



Proposed ConRAC Location

Transportation Planning & Programming at LAX



ConRAC Project

Goal:

– Develop sufficient project definition for detailed discussion/negotiations with rental car companies and to allow start of Environmental Impact Report in 2015

Expected results in 2014:

- Site plan within Manchester Square, including protection of full site from other "pop-up" development proposals
- Facility configuration in context of industry consolidation among major companies and issues associated with smaller companies
- Roadway/ramp access circulation plan—affecting both local streets and access arterials—and other transportation improvements needed to efficiently manage and mitigate projected vehicular demand
- Phasing plan and sequential schedule of actions for development of the ConRAC, informed by other landside improvement initiatives
- Refinement of the connectivity between a CTA/ConRAC Automated People Mover and Metro airport-area rail projects
- Market study for potential complementary adjacent uses of other Manchester Square property not needed by ConRAC, including parking and transportation facilities

Single Level Busing

Vertical Circulation Recommendations:

Short Term:

At T-1 and T-3, some escalators that currently take passengers from the departures level to the security area on the concourse level would need to be reversed.

Long Term:

Build one additional escalator in T-1 between concourse and departures level

Single Level Busing

Proposed Single Level Busing Zones

Single Level Busing

Example of Upper Level Loading/Unloading Zone

Existing Striping

Proposed Striping

Second Level Roadway Project Coordination

- Roadway repair: expansion joints, bearing pads, and deck sealing
- Escalator/elevator upgrades
- New Face of the CTA: Canopy extension between T-3 and TBIT; TBIT and T-4, New Street Lights, Extension of Light Band
- Southwest's Terminal 1 upgrade
- Pedestrian Wayfinding improvements
- ADA ramp improvements/relocations
- Security Bollard installation

Extra Slides

The following slides will likely not be included – here just for information

Benefits of a ConRAC at LAX

- **Improved Passenger Experience –** Current LAX facilities are scattered, wayfinding is challenging for visitors. Current bus services below expectations given traffic and congestion.
- **Trip Reduction –** Reduction and/or elimination, with Automated People Mover, of shuttle trips. Currently, there are approximately 760,000 rental car shuttle trips into LAX annually. Overall, auto traffic on local streets likely to be improved with a ConRAC.
- **Operational Efficiencies –** Benefits to operators likely greater at LAX than at most other airports, given multi-site operations in evidence

Top Rental Car Markets at US Airports

Los Angeles World Airports

Rank	Airport	ConRAC?
1	Orlando	Companies at Terminals
2	LAX	No
3	Phoenix	Yes
4	Atlanta	Yes
5	Miami	Yes
6	Denver	No
7	Tampa	Planned
8	Las Vegas	Yes
9	Fort Lauderdale	Yes
10	San Francisco	Yes

Latest information available. Rankings may have changed.

Manchester Square Property Acquisition Status

Los Angeles World Airports

Agenda

- Introductions
- ConRAC Background and Single Level Busing Update
- Summary of LAWA/TranSystems kickoff meeting
- Overview of the conclusions from the previous study
- Why a LAX CONRAC
- Content and purpose of current survey
- Confirm LAX functional values
- Project Schedule
- Project Participants
- Communication Protocol
- Next Meeting

Study Parameters

- Identify the ideal size, location, functional configuration and connection of the conrac
- There are no preconceived notions or commitments on the extent or composition of the collateral development. We are to discover what makes sense
- There will be extensive involvement of airport senior staff in the process
- Once this study is complete, there will be an extensive environmental approval process before final design can begin

Previous Study Results

- Manchester Square is the right location
- Project may go through phased development
- Project can't progress without a satisfactory business agreement and appropriate balance between costs and revenue
- This project is part of a much larger effort to remake the LAX customer experience
  - How do passengers and employees get to and from the terminal area from the freeways
  - Shifting how and where customers and employees interact with the terminal
  - Providing alternative modes for connection to the terminals

WHY A LAX CONRAC

- No one has to have it
  - customers, industry, airport, neighbors can all continue as is indefinitely
- No reason to do it unless it is transformational
  - for customers, industry, airport and neighbors
- Lots of legitimate stakeholders
- Demanding regulatory environment
- There is not a pressing deadline and time is not on our side
- Eliminate planning uncertainty

WHY A LAX CONRAC

- There are many steps between where we are right now and final design/construction
  - Study process
  - Environmental studies
  - Business agreements
  - Procurement process
- The vision for the project includes both a very high bar and few preconceived notions – It is up to us to both discover and deliver the value this project can bring

WHY A LAX CONRAC

- This is just one part of a much larger effort to transform LAX and the surrounding neighborhoods
- Lots of good work has been done before. Now there is a growing desire for a comprehensive solution that leads to construction
- Learn for all the previous CONRACs

Potential differences between current LAX rental car operations and a CONRAC

- Substantial potential industry operational savings in consolidated busing or APM
- Significant car movements between daily operations in the garage and offsite storage
- Significant potential operational and security savings through proper configuration of brand families. Savings come through consolidation of staff, space and fleet
- Operational savings and customer service benefits of ready/return/QTA all under cover

Potential differences between current LAX rental car operations and a CONRAC

- Brand new state of the art facilities designed around current and future customer service and operating models
- Facilities and operations that are created with sustainability as one of the guiding principles with associated long term energy and operational savings
- Flexibility to handle market share shifts both by brand and by brand family

Potential differences between current LAX rental car operations and a CONRAC

- Significant reduction in customer time getting on the road and returning to the terminal
- Significant improvement in customer way finding returning a car to the airport
- Potential improvement in customer safety and security during the rental car process
- Potential brand dilution

Potential differences between current LAX rental car operations and a CONRAC

- Significant improvement in air quality around the airport
- Significant reduction in congestion in the central terminal area
- Potential to attract more customers to LAX
- Potential to facilitate transit access to work for rental car employees

Potential differences between current LAX rental car operations and a CONRAC

- Operations in an expensive multilevel garage is different than how you configure an at grade facility
- Attract more airport customers
- Facilitate city renters
- Catalyst for local business development and neighborhood revitalization
- Potential reduction in congestion on the streets around the airport

Potential differences between current LAX rental car operations and a CONRAC

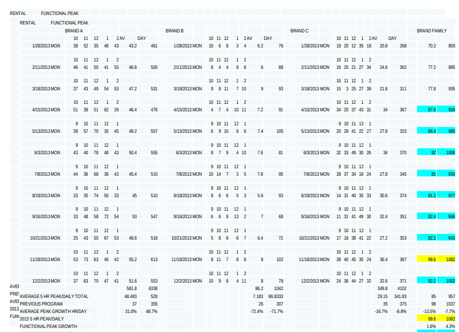
- Consolidation and management of the environmental risks associated with fueling, washing and vehicle maintenance
- Consolidation and management of the operations and maintenance costs of the garage and customer service areas
- Potential for a new business agreement that serves as a foundation for future profitability

CURRENT SURVEY

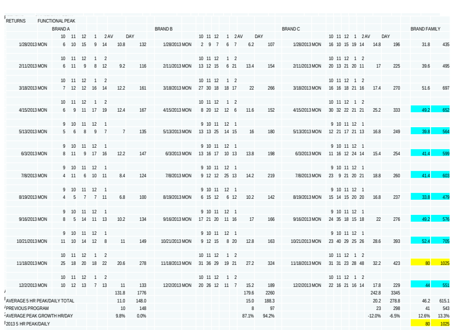
- We have learned from the industry four factors determine the appropriate size of a conrac
  - Peak hourly rentals and associated returns drive the size of the QTA
  - Daily cumulative rentals and returns drive the size of the garage
  - Annual rental/return patterns determines which are the design days – Phoenix example
  - Brand ownership configuration at this airport

- Our program calculations are based on transaction data and industry operational metrics, not on surveys of existing facilities. Transaction data is an accurate description of market demand. Current facilities are not.
- There is always a need for “offsite” facilities
  - In and out fleeting
  - Overflow storage
  - Heavy maintenance
  - Repair
  - Weather events
  - Breakdown returns
  - Others

SAMPLE RENTAL DEMAND



SAMPLE RETURN DATA



SAMPLE STALL DEMAND

		X 2	X 1.5	.8 CONV	.6 CONV	TOTAL	50% GRTH	20% CIR	COUNTS
PEAK HOUR RENTAL	100	200							300
SAME HOUR RETURN	80		120	96					180
PEAK DAY TOTAL DEMAND	1082								
.9 PEAK DAY TOTAL RETURN	-923								
DEFICIT STORAGE	252								
SUBTRACT RENTAL STALLS	-200								
REQUIRED STORAGE	52				31	327	491	589	78
									558
PEAK SEASON HOUR RENTAL	86	172							258
SAME HOUR RETURN	45		68	54					101
PEAK SEASON TOTAL DEMAND	966								
.9 PEAK SEASON TOTAL RETURN	-543								
DEFICIT STORAGE	478								
SUBTRACT RENTAL STALLS	-172								
REQUIRED STORAGE	306				183	409	614	737	458
									818

FUNCTIONAL VALUES

- Customer Service
- Operational Efficiency
- Efficient Use of Money
- Flexibility
- Level Competitive Playing Field
- Schedule may also be a factor. There are many different entities and issues that can interrupt the development of the project. We will seek the ideal solution then seek for ways to mitigate the potential obstructions rather than handicap the project in an effort to avoid facing stakeholder, environmental or functional challenges. We want to discover and address those issues that can significantly delay the project.

Work Plan

- Milestones
  - April 24 – Kickoff, Project Overview, New Surveys
  - May 1 – Survey Results to TranSystems
  - June 25 – Site Analysis, Program Update
  - August 21 – Functional Design, Multiple Concepts
  - October 16 – Three Concepts
  - November 20 – Single Concept
  - January 15 – Single Concept Refined
  - February 12 – Final Deliverable

Participants and Communication

- Only the current participants
- Additional small operators in the future
- Project specific information with come through
  - Jeff Jarvis
  - jgjarvis@transystems.com
  - 602 576-1733

Next Meeting

- June 25: 9-11am – Site Analysis and Program Update

July 28, 2014
Meeting Minutes

LAX CONRAC – RAC Industry Meeting No. 2

June 26, 2014 10:00 – 12:00pm PDT.
Location: GoToMeeting and Conference Call

Attending:
LAWA - Steve Martin, Cynthia Guidry, Diego Alvarez, Christopher Koontz, Fatima Hashim, Pat Tomcheck, Debbie Bowers
Advantage – Cem Conul, Joe Olivera
Avis/Budget – Lorraine Tallarico
Enterprise-Peter Van Valkenberg, Scott Goldstein, Bill Bettison
EZ Rental Car-Daria Briggs, Andrew Burke, Mark Murray
Fox Rent A Car-Arnold Goehring
Hertz-Connie Gurich
OK Rent-A-Car-Clifford Weber
Sixt-Jerry Copelan, Tim Vettera, Clemens Schoenberger
PB – Greg Wellman
TranSystems – Jeff Jarvis, Chuck Rowe, Doug Steen, Gina Trimarco, Norman Lin

The purpose of the meeting was to review with the Rental Car Industry (RACs) the status of the development of a preliminary ConRAC program; the site influences that will impact the development of Manchester Square; and site concepts showing some initial alternatives for accommodating the ConRAC complex within the site constraints. A copy of the presentation provided by TranSystems accompanies these minutes.

Jeff Jarvis led the review. The items discussed and the feedback/suggested refinements provided by the rental car representatives are as follows. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Pat Tomcheck explained that the goal of the meeting is to solicit feedback from the RACs in regard to the components of the preliminary ConRAC program and the initial site concepts.
2. Jeff Jarvis discussed the location of the existing rental car sites in relation to Manchester Square. **Peter Van Valkenberg suggested their other sites used for over-flow vehicle storage, employee parking, bus maintenance, etc. be shown.**
3. Jeff Jarvis reviewed the overall landside planning for LAX discussing the proposed APM link from the ConRAC, to the ITF and the Central Terminal Area (CTA). Connie Gurich asked why the RACs could not stay on their existing sites and bus to the ITF. Her observation is that the ConRAC customers would be disadvantaged at the end of the APM, requiring the maximum number of stops to the CTA. She asked why couldn't the RAC companies use the station at the ITC to drop off and

pick up their customers. Jeff Jarvis explained this will be an inconvenience to RAC customers because double busing - or busing plus an APM ride – would be required.

4. TranSystems (TSC) will provide travel time for passengers on the APM from the ConRAC to the CTA.
5. Jeff Jarvis reviewed the Values which Frame Key Decisions. After input from the RACs, it was decided to restate the "Level Competitive Playing Field" value to "Equitable Opportunity."
6. Jeff Jarvis reviewed the methodology in the development of the ConRAC program. The program is based on transaction data provided by the RACs in their responses to surveys which were distributed to all the current on-airport RACs.
7. Jeff Jarvis stated that the peak hour for business customers is different from the peak hour for leisure customers.
8. The overall requirement, for ready/return, QTA, the customer service building and support functions is approximately 132.4 acres, if provided on one level. The program includes a 5% contingency for future growth or new RAC tenants. The total area for Manchester Square is 127 acres. The program incorporates sharing of various facilities, such as vehicle storage/fueling/wash bays/maintenance, to reflect the synergy associated with multiple companies within the umbrella of a single brand family. Mr. Jarvis also explained that the program is based on the distinct peak demand period for each company – not the blended peak for all companies.
9. The program reflects a ConRAC to accommodate all RAC operations on the site. Mr. Jarvis presented the Support facilities program which includes space for vehicle idle storage plus employee parking plus area for car carriers to load and unload vehicles. The only facilities not covered in the program are requirements are for functions like heavy maintenance or long-term vehicle storage.
10. Some RACs questioned if the CFCs would support the funding required for the total program presented. They do not believe CFC funds should be used for the acquisition of the school or the new entrance and exit roadway improvements which they perceive as also benefitting non-RAC customers.
11. Some of the RACs challenged the metrics used in development of the program and expressed concern that the metric used for calculating premium (i.e. business) customers will have the effect of "shortchanging" the amount of counters allocated for companies for whom business customers are a large proportion of their overall business (Avis' experience in San Jose was an example). Mr. Jarvis stated the metrics were based on processing times and space requirement factors provided by the RACs.
12. One RAC representative cautioned that the proposed ConRAC may be undersized. He emphasized the need for a "flow-through design" and that the appropriate integration of vertical circulation is critical.
13. Mr. Jarvis invited the RACs to provide suggestions for the metric to use for calculating the number of maintenance bays to provide in the QTA.

14. Connie Gurich expected TranSystems to count the number of existing fuel nozzles, wash bays and maintenance bays as part of their site visits. Mr. Jarvis explained the reason TranSystems is not using the inventory of existing facilities is that the planning for the future facilities is based on the transaction data and brand ownership structure at LAX combined with industry metrics.
15. The RACs indicated they would also review the processing times used for calculating the number of fueling positions and wash bays.
16. With respect to the Customer Service Building (CSB) requirements, there was concern from the RACs whose main focus is the business traveler that they are shortchanged when it comes to the amount of customer counter space; in other words, that leisure companies are provided more than their share of counter space. This is perceived as the business-traveler oriented RACs subsidizing building improvements for its competitors. It was stated that the metrics used by TranSystems are inequitable for the larger companies and that the counter space should be based on market share.
17. The RACs asked if Mr. Jarvis could share the excel file that shows the summary of area requirements. (Note: This file contains the company proprietary data gathered from the survey responses. TranSystems can share the specific transaction data files with each company so they can see how the data has been utilized to develop the requirements).
18. Mr. Jarvis showed how this program could be allocated to facilities with various levels. He explained the benefit of multi-level facilities is they can provide for minimum customer walking distances to and from vehicles. Mr. Jarvis explained that the multi-level facilities also contribute to optimizing the utilization of the site area.
19. Mr. Jarvis explained that the vehicle count of the proposed program is approximately 3.6% less than developed in 2010 and the overall area is 6.8% less. Without seeing the details underlying the previous program, Jeff Jarvis speculated the reduction in program area may reflect the efficiencies associated with the brand family sharing of facilities.
20. Jeff Jarvis reviewed the site influences analysis. Pat Tomcheck stated that LAWA is interested in developing at least one ConRAC option in which the existing charter school could be retained.
21. The RACs expressed concern about the alignment of the proposed 96th Street and 98th Street circulation roads limiting the amount of site area available for development of the ConRAC.
22. Jeff Jarvis described the elements that contribute to the ideal relationship between the APM platform and the layout of the rental car facility. For preferred passenger convenience, the APM platform should be located at the center – or be accessible from the center – of the Customer Service Building (CSB) with no level change between the APM platform and the CSB.
23. Each of the site alternatives studied by the planning team show a bus plaza to accommodate a shared busing operation on opening day. Mr. Jarvis stated that ideally, he would like to see the APM platform be accommodated on the same level as the bus plaza.
24. Jeff Jarvis described the range of site alternatives that had been studied by the planning team. Each of these alternatives have used the 4-level Garage/CSB, 3-Level QTA and 4-Level Support Building to reflect a 25% allocation to each level of those two facilities. The QTA in each of these

options has been limited to 3 Levels because the fueling system gets more complex and expensive if the building is more than 3 Levels. From this range of site alternatives, three Proposed Site Concept Diagrams (Concepts 1, 2 and 3) were presented to the RACs for their review and comment.

25. Based on input from the RACs, the team agreed to investigate the following additional concepts:
a. Maximize the use of the available site area with no more than two levels for any building. Mr. Jarvis agreed that the planning team should study those alternatives.
26. b. Customer service counters located at each ready/return level, In this alternative, there would be no central CSB.
27. c. A "split-garage and QTA" similar to the Atlanta ConRAC.
28. Concept 1 review comments from the RACs: included:
    a. Confusing and inefficient circulation.
    b. Lots of level changes and will cost a lot of money to operate.
    c. Hertz should be on a single level – very important.
    d. QTA is too remote.
    In this concept, there will be one or more bridges linking the garage to the Support/QTA.
29. Concept 2 review comments from the RACs: included:
    a. Bottleneck at the intersection of the QTA with the garage/support building.
    b. 8 level garage/support building will be too expensive – too much vertical movement.
30. Concept 3 review comments from the RACs: included:
    a. No justification for extending the APM beyond the ConRAC. Non-ConRAC riders should not be taking up space on the APM cars jeopardizing the ability for RAC customers to get on the train.
    b. Concern that commercial development in Manchester Square creates potential congestion and inefficiencies for the RAC operation.
    c. Compared to the other two schemes, was a good plan in that there was a logical connection between the garage, QTA and support building. The vehicle movements on each level are linear and efficient.
31. Comments from the RACs that are common to all three site concept diagrams include:
    a. A larger map of the Airport area needs to be provided which shows the traffic flows between the freeway and each ConRAC concept.
    b. Place entry and exit helices at the ends of the garage so the full length of the ready/return area can be utilized.
    c. Right turns are better than left turns.
    d. School should not constrain the ultimate development of the site.
    e. Multi-level structures are considered inefficient and labor intensive.
    f. Allocate a larger portion of the site to the ConRAC development to allow for a "low-rise" solution.

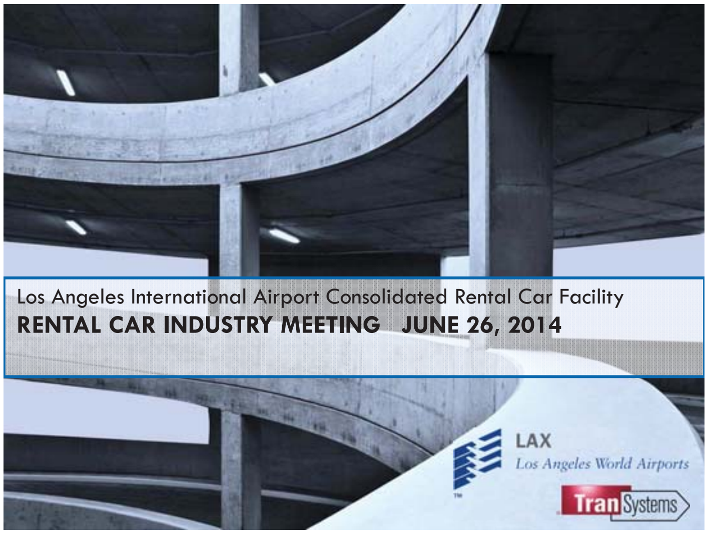
   g. The footprint for the garage needs to be balanced with the goal of maintaining a maximum walking distance of 300 feet from the CSB to the vehicles.

32. It was suggested that LAWA not extend the conceptual planning of the ConRAC beyond what is required for environmental use.
33. An off-airport RAC representative shared his concern about LAWA extending the current RAC agreements that may limit the entrance of new rental car companies into the CTA. New agreements must run parallel to this process
34. The previously proposed meeting with the RACs on August 19th will be rescheduled. It was suggested that we use the recurring dates that had been set aside for the Burbank ConRAC

Attachments: PDF of Rental Car Industry Meeting Presentation, June 26, 2014

Cc: Attendees

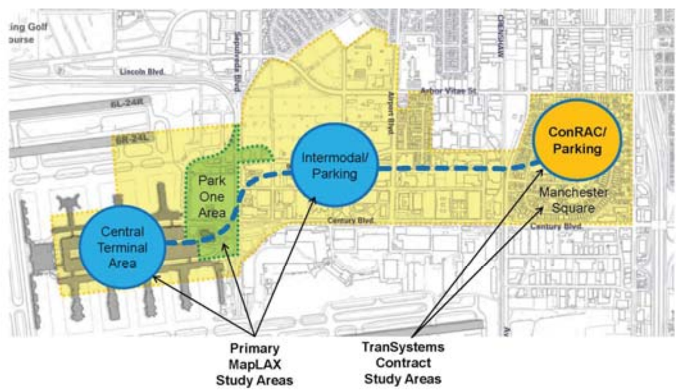
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Bernhard Lee	Walker Parking Consultants
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers
Jill Liu	Fehr & Peers
Sherry Rudnak	BAE Urban Economics
Ron Golem	BAE Urban Economics



- Proposed ConRAC Location
- Overall Landside Planning for LAX
- Preliminary ConRAC Program
- Manchester Square Site Influences
- Site Land Use Concepts

AGENDA – June 26 Industry Meeting

Proposed ConRAC Location



Overall Landside Planning for LAX

These are the Values Which Frame Key Decisions

- **Customer Service –** *quick and easy to use*
- **Operational Efficiency–** *minimize labor and process time*
- **Efficient Use of Money -** *optimize the utilization of all facilities*
- **Flexibility -** *accommodate growth and industry changes*
- **Level Competitive Playing Field -** *all users have an equal opportunity for efficient and profitable operations*
- **Time –** *use current window of opportunity*

FUNCTIONAL VALUES

Guidelines Associated with a Successful ConRAC Facility

- **Intersection Management –** *separate the different types of traffic*
- **One Way Traffic for Customers –** *arriving and departing customers and vehicles do not cross paths*
- **Customers Always Move Toward Their Destination -** *no "doubling back"*
- **Minimize Walking Distance from Vertical Core –** *350' maximum walk to/from vehicle*
- **Minimize Level Changes**
- **Direct Connection from Garage to QTA to Support Facilities**
- **Brand Family Allocation –** *synergy in shared fleet and use of facilities*

TYPICAL PLANNING PRINCIPLES

Company	% of Revenue
Advantage	2.0%
Alamo	13.4%
Enterprise	8.4%
National	8.0%
Subtotal EHI Brand Family	29.8%
Avis	15.8%
Budget	6.1%
Hertz	26.8%
Dollar	10.3%
Thrifty	4.2%
Subtotal Hertz Brand Family	41.3%
Fox	5.0%

RAC Industry Market Share

Facility Programming Goals

- Size the Facility based on the operational pattern of Individual Brands and Brand Families rolled up to the industry as a whole. Brand families preserve brand operations at the counter and with ready and return spaces while sharing storage and QTA functions and fleet
- Accommodate Future Growth
  - Current airport operations were at 67 MAP in 2013
  - Plan ConRAC for 42% growth in airport operations

Program Sizing Description

Development of Future Peak Hour

- Reviewed hourly rental/return data for all companies as individual brands
- Identified the average of the peak two hours for predominately business traveler companies
- Identified the average of peak three hours for leisure traveler companies

Program Sizing Description

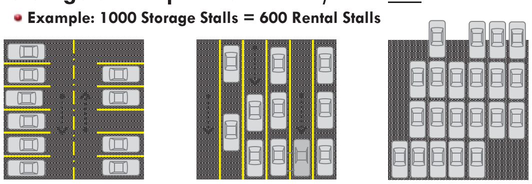
Identification of the Peak Rental Demand

- Looked at each current on-airport company's peak rental transaction data
- Recorded the average seasonal peak transactions specific to each brand – typically peak season was 4 to 6 months
- Targeted the 94th to 96th percentile – 18th busiest day of the year
- Current peak rental transactions for all companies is 1,371/hour
- Program uses 2 times this peak hour to establish the current peak demand for rental spaces – 2,830 spaces
- Future facility will accommodate 42% growth = 4,020 spaces

Program Sizing Description

Stall Requirement Methodology

- Rental Stall used as the Consistent Unit of Measure
  - Rental Stall = 12/12 = 1.0
    - Example: 1000 Rental Stalls = 1000 Rental Stalls
  - Return Stall Equivalent = 12/15 = 0.8
    - Example: 1000 Return Stalls = 800 Rental Stalls
  - Storage Stall Equivalent = 12/20 = 0.6
    - Example: 1000 Storage Stalls = 600 Rental Stalls



Rental 1.0 — 12 Stalls per Block
Return 0.8 — 15 Stalls per Block
Storage 0.6 — 20 Stalls per Block

Identification of the Return Demand

- Identified the number of returns during the peak season peak rental hours
- Current return demand during the peak rental hour = 664/hour
- The number of proposed return stalls is 1.5 times the peak rental hour returns
- Current peak return requirement = 1,000 stalls
- Proposed future peak return requirement = 1,500 stalls
- Converted return spaces into standard ready stalls using a conversion factor of .8
- Calculations assume only 90% of returned cars will go to the QTA to be put back into service – i.e. 10% of the vehicles will be pulled out of service for maintenance, resell, etc.

Program Sizing Description

Identification of the Peak Storage Requirements

- The difference between the total daily peak rental demand and 90% of the corresponding daily return = the amount of idle storage which needs to be available in the garage to back-fill the rental stalls
- Current peak daily storage demand = 1,642 spaces
- Proposed future vehicle storage = 2,331 spaces
- Storage stalls for brand families can be shared between brands
- Storage space requirement is converted into a standard ready stall by using a conversion factor of .6 times the number of idle storage stalls required
- 8% of the vehicle storage requirement is proposed to be accommodated in the QTA for stacking/queuing associated with fueling, wash and maintenance bays

Requirement of Vehicle Circulation

- 20% is added to the rental, return and storage requirements to accommodate vehicular circulation, pedestrians, customer service booths and exit booths.

QTA Requirements

- The QTA is sized based on the goal of enabling 90% of the fleet returned during the peak rental period to go back into service
- Fuel/cleaning process rate = 5 vehicles/hour
- Fuel/cleaning area = 360sf/nozzle
- Total fuel nozzles = 120 currently required
  170 proposed nozzles in the future
- Wash process rate = 20 vehicles/hour
- Wash area = 1,650sf/bay
- Total wash bays = 30 currently required
  42 proposed wash bays in the future
- Maintenance bay area = 720sf/bay
- 60 maintenance bays proposed in the future
- 40% is added to the required areas for offices, support spaces and circulation

Support Functions

- Idle storage – 28% of fleet minus garage capacity
  15,600 – 7,600 = 8,000 spaces currently required
  11,360 spaces proposed in the future
- Employee parking 1,200 spaces currently required
  1,700 spaces proposed in the future
- 15 car carriers

Customer Service Building (CSB)

- All customer counters will be in the CSB
- Leisure transactions rate = 6 transactions/hour
- Current leisure counters = 148 currently required
  220 proposed in the future
- Business transaction rate = 20 transactions/hour
- Current business counters = 24 currently required
  34 proposed in the future
- Area per counter = 300 square feet
- Add 70 % for circulation, support and vertical circulation
- Rather than develop a long-linear counter, the CSB may be a mini-mall, similar to the ConRAC at Phoenix Sky

			Gross Area Required	
Function	**Capacity - 95 MAP**		*Square Feet*	*Acres* [1]
Ready Return Garage - including storage	8,241 rental stall = 10,367 vehicle count		2,509,523	57.6
Ready/Return Design Area	8% of ready/return is allocated to the QTA for stacking/queuing of vehicles			**53.0**
Leisure Customer Service Area	220 counters		117,736	2.7
Premium Customer Service Area	34 counters		18,440	0.4
Total Customer Service Building (CSB)			**136,176**	**3.1**
QTA				
Fueling - Nozzles		170	64,233	1.5
Wash Bays		42	73,601	1.7
Maintenance Bays		60	45,360	1.0
Office/Circulation/Support	40% of Fueling-Wash-Maintenance		73,278	1.7
Subtotal QTA			**256,471**	**5.9**
Stacking/Queuing for Vehicles	8% of ready/return		200,762	4.6
QTA Building Design Area			**713,705**	**10.5**
Total Building Area for Ready/Return & QTA				**66.6**
QTA Site Area				
Visitor Parking- adjacent to CSB	100 spaces		31,900	0.8
Fuel Operation - adjacent to QTA			8,800	0.2
Loading Dock/Service Yard - between ready/return and QTA			88,000	2.1
Subtotal QTA Site Area			**128,700**	**3.1**
Total Area for Buildings and QTA Site Area				**69.7**
Support Facilities [2]				
Idle Vehicle Storage	11,360 vehicle count		1,976,640	49.9
Empolyee Parking	1,704 spaces		494,160	12.5
Car Carriers Loading/Off-loading	15 positions		10,800	0.3
Subtotal Support Facilities				**62.7**
TOTAL PROJECT				**132.4**

Notes:

- These gross areas include a 5% contingency to accommodate future tenants and/or growth
- Requirements for roadways, landscaping, setbacks, etc. are not included
- Manchester Square area available is approximately 127 acres.

	Program Allocation Options (Acres)				
Project Component	2 Levels	3 Levels	4 Levels	5 Levels	6 Levels
Ready Return Garage + CSB					
Garage - multiple levels	26.5	17.7	13.3	10.6	8.8
Customer Service Building (CSB) - single level	3.1	3.1	3.1	3.1	3.1
Site Footprint for Ready Return Garage + CSB	**29.6**	**20.8**	**16.4**	**13.7**	**12.0**
Width (ft.)	803	673	597	547	510
Length (ft.)	1,607	1,346	1,194	1,094	1,021
QTA and QTA Site Area					
QTA Building - multiple levels	5.2	3.5			
QTA Site Area - single level	3.1	3.1			
Site Footprint for QTA and QTA Site Area	**8.4**	**6.6**			
Width (ft.)	430	382			
Length (ft.)	860	764			
Support Facilities					
Vehicle Storage & Employee Parking - multple levels	31.2	20.8	15.6	12.5	10.4
Car Carriers Loading/Off-loading - single level	0.3	0.3	0.3	0.3	0.3
Site Footprint for Support Facilities	**31.5**	**21.1**	**15.9**	**12.8**	**10.7**
Width (ft.)	830	680	590	530	480
Length (ft.)	1,660	1,360	1,180	1,060	960
TOTAL PROJECT	**69.5**	**48.5**	**38.9**	**33.1**	**29.3**

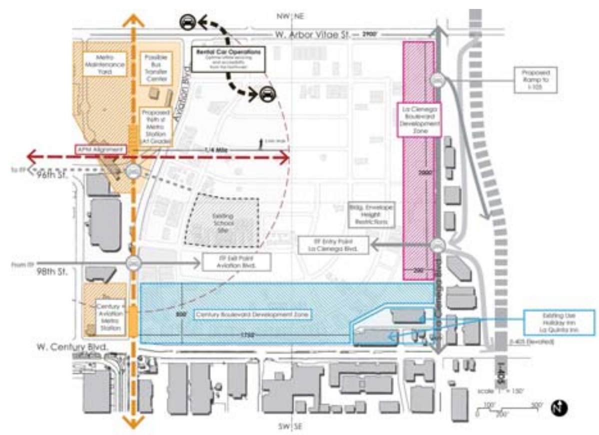
ConRAC Development Options

Comparison with previous 2010 program

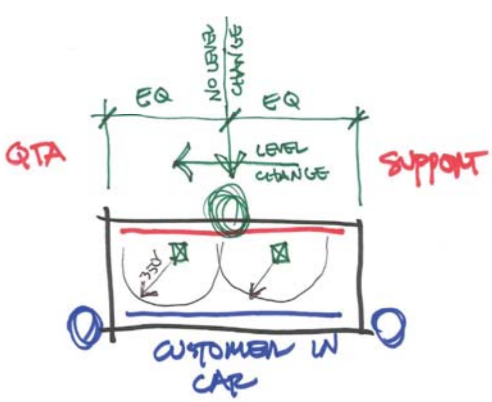
- **Previous vehicle count 22,561**
  Proposed vehicle count 21,727 – 3.6% difference
- **Previous program area - 142 acres**
  Proposed program area - 132.4 acres – 6.8% difference
- **The difference between the two sets of program numbers is likely due to current brand family synergy that did not exist during the previous programming effort**

Program Sizing Description

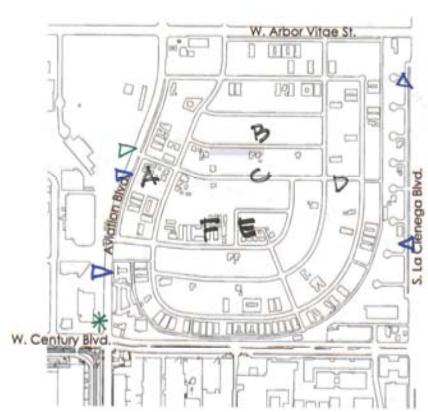
Previous Study - 2010 Site Plan



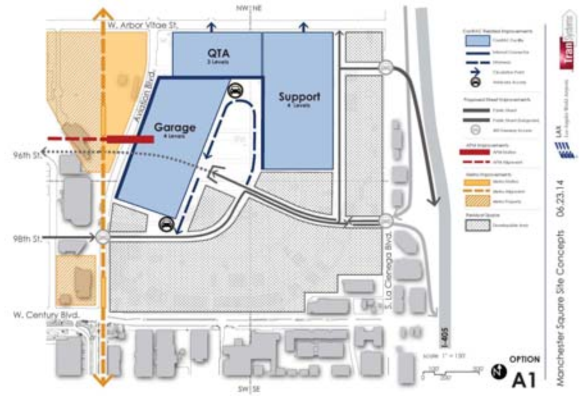
Manchester Square Site Influences



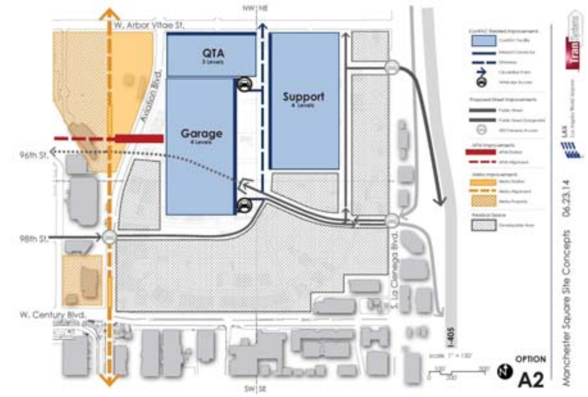
ConRAC APM Platform Orientation



ConRAC APM Platform Locations



Initial ConRAC Site Concepts



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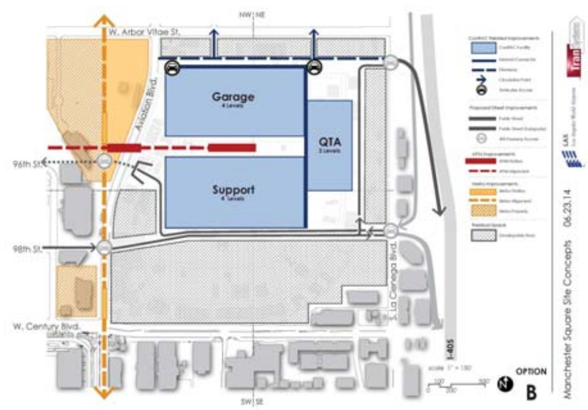

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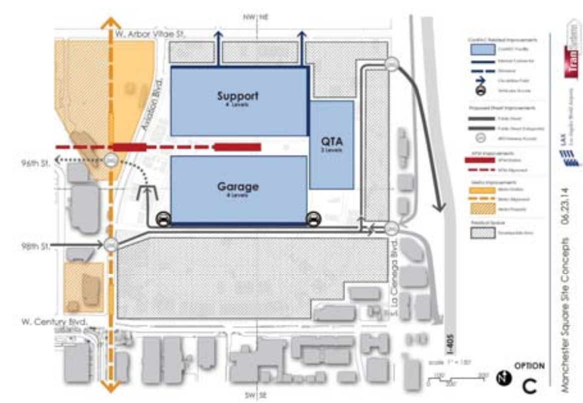

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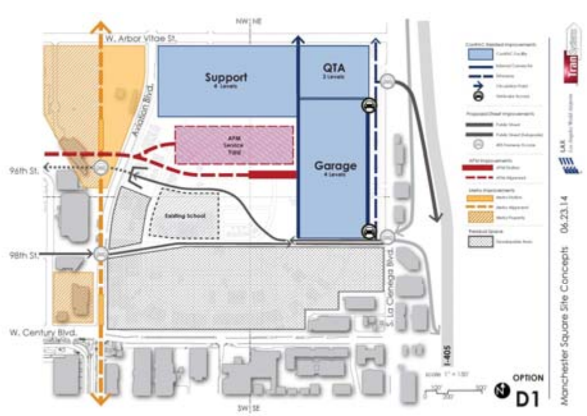
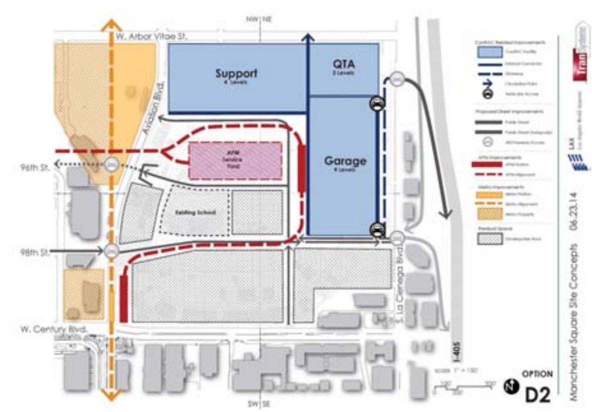
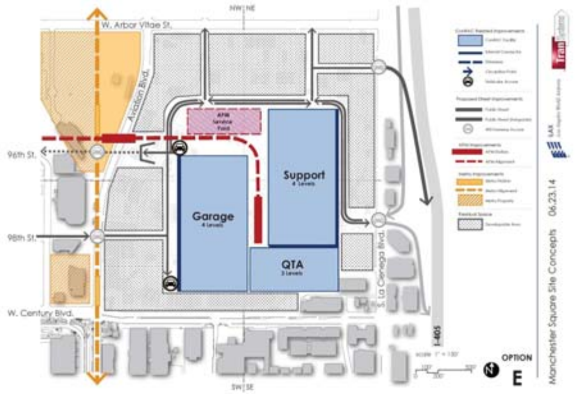


Initial ConRAC Site Concepts



Initial ConRAC Site Concepts

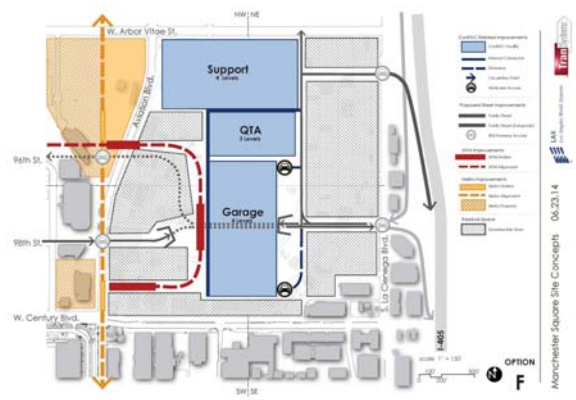


Initial ConRAC Site Concepts

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems



Initial ConRAC Site Concepts

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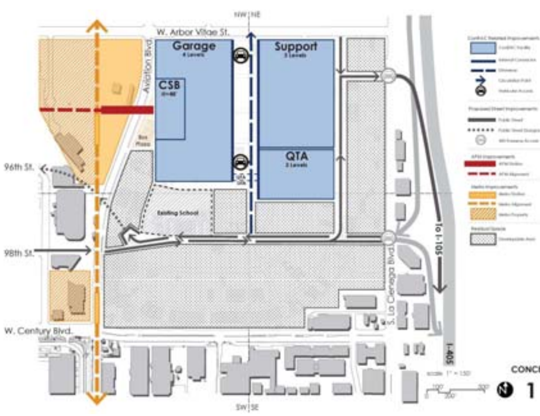


Pro:
- One APM station
- Shortest APM connection
- No level change from CSB to APM
- Economical construction – no building more than 4 levels
- Area for expansion to the south
- Employees can walk to Metro train and bus stations

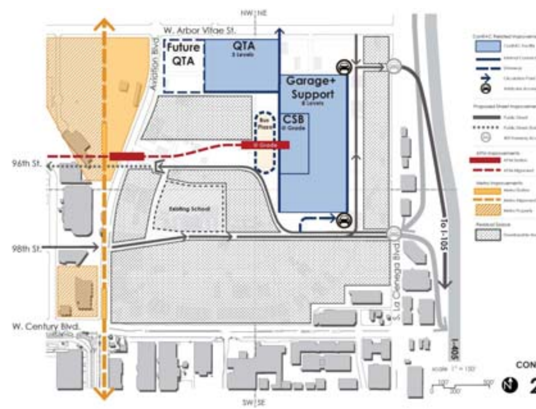
Con:
- CSB embedded in L4 of ready/return area
- QTA & Support not adjacent to Garage
- Inconvenient service access from Arbor Vitae to QTA and Support buildings
- APM spans over Metro maintenance yard

Proposed ConRAC Site Concepts

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems



Pro:
- Easy customer access from and to freeways
- APM station at grade
- No level change from CSB to APM
- CSB does not encroach on ready/return area
- ConRAC buildings are contiguous
- Direct service access to QTA from Arbor Vitae
- Convenient access to Support area from Garage
- Area for ConRAC expansion
- APM does not encroach over the Metro maintenance yard

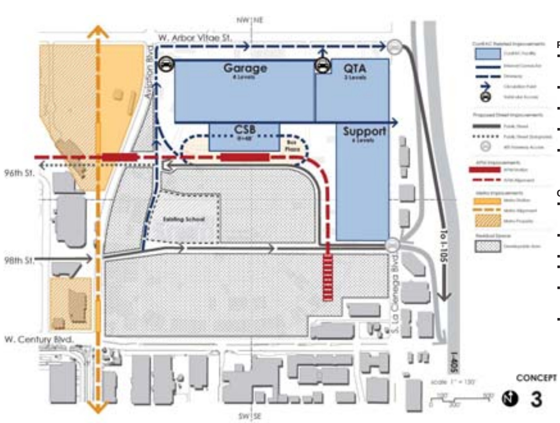
Con:
- Vertical movement within Garage/Support building
- Cost of multi-level Garage/Support building
- 1,500 foot long APM guideway from 96th St. Metro Station
- Change in elevation of APM guideway
- Long walk for employees to Garage/Support building from Metro train and bus stations if there is no APM station at 96th St.

Proposed ConRAC Site Concepts

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems



Pro:
- No level change from CSB to APM (until APM is extended to Century Blvd.)
- CSB does not encroach on ready/return area
- ConRAC buildings are contiguous
- Direct service access to QTA from La Cienega
- APM does not encroach over the Metro maintenance yard

Con:
- Long routes for customer access and egress from freeways
- Lack of area for ConRAC expansion
- Cost of above grade CSB
- Cost of 6 level Support building
- 1,400 foot long APM guideway from 96th St. Metro Station
- Long walk for employees to QTA and Support building from Metro train and bus stations if there is no APM station at 96th St.

Proposed ConRAC Site Concepts

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

	CONCEPTS		
	1	2	3
EASE OF ACCESS/EGRESS FROM FREEWAYS	2	3	1
EASE OF CONNECTION FROM CSB TO APM (SAME LEVEL)	3	2	1
CSB DOES NOT ENCROACH ON READY/RETURN AREA	1	3	2
CONTIGUOUS BUILDING LAYOUT	1	3	2
OVERALL COST OF COMPLEX - INCLUDING APM	3	2	1
FLEXIBILITY FOR FUTURE EXPANSION	2	3	1
VERTICAL MOVEMENTS FOR VEHICLES	1	2	3
EMPLOYEE WALKING DISTANCE TO METRO STATIONS (W/NO APM)	3	2	1
Preferred	3		
Needs Refinement	2		
Not Ideal	1		

Evaluation of Site Concepts

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

DATE	MEETING CONTENT
19-Aug	LAWA REVIEW
4-Sept	RAC INDUSTRY MEETING NO 3 – DETAILED FUNCTIONAL DESIGN OF MULTIPLE CONRAC CONCEPTS – PLANS/SECTIONS/SITE DEVELOPMENT REFINEMENT
15-Oct	LAWA REVIEW
21-Oct	RAC INDUSTRY MEETING NO 4 – REFINEMENT AND EVALAUTION OF CONRAC CONCEPTS – SELECT SINGLE CONCEPT FOR FINAL DEVELOPMENT
12-Nov	LAWA REVIEW
18-Nov	RAC INDUSTRY MEETING NO 5 - SINGLE CONRAC CONCEPT
2015	
6-Jan	LAWA REVIEW
13-Jan	RAC INDUSTRY MEETING NO 6 - SINGLE CONRAC CONCEPT REFINED
17-Feb	FINAL DELIVERABLE

Industry Meeting Agenda

LAX CONRAC – RAC Industry Meeting No. 3

September 4, 2014 10:00 – 12:00pm PDT.
Location: LA NEXT Conference Room, LAWA Administration Building

Attending:
LAWA - Steve Martin, Cynthia Guidry, Diego Alvarez, Rachelle Yuvienco, Marcia Katrich, Lisa Trifiletti, Fatima Hashim, Pat Tomcheck, Debbie Bowers, Ulises Aguirre
Advantage – Richard Christensen, Jonathan Carrillo
Avis – Lorraine Tallarico, Andrew Jaksich, Bob Bouta, Mike Luedtke
Budget-Jim Reed
Enterprise-Peter Van Valkenburg, Scott Goldstein, Bill Bettison, Jennifer Koontz
Fox Rent A Car-Arnold Goehring
Hertz-Connie Gurich
MapLAX – Greg Wellman
TranSystems – Jeff Jarvis, Chuck Rowe, Doug Steen, Norman Lin, Justin Neel
Jacobs Daniels Associates-Darryl Daniels

The purpose of the meeting was to update the Rental Car Industry (RACs) on the rental car facilities program; update of the inventory of the existing RAC sites; analysis of bus and APM trip times from the Manchester Square site; analysis of the bus trip times from the existing RAC; review and evaluation of the ConRAC/Site development concepts; and review of an alternative APM route proposed by Hertz. A copy of the presentation and associated handouts accompany these minutes.

Jeff Jarvis led the review. The items discussed and the feedback/refinements suggested by LAWA and the rental car representatives are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis stated the goal of the meeting is to identify the principles incorporated into the ConRAC concepts consistent with the car rental companies' expectations. The focus of the planning team's efforts is the ConRAC functional analysis and program only– design will be addressed in subsequent phases. The planning team work is intended to address issues of pedestrian and vehicle circulation, location, access, massing, spatial relationships/adjacencies at a high level.
2. The proposed APM, will provide the connection between the CTA, the proposed Intermodal Transit Facility (ITF) and the ConRAC. An update of the progress of the proposed APM work will be presented to the Board of Airport Commissioners on September 18th. The presentation will be available live or viewed from the LAWA website at www.lawa.org.
3. An update of the ConRAC program will be presented to the Board of Commissioners November 6th.
4. Lisa Trifiletti (LAWA) is working on the Environmental Impact Report (EIR). Work will begin the first part of 2015 and will take approximately 2 years to complete.
5. Hertz indicated they cannot support the proposed ConRAC without understanding LAWA's plans in regard to their existing properties.

6. Mr. Jarvis explained that the focus of the meeting is the programming and planning for the ConRAC . The planning team's final deliverable is currently due in February of 2015
7. Enterprise stated that it is necessary for LAWA to work on a business plan for the ConRAC while planning and programming is taking place. Peter Van Valkenburg stated that the RACs need to understand how the project will be funded, including the use of CFCs. He indicated a long-term commitment, (i.e. 30 year lease) d be required to make a feasible business deal. The concession term can be shorter.
8. The February 2015 deliverable will include estimates of costs
9. Diego Alvarez indicated there has been significant movement on a number of fronts, including Metro Crenshaw light-rail line development, continuing property acquisition in Manchester Square, and other LAWA improvements. LAWA does not own all the land required for the construction of the ConRAC, but they are in discussion with LA Unified School District in regard to the charter school in Manchester Square. The ConRAC and other landside development projects are important to relieve congestion in the CTA. The best estimate of start of ConRAC construction is early 2020 with a phased development.
10. Mr. Jarvis distributed the updated ConRAC program. This reflects additional data received from several companies. The program is similar to the version presented on June 26th, with a small increase in overall area. The facility program is based on transaction data and addresses current individual family and brand model, with flexibility built into concepts, allowing for 42% growth (from 67 MAP to 95 MAP) over time. 95% of RAC operations will be accommodated on the site. The "Program and Planning Criteria" does not include elements such as tow backs, region offices, etc. All the ConRAC concepts presented today meet these program requirements.
11. The RAC representatives can contact Jeff Jarvis to review any of the program details (ph: (602)-576-1733 email: jqjarvis@transystems.com)
12. Mr. Jarvis reviewed the future traffic flows to and from Manchester Square. The Project will improve operational efficiencies and provide traffic relief for LAX passengers. There will be multiple access points to the site, from the I-405 for passengers coming from the north and south, as well as use of arterials coming from many other directions, as seen in the traffic area map.
13. The proposed connections to the ITF and the ConRAC via 98th and 96th Street has changed since the last meeting on June 26th. The planning team is anticipating that 98th St. will be the primary east/west corridor serving the ConRAC and extending to the ITF.
14. Mr. Jarvis presented the analysis of the APM trip time indicating a range of 12 to 14 minutes from Manchester Square to the CTA.
15. Mr. Jarvis presented the estimate of bus trip times from the ConRAC in Manchester Square indicating times ranging from 16 minutes for Terminal 1 to 31 minutes for Terminal 8. The analysis is based on the assumption that there would be 3 separate routes for the consolidated ConRAC buses which will each serve only 2 or 3 terminals each. The buses analysis assumes upper level pick up and drop off.
16. Chuck Rowe reviewed an analysis of projected bus trip times from the existing RAC sites to the CTA that had been requested at the June 26th meeting. The analysis is based on 2025 activity. The analysis used two assumptions for bus routes: 1) buses would stop at each terminal as they do today; 2) buses would run on 3 separate routes to serve 2 or 3 terminals on each route, similar to the study of bus trips from a ConRAC located at Manchester Square. The analysis of the two

scenarios shows the anticipated bus trip times from the existing sites range from 41.4% for scenario 1 to 42.3 % for scenario 2 longer than the projected bus trip times from a ConRAC located at Manchester Square.

17. Diego Alvarez pointed out the bus analysis from the existing sites should consider an added delay for those companies whose sites are located east of Aviation Boulevard, which will be created due to the future at-grade Metro rail crossing on Arbor Vitae Street. Diego Alvarez is concerned the analysis presents bus trip times which may be shorter than what they will actually be.
18. The analysis clearly indicates the APM will be a significant improvement over the majority of the existing car rental company bus trip times to the CTA. The APM will provide a consistent level of service for all users.
19. Mr. Jarvis distributed copies of the proposed evaluation matrix (copy attached). This evaluation matrix will be used at the next meeting to narrow down the concepts. Prior to that meeting, TranSystems would like each company to become familiar with criteria identified and consider how that criterion is applied to the various components of each scheme. After TranSystems presents the 3 refined schemes in the next rental car industry meeting on October 21st, we will ask the rental car representatives to use the matrix to help them select their preferred alternative.
20. Mr. Jarvis reviewed the three ConRAC concepts. He explained that the ConRAC concepts have been grouped by the number of ready/return levels in each scheme – there are 2 (A1 through A4), 3 (B1) and 4 (C1 and C2) level schemes. The planning team has provided for the RAC preference for all operations for a brand family be accommodated on one level. The secure area for QTA could include separate lanes for security between ready/return and QTA in each of final schemes, as needed.
21. Concept A1 has conflicts with vehicle traffic and customer pedestrian access to ready/return from the CSB on Level 1. The vertical circulation would be similar to the elevator bank in the San Jose rental car center.
22. Concept A2 – shows the APM platform connection to the CSB on the north side and the interim bus drop off on the opposite side of the CSB – this is similar to the MIA facility.
23. The 8,000 parking space facility shown on all the concepts is a planning number only (increased from 4,200 in the original project scope). LAWA explained this facility may replace parking that will be lost in the CTA (P2 and P5), due to the construction of the APM, plus they would like to alleviate traffic from the CTA and provide more direct/timely access to the major roadway system, rather than through local roads. LAWA's intent is to intercept parkers close to the I-405 freeway.
24. The RACs indicated they had questions with regard to LAWA's plans for the financing of the parking. LAWA indicated that public parking would not be funded by CFCs.
25. Public parking circulation is completely separate in each scheme, keeping car rental and parking customers apart.
26. Mr. Jarvis suggested the extra space for bus drop level (L3) , in Concept A2, would be used for other functions, like employee parking
27. Connie Gurich (Hertz) suggested the long walking distances for parking could be dealt with by the use of moving walkways similar to the new intermodal center at BUR. She suggested this would allow more public parking to be located further south on the site.
28. In concept A2, the RACs indicated the QTA should be shifted to the center of the storage areas

29. Concept A3 is similar to the ConRAC in Atlanta. It includes a separate public parking facility. This scheme separates customer traffic from service traffic. The CSB and APM platform are on one level with no elevation change.
30. All the concepts have attempted to minimize RAC customer walking distance from the vertical cores to the ready/return areas to less than 350 feet. The table on page 22 of the slide presentation, ("ConRAC Concepts – Comparison Data") shows the % of RAC area within 350 feet walking distance for each concept. The yellow shaded numbers highlight the highest and lowest performers for the range of concepts.
31. Mr. Jarvis made the observation that the sheer size of the areas in the two level schemes will be a challenge to manage. The smaller footprint of the 3 and 4 level schemes bring all functions closer and would be easier to monitor and access.
32. Mr. Jarvis indicated traffic analysis will be performed for each scheme, with refinement of intersections, direction of traffic, and access to surrounding roadways for the refined concepts and the final preferred scheme.
33. Concept A4 is the concept that consolidates the ConRAC into the smallest footprint, allowing for with collateral development along the east edge. The existing charter school could possibly remain if the parking is deferred or shifted to the north side of the APM.
34. Concept B1 is a 3 level scheme with each level organized to allow for larger market share on L1 and the remainder on L2 and L3. The L2 and L3 floor plates could be expanded in the future.
35. Andrew Jaksich (Avis) pointed out that it would be a challenge to expand over the existing levels in the future due to code changes and operational impacts.
36. Concept C1 is a 4 Level scheme with ramps connecting the ready/return and idle storage decks to the QTA.
37. Exiting from the ConRAC to Arbor Vitae Street, based on recent traffic studies, will provide the best access to the 405 and 105. This is being addressed in ongoing engineering by the MapLAX team. The improvements being considered are similar to what's portrayed on the "ConRAC to ITF Vehicle Connections" slide (no. 7).
38. The benefit of the 4 Level scheme is that it uses less footprint, with shorter walking distances,
39. Andrew Jaksich (Avis) pointed out the 4 level escalator could be a challenge.
40. In C1, the allocation of 40% plus for Hertz would have to occur on two levels.
41. Andrew Jaksich (Avis) observed that C1 would be less efficient than the San Jose rental car center, since there are only 2 levels of fuel/wash.
42. The RACs pointed out the vehicle flow in C1 is awkward due to the relationship between the QTA and support, ready/return, with car jockeys required to make many turns..
43. Concept C2 has two decks with their own CSBs - or there could be no CSB in one. The smaller deck is sized to accommodate a 40% plus company on two levels. Hertz appeared to like this concept.
44. Mr. Jarvis explained that the planning team would like input from the RACs to help narrow the number of concepts. The RAC representatives evaluated the various schemes. They were given different colored dots to place on the physical models to indicate which concepts they preferred for further refinement.
45. Concepts A2, C1 and C2 did not receive much support. The other four concepts received varying levels of support. The RACs shared the reasons for their preferences.

46. EHI favored the 2 or 3 level concepts (A1, A3, A4 and B1)- due to the flexibility for allocation/reallocation. They did suggest the split QTA be consolidated, with the QTA oriented linearly to the ready/return and support blocks.
47. EHI indicated they want to understand, for all the concepts, how access to offsite locations is provided.
48. Avis preferred Concept A1. Avis reinforced the need for a linear relationship between the storage and QTA – they view these components as one and the same, functionally. They suggested there could be a slice through the QTA to connect the storage to the ready/return block. They are also concerned with how security is provided on multi-tenant floors.
49. Avis also liked A3 and B1. They suggested consideration be given to fill in the gap between the two decks for the 2 ready/return floor plates.. They observed the interim bus plaza could eventually become at grade storage. (Note: some of the bussing facility would be maintained for redundancy/backup).
50. Avis prefers escalators to connect all the ready/return levels to the CSB. They agreed anything over 3 levels should be provided with elevators for vertical transportation.
51. There is a RAC preference for providing access for shuttle traffic off of Arbor Vitae Street over La Cienega Boulevard (pending results from traffic studies.)
52. Pat Tomcheck (LAWA) indicated Arbor Vitae can be widened.
53. Advantage preferred Concepts B2 and C1. They liked the 4 level ready/return with the smaller floor-plate which provides shorter walk distance and better access to CSB
54. Fox liked B1 with smaller floor plate, and the flexibility to break the QTA into 6 areas which provides closer proximity for a smaller company to the ready/return.
55. There was a review of a alternative APM alignments, suggested by Hertz, with the intention that the RACs could stay in their existing sites rather than move to a new ConRAC.
56. The following shortcomings of the Hertz proposed APM alignment were discussed::
    - Avis is on LAWA property, other properties are leased by the RACs with no guarantees they can remain on the existing sites.
    - The links between the APM stations and the RAC sites would not provide balanced customer service. Rather than one central spacious station/lobby as is proposed for the ConRAC, there would be a series of space challenged stops and a perception of lower customer service at these end-of-the-line stations.
    - This plan does not resolve the traffic congestion relief that would be provided by the ConRAC connected to the CTA with an APM
    - Proposed alternate offers no connectivity with the Metro Crenshaw Line, nor with the planned ITF.
57. Connie Gurich (Hertz) pointed out the RAC sites at EWR, JFK and SFO have multiple stops. In Hertz's view, the train equalizes the customer experience since the customers only care about getting to their stop –regardless of the sequence in which it occurs. Hertz suggested the other companies who wished could lease space from the Airport at the ConRAC site with lock in for 30 years - similar to the way Hertz leased land from the PANYNJ and built their facilities at EWR and JFK on their own nickel.
58. EHI does not support Hertz's alternate APM plan. .

59. There was a suggestion that there are multiple sources of funding for projects incorporating transit –such as a TIFIA loan. Providence financed a transit station, linked to the ConRAC and terminal using TIFIA.. These sources of funding can impose operational/construction constraints.
60. The next Rental Car Industry meeting is scheduled for October 21st. Subsequent meetings are scheduled for Nov. 21st. and January 13, 2015. All meetings will be held at the LAWA Administration Building and will run from 10am to Noon (PDT).

Attachments: Presentation – Rental Car Industry Meeting September 4, 2014 for On-Airport Operators
Table A: LAX Design Concept Evaluation Matrix dated 9/4/14

Cc: Attendees

Joe Olivera	Advantage
Jeff Mirkin	Budget
Gina Trimarco	TranSystems
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers
Jill Liu	Fehr & Peers
Sherry Rudnak	BAE Urban Economics
Ron Golem	BAE Urban Economics

LAX CONRAC – Off-Airport Operators Meeting

September 4, 2014 2:00 – 3:30pm PDT.
Location: Conference Room 210, LAWA Administration Building

Attending:
LAWA - Diego Alvarez, Rachelle Yuvienco, Marcia Katrich, Fatima Hashim, Pat Tomcheck, Ulises Aguirre
FlightCars – Greg Johnson, Arthur Ray
Sixt – Clemes Schoenberger, Tim Vettas, Jerry Copelan
Midway-Gary Macdonald, Jorge Arevalo
Silvercar - Michael Kaa, Kay Stroman
Beverly Hills Rent-A-Car - David Sajasi
EZ Rental Car – Daria Briggs
LAX Transportation – Clifford Weber, Yasuko Kubo
TranSystems – Jeff Jarvis, Chuck Rowe, Doug Steen, Norman Lin, Justin Neel

The purpose of the meeting was to review with the Off-Airport rental car operators (RACs) the status of the programming and planning for the proposed ConRAC at Manchester Square. This is follow-up to the previous Go To Meeting held with both the on-airport and off-airport operators on June 26, 2014. A copy of the presentation, which was handed-out to the attendees, accompanies these minutes.

Jeff Jarvis led the review. The items discussed and the feedback/refinements suggested by LAWA and the rental car representatives are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. After Pat Tomcheck, the LAWA Landside Element Manager, introduced the LAWA team, Jeff Jarvis (TranSystems) explained the ConRAC is being programmed to accommodate off-airport operators. He stressed the goal of the project is to relieve congestion within the Central Terminal Area (CTA) and make wayfinding easier for customers. This should result in easy access to the freeways and increased profitability for car rental companies who are operating in sites spread out in different locations throughout the airport with individual shuttle services to and from the CTA.
2. In parallel with the programming and planning of the ConRAC, LAWA has a team looking at development of an Intermodal Transit Facility (ITF) to provide an easy link to the CTA for remote public parking and off-airport shuttles (hotels, off-airport parking, etc.). The ITF will also have a Kiss N' Fly component and a cell phone lot. An APM will connect the ConRAC and the ITF to the CTA with the intent of reducing airport related traffic off area roadways. The trip from the ConRAC to the CTA, on the APM, is envisioned to take 15 minutes or less, with 3 minute

headways between trains. LAWA anticipates this plan could reduce future congestion on the CTA roadways and curb by 17%.

3. Diego Alvarez noted there is a Board of Airport Commissioners meeting scheduled for September 18 to update the progress of the landside development planning with a focus on the APM alignment in the CTA. There is a video of the previous Board meeting on May 5th available on line at www.lawa.org.
4. The ConRAC is programmed to accommodate 8000 vehicles for car rental, with 7000 idle vehicle storage in a separate support facility.
5. The goal of the current planning process is to narrow the range of ConRAC alternatives to one or two preferred concepts to be incorporated into an Environmental Impact Report envisioned to take 2 years to complete. The process will start in early 2015.
6. LAWA has additional properties to acquire and will work out a resolution/timetable for relocation of the LAUSD school,
7. Mr. Alvarez indicated construction of the ConRAC may possibly occur in the early 2020's. The timetable is influenced by the acquisition of the remaining properties needed to construct the ConRAC. Avis currently occupies land planned for the ITF. The necessary roadway improvements, collateral development, etc. are other considerations. Completion of the SPAS report and start of the Century/Aviation Metro station have created momentum to move forward with this project.
8. The ConRAC is anticipated to open with a consolidated bus shuttle service and the APM will come online afterwards.
9. Mr. Jarvis explained the size of the ConRAC program is based on transaction data, not based on survey of existing facilities. Data was collected from the on-airport operators for every hour of the year from all the on airport companies, with 42% growth incorporated from 67 MAP up to 95 MAP. The program recognizes the benefit of sharing of facilities among brand families of the larger companies, which reduces the overall building needs. The program has been developed using standard metrics recognized for the programming of these type of facilities across the country.
10. The RACs questioned the 5% factor added to the overall ConRAC program to accommodate the smaller companies. Mr. Jarvis indicated the planning team needed real data, rather than opinions, to address the RAC's concern regarding the adequacy of the program. He requested the RACs supply whatever data they believe is applicable. (Jeff Jarvis' contact information - ph: (602)-576-1733 email: jqjarvis@transystems.com).
11. The RACs pointed out the smaller companies may choose not to move to the ConRAC for various reasons.
12. Mr. Jarvis reviewed the three basic types of ConRAC concepts – those with 2 level, 3 level and 4 level ready/return decks. He explained that in the review with the on-airport operators the smaller companies liked the shorter walking distances provided by the 4 level scheme. The 2 QTA's in these schemes make the vehicle travel distances shorter.

13. LAWA pointed out that those companies which choose not to operate from the ConRAC will be required to send their shuttle buses either to the ConRAC, or ITF, for their customers to be transferred to the CTA – 2 bus trips will be required until the APM comes on line.
14. The planning team will be developing cost estimates for the ConRAC as part of the February 2015 project deliverable.
15. The RACs want to know how the smaller companies will fit into this plan.
16. Marcia Katrich (LAWA Commercial Development) indicated there will be a separate process to solicit and review interest from the small/independent operators. LAWA will be in touch with all the companies.
17. The next LAWA meeting with the on-airport operators is scheduled for October 21st.
18. Sixt requested that LAWA reconsider their decision to have separate meetings with the on-airport and off-airport RACs
19. The RACs asked that future meetings be scheduled for the morning.
20. The RACs requested LAWA provide the backup for the programming of the ConRAC, as well as any information related to the APM and other project programming. [The detail of the ConRAC program is attached].
21. Mr. Jarvis stated the program has plenty of flexibility to accommodate new entrants with 190 fuel nozzles in the QTA, 8000 rental car stalls, etc.
22. The RACs stated the facility needs to be effective for smaller operators.
23. TranSystems agreed to distribute PDFs of the handouts/presentation. [See attached]

Attachments: Presentation – Rental car Industry Meeting with Off-Airport Operators September 4, 2014
LAX ConRAC Program – Sizing Description Table, dated September 25, 2014

Cc: Attendees

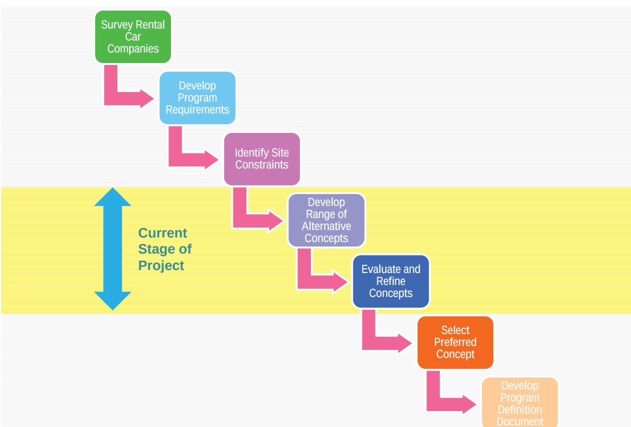
Gina Trimarco	TranSystems
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers
Jill Liu	Fehr & Peers
Sherry Rudnak	BAE Urban Economics
Ron Golem	BAE Urban Economics

Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING SEPTEMBER 4, 2014
FOR ON-AIRPORT OPERATORS

1. Update to Rental Car Program
2. Items Design Team Agreed to Incorporate from June 26th Meeting with Rental Car Industry
   - Input on Program Metrics for Fueling, Wash and Maintenance Bays
   - Update of Inventory of Existing Sites
   - Bus and APM Trip Comparison
3. Review of ConRAC/Site Development Concepts
4. Evaluation/Ranking of RAC/Site Development Concepts
5. Review of Hertz Proposed APM Alternatives
6. Next Steps

AGENDA – Sept. 4th LAWA Review



Study Process

	Design Basis				SF	Acre
READY/RETURN						
Size in Equivalent Ready Spaces	**7,620**	stalls			**2,400,300**	**55.1**
QTA						
fuel positions	**190**	360	sq. ft./position		68,400	1.6
wash bays	**48**	1,650	sq. ft./bay		79,200	1.8
maintenance bays	**60**	720	sq. ft./bay		43,200	1.0
add 40% office/circulation/support					76,320	1.8
stacking/queuing stalls for vehicl	**660**	300	sq. ft./stall		198,000	4.5
5% Contingency for small operators					23,260	0.5
QTA Area					**488,380**	**11.2**
Ready Return + QTA Equivalent Spaces	**8,280**	stalls				
CSB	positions					
Leisure Counter Transactions	**208**	300	sq. ft./counter		62,370	1.4
Premium Counter Transactions	**31**	300	sq. ft./counter		9,220	0.2
Add 70% Circulation/Support					50,110	1.2
5% Contingency for small operators					6,090	0.1
CSB w/Contingency					**127,790**	**2.9**
Support Facilities						
Idle Storage Required	**11,000**	191	sq. ft./stall		2,101,000	48.2
Employee Parking	**1,700**	325	sq. ft./stall		552,500	12.7
5% Contingency for small operators					132,680	3.0
Total Support Facilities with Continency					**2,786,180**	**64.0**
QTA Support and Additional Site Functions						
Visitor parking	**100**	325	sq. ft./stall		32,500	0.7
Fuel Farm and Drop					8,800	0.2
Loading Dock/Service Yard					88,000	2.0
Car Carriers Load and Unload	**15**	720	sq. ft./carrier		10,800	0.2
QTA Support and Additional Site Functions					**140,100**	**3.2**
TOTAL CONRAC PROJECT					**5,942,750**	**136.4**
PUBLIC PARKING						
TOTAL PUBLIC PARKING	**8,000**	325	sq. ft./stall		**2,600,000**	**59.7**
RAC Shuttle Bus Bays		**10**	**bays**			
Kiss N' Fly Parking Spaces		**30**	**spaces**			

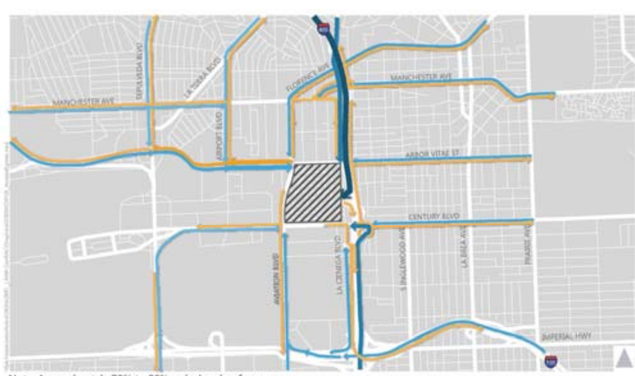
Additional Site Requirements
- Landscaping
- Retention
- Roadways
- Setbacks

Not Included in the Program
- Regional Offices
- Tow Backs
- Heavy Maintenance
- Accident Storage
- Massive Recalls

Manchester Square area available is approximately 127 acres.

Program and Planning Criteria

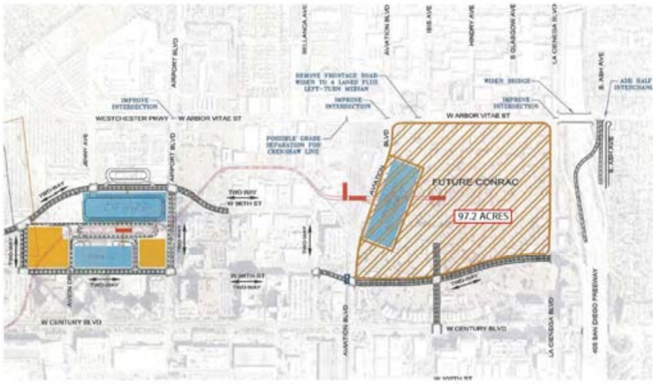
Inventory of Existing Sites



Note: Approximately 70% to 80% arrivals using freeways

CONRAC Site | Site Access | Site Egress
High
Medium
Low

Future Traffic Flows



ConRAC to ITF Vehicle Connections

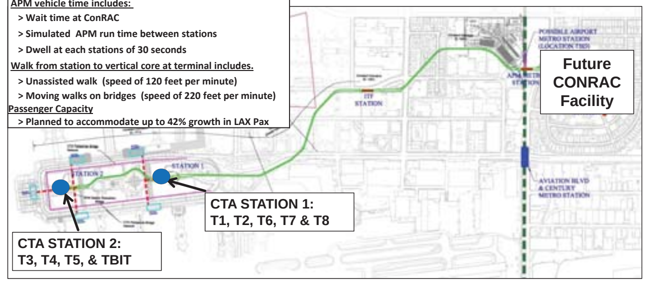
APM One-way Trip Time from ConRAC to LAX CTA In Minutes			
Terminal	Vehicle Time	Station to Terminal	Total Trip Time
1/2	8	4	12
2/3	10	3	14
TBIT	10	3	14
4/5	10	4	14
6/7/8	8	4	12

APM vehicle time includes:
- > Wait time at ConRAC
- > Simulated APM run time between stations
- > Dwell at each stations of 30 seconds

Walk from station to vertical core at terminal includes.
- > Unassisted walk (speed of 120 feet per minute)
- > Moving walks on bridges (speed of 220 feet per minute)

Passenger Capacity
- > Planned to accommodate up to 42% growth in LAX Pax

Estimated Range: 12 to 14 Minutes

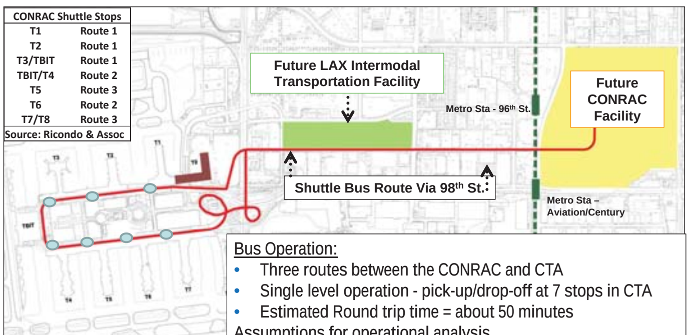


Note: Times based on APM Spine Alignment currently being refined and subject to change

Potential APM Trip Time – ConRAC to CTA

CONRAC Shuttle Stops	
T1	Route 1
T2	Route 1
T3/TBIT	Route 1
TBIT/T4	Route 2
T5	Route 3
T6	Route 2
T7/T8	Route 3

Source: Ricondo & Assoc

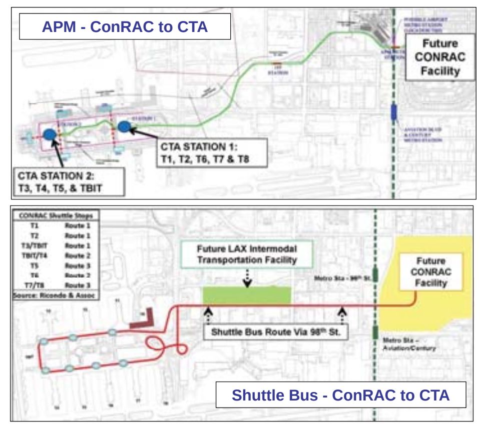


Bus Operation:
- Three routes between the CONRAC and CTA
- Single level operation - pick-up/drop-off at 7 stops in CTA
- Estimated Round trip time = about 50 minutes

Assumptions for operational analysis
- Roadway conditions - mid-Friday afternoon in 2025
- Average bus speed on route - 20 MPH
- Average pax load – 20 pax inbound/outbound each round trip
- Boarding/deboarding time per pax = 15 seconds

Consolidated Shuttle – ConRAC to CTA

One Way Trip Time ConRAC to Terminal Bus v. APM in Minutes		
Terminal	Bus	APM
T1	16	12
T2	23	12
T3	25	14
TBIT	19	14
T4	21	14
T5	22	14
T6	28	12
T7	29	12
T8	31	12
Forecast year - 2025		



Bus vs. APM Estimated Trip Time to CTA

Bus Routes to CTA from Existing Sites

Table A. Bus Trip Times from Existing RAC Sites - 2025 - Shuttles Stop at All Terminals

Company	Total Time to Terminal Lobby (Minutes)								
	From Site to T1								
	T1	T2	T3	TBIT	T4	T5	T6	T7	T8
Advantage	16.85	18.77	21.78	21.78	26.04	29.83	32.99	36.81	38.81
Avis	9.08	11.00	13.01	13.01	16.87	20.66	23.82	27.64	29.64
Budget	11.24	13.16	16.17	16.17	19.03	22.82	25.98	29.80	31.80
Dollar	13.66	15.58	18.59	18.59	21.45	25.24	28.40	32.22	34.22
Enterprise	13.15	15.07	18.08	18.08	20.94	24.73	27.89	31.71	33.71
Fox / Thrifty	16.66	18.58	21.59	21.59	24.45	28.24	31.40	35.22	37.22
Hertz	11.54	13.46	16.47	16.47	19.33	23.12	26.28	30.10	32.10
National / Alamo	14.69	16.61	19.46	19.46	22.48	26.27	29.43	33.25	35.25

41.4 % by Market Share Exceeds Trip Time from Manchester Square

Table C. Bus and APM Trip Times from ConRAC at Manchester Square - 2025

Total Time to Terminal Lobby (Minutes)									
Terminal	T1	T2	T3	TBIT	T4	T6	T5	T7	T8
Bus	16	23	25	19	21	28	22	29	31
APM	12	12	14	14	14	12	14	12	12

Notes:
1. All bus trips are to departures level curb
2. All bus trip times assume mid-Friday afternoon peak
3. Average bus speed on route is 20mph
4. Average time for debording/boarding is 1.3 minutes per stop for T1 and T2 and 2.7 minutes per stop for the other terminals to reflect the majority of passenger demand is associated with those terminals - therefore the bus dwell times will be longer

Estimated Bus Trip Time to CTA from Existing Sites

Table B. Bus Trip Times from Existing RAC Sites - 2025 - Using 3 Separate Shuttle Routes

Total Time to Terminal Lobby (Minutes)									
Company	Route No (See Table D for stops on each route)								
	1			2			3		
	T1	T2	T3	TBIT	T4	T6	T5	T7	T8
Advantage	19.55	26.55	28.55	22.55	24.55	31.55	25.55	32.55	34.55
Avis	11.78	18.78	20.78	14.78	16.78	23.78	17.78	24.78	26.78
Budget	13.94	20.94	22.94	16.94	18.94	25.94	19.94	26.94	28.94
Dollar	16.36	23.36	25.36	19.36	21.36	28.36	22.36	29.36	31.36
Enterprise	15.85	22.85	24.85	18.85	20.85	27.85	21.85	28.85	30.85
Fox / Thrifty	19.76	26.76	28.76	22.76	24.76	31.76	25.76	32.76	34.76
Hertz	14.24	21.24	23.24	17.24	19.24	26.24	20.24	27.24	29.24
National / Alamo	17.39	24.39	26.39	20.39	22.39	29.39	23.39	30.39	32.39

42.3 % by Market Share Exceeds Trip Time from Manchester Square

Table C. Bus and APM Trip Times from ConRAC at Manchester Square - 2025

Total Time to Terminal Lobby (Minutes)									
Terminal	T1	T2	T3	TBIT	T4	T6	T5	T7	T8
Bus	16	23	25	19	21	28	22	29	31
APM	12	12	14	14	14	12	14	12	12

Table D. ConRAC Shuttle Stops

Bus Routes		
1	2	3
Serves Terminal	Serves Terminal	Serves Terminal
1	TBIT/4	5
2	6	7/8
3		

Notes:

1 All bus trips are to departures level curb

2 All bus trip times assume mid-Friday afternoon peak

3 Average bus speed on route is 20mph

4 Average time for debording/boarding is 4 minutes per stop for T1, T2 and T3 and 6 minutes per stop for the other terminals on the south side of the CTA to reflect the majority of passenger demand is associated with those terminals - therefore the bus dwell times will be longer

Estimated Bus Trip Time to CTA from Existing Sites

Items We Agreed to Incorporate From June 26th Meeting

2 – Level Ready/Return

3 – Level Ready/Return

4 – Level Ready/Return

1. Maximize Use of Available Site Area
2. Split Garage and QTA – Similar to Atlanta ConRAC
3. Option to Locate Customer Service Counters at Each Ready/Return Level

ConRAC Concepts

Pro:
- CSB and Shuttle curb at grade
- One APM station
- Shortest APM connection
- Economical construction – no building more than 4 levels
- QTA & Support directly adjacent to ready/return
- Flexibility for service and employee access from either Arbor Vitae or La Cienega
- May be least expensive ultimate development option

Con:
- Level change from CSB to APM
- School prevents full build-out
- 47% of walking distances to ready/return beyond 350ft.
- Long shuttle bus route, clockwise around site, back to 98th St.
- Long travel distance from east side of support area to the west side of the ready/return area
- Requires 56% of the site development area

ConRAC Concepts

Pro:
- Shuttle drop-off at same level as CSB
- Shuttle ramp rises only 2 levels to CSB
- Shuttle bus returns directly to 98th St.
- Parking is linked to both APM stations
- QTA & Support directly adjacent to ready/return
- Side loaded APM Station
- Shortest distance from garage to storage

Con:
- APM slopes down to CSB from the Metro Station
- Limited queuing for vehicles exiting ready/return area onto La Cienega
- Long travel distance from north side of support and QTA to south side of QTA
- Requires 57% of the site development area

ConRAC Concepts

Pro:
- Similar to Atlanta ConRAC
- Shuttle curb at ground level
- No level change from CSB to APM
- Parking is in separate structure
- Convenient service access from Arbor Vitae and La Cienega
- QTA levels directly adjacent to ready/return levels
- Short vehicle travel distance between support areas and QTA and ready/return areas
- Requires only 38% of site area for ConRAC and Parking

Con:
- CSB 4 levels above grade
- Vertical circulation required between shuttle curb and CSB
- Both RAC levels are above grade
- Ramping required between ready/return levels to support levels

ConRAC Concepts

Pro:
- No level change from CSB to APM
- Shuttle bus returns directly to 98th St.
- Parking is in separate structure
- Parking linked to both APM stations
- Convenient service access from Arbor Vitae
- QTA levels directly adjacent to ready/return levels
- Requires only 36% of site area for development of the ConRAC and parking

Con:
- Shuttle curb at Level 3 – one level below CSB
- Ramping required between ready/return levels to support levels

ConRAC Concepts

Pro:
- No APM elevation change between Metro Station and CSB
- Shuttle drop-off at same level as CSB
- Shuttle bus returns directly to 98th St.
- Parking is in separate structure
- Phased parking development allows for school to stay in place
- Accommodates current RAC market share
- QTA & Support directly adjacent to garage
- Shortest distance from east side of support area to west side of ready/return
- Flexibility for service and employee access from either Arbor Vitae or La Cienega

Con:
- Shuttle ramp slopes up 3 levels to CSB
- Short decision distance between roundabout and RAC entry
- Short queuing space between the exit helix and Arbor Vitae

ConRAC Concepts

Pro:
- Shuttle curb at ground level
- APM has a north side loading platform into CSB
- No level change from CSB to APM
- Shortest walking distances from CSB to ready/return areas
- Parking is in separate structure
- Convenient service access from La Cienega

Con:
- CSB 4 levels above grade
- Vertical circulation required between shuttle curb and CSB
- APM slopes up to CSB from Metro Station
- 4 level ready/return
- Long travel distance for vehicles from west side of ready/return area to east side of support area and QTA
- Ramping required between 4 ready/return levels to 2 level QTA
- 5 level structure including CSB and APM

ConRAC Concepts

Pro:
- Shuttle curb at ground level
- No level change from CSB to APM
- Parking is in separate structure
- Parking is linked to both APM stations
- Convenient service access from Arbor Vitae or La Cienega
- QTA levels directly adjacent to ready/return levels
- Requires the least amount of site area for development – only 35%
- Shortest vehicle travel distances among all components

Con:
- CSB 4 levels above grade
- Vertical circulation required between shuttle curb and CSB
- APM slopes up to CSB from Metro Station
- 5 level structure– including CSB and APM station
- Ramping required between ready/return levels to support levels

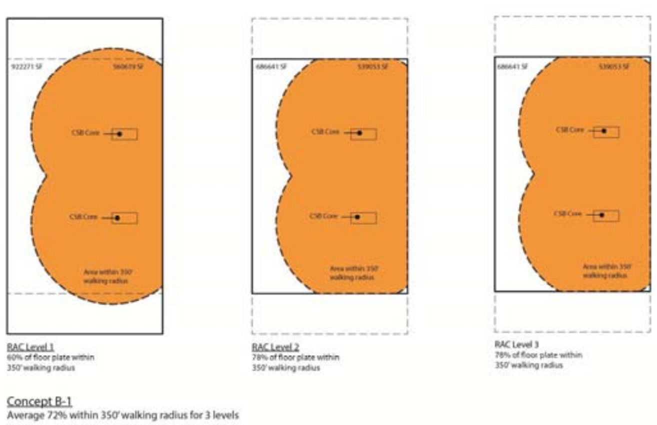
ConRAC Concepts

Concept	Concept Footprint (acres)				% of RAC Area within 350' Walking Distance	% of Parking Area within 600' Walking Distance
	ConRAC Footprint	Parking Footprint	Total Footprint	% of Site Occupied		
A1	75.2	0*	75.2	56%	47%	86%
A2	69.2	7.6**	76.8	57%	54%	86%
A3	35.7	14.6	50.3	38%	70%	88%
A4	38.8	9.2	48	36%	86%	100%
B1	51.4	15.9	67.3	50%	72%	95%
C1	42.2	19.4	61.6	46%	91%	80%
C2	35.5	11.2	46.7	35%	86%	99%

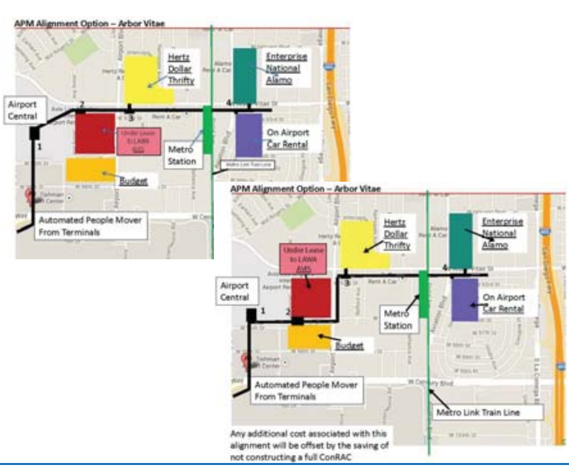
*Parking included in ConRAC footprint
** Option A2 parking footprint does not included portion located on second level of ConRAC

Concept	Operational Efficiency						Building Levels				
	RAC-QTA		Support-QTA		RAC-Support						
	Distance	Floor	Distance	Floor	Distance	Floor	RAC	Support	QTA	CSB	PPG
A1	2000'-3750'	Same	2000'-4235'	Same	200'-2650'	Same	2	2	2	1	2
A2	2175'-5200'	Same	2175'-5200'	Same	200'-1680'	Same	2	2	2	1	4
A3	1450'-2450	Same	2650'-3650'	Different	450'-2255	Different	2	2	2	1	4
A4	2300'-4600'	Same	2300'-4600'	Same	300'-4000'	Different	2	2	2	1	6
B1	1400'-3000'	Same	1400'-3600'	Same	225'-1550'	Same	3	3	3	1	4
C1	2170'-4565'	Different	2170'-4920'	Different	200'-3190'	Same	4	4	2	1	5
C2	2000'-4100'	Same	2000'-4100'	Different	450'-2255'	Different	2	2	2	1	5

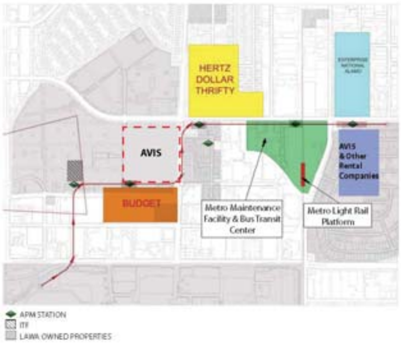
ConRAC Concepts – Comparison Data



Walking Distance



Hertz Alternative APM Alignment



1. 5 stations required – instead of 2 to 3 – in close proximity reduces capacity and increases trip time.
2. Unequal level of connectivity for customers due to wide range of walking/shuttle distances to APM stations vs. centrally located CSB in ConRAC.
3. Alignment along Arbor Vitae is 700ft. from south end of the proposed Metro light-rail platform – long walk for transit passengers to APM station at 96th St.
4. Avis lease reverts to LAWA
5. LAWA will need to acquire additional land for r.o.w. from ConRAC to ITF and from ITF to CTA.
6. APM alignment crosses over Metro maintenance facility – will require easement or license agreement.
7. Shifts ITF west of Jenny Ave – under the RPZ – not allowed by FAA.
8. Complicates roadway access and ability to connect the ITF to the planned parking facilities.

Hertz Alternative APM Alignment

DATE	MEETING CONTENT
21-Oct	RAC INDUSTRY MEETING NO 4 – REFINEMENT AND EVALUATION OF CONRAC CONCEPTS – SELECT SINGLE CONCEPT FOR FINAL DEVELOPMENT
18-Nov	RAC INDUSTRY MEETING NO 5 - SINGLE CONCEPT
13-Jan	RAC INDUSTRY MEETING NO 6 – REFINEMENT OF SINGLE CONCEPT
17-Feb	FINAL DELIVERABLE - PROGRAM DEFINITION DOCUMENT

Next Steps

TABLE A: **LAX DESIGN CONCEPT EVALUATION MATRIX** 9/4/14

	A1		A3	A4	B1	LEVEL OF IMPORTANCE - RAC	
CUSTOMER SERVICE							
ELEVATION CHANGE FOR APM OPERATION (COMFORT OF RIDE FOR PASSENGERS)						**M**	0.50
VERTICAL TRANSITIONS FOR BUS OPERATION (TO/FROM CSB)						**L**	0.25
WALKING DISTANCE BETWEEN APM AND CSB						**H**	1.00
WALKING DISTANCE WITHIN CSB TO CORES						**H**	1.00
WALKING DISTANCE WITHIN GARAGE TO VEHICLES(350FT MAX.)						**H**	1.00
EASE OF WAYFINDING LEAVING GARAGE						**M**	0.50
EASE OF WAYFINDING RETURNING TO THE GARAGE (VISIBILITY FROM ADJACENT ROADWAYS)						**H**	1.00
"WHOOPS" RECIRCULATION (CUSTOMER MISSES ENTRANCE OR CORRECT LEVEL FOR RETURN)						**H**	1.00
DIRECT ACCESS TO CORES FOR BUSINESS TRAVELERS - COUNTER BY-PASS						**H**	1.00
APM TRIP DURATION (NUMBER OF STOPS FROM CONRAC)						**H**	1.00
BUS TRIP CIRCULATION						**H**	1.00
EASE OF CUSTOMER WAYFINDING WITHIN THE FACILITY						**H**	1.00
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
OPERATIONAL EFFICIENCY							
ALL BRAND FAMILY OPERATIONS ON ONE FLOOR						**H**	1.00
SIMPLE CONNECTIONS BETWEEN CONRAC FUNCTIONS						**H**	1.00
AVOIDANCE OF PEDESTRIAN /VEHICLE CONFLICT POINTS						**H**	1.00
AVOIDANCE OF CUSTOMER VEHICLE/SHUTTLE VEHICLE CONFLICT POINTS						**H**	1.00
DISTANCE FOR CAR JOCKEY MOVEMENTS (I.E. SUPPORT TO READY/RETURN)						**M**	0.50
SECURE PERIMETER FOR ALL OPERATIONS						**H**	1.00
EFFICIENT ACCESS TO OFFSITE SERVICES						**H**	1.00
EFFICIENT ACCESS FOR SERVICE VEHICLES (DELIVERIES/WASTE,ETC.)						**M**	0.50
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
EFFICIENT USE OF MONEY							
COST OF BUS OPERATION FOR PHASE 1 (BUS PLAZA AT GRADE OR ELEVATED)						**H**	1.00
ADDITIONAL COST OF APM (STATION/GUIDEWAY ALIGNMENT/ASSOCIATED VERT. CIRCULATION)						**H**	1.00
COST OF QTA (NUMBER OF LEVELS/RAMPS & LAND ACQUISITION REQUIRED)						**H**	1.00
COST OF GARAGE (NUMBER OF LEVELS/RAMPS & LAND ACQUISITION REQUIRED)						**H**	1.00
COST OF IDLE STORAGE (NUMBER OF LEVELS/RAMPS & LAND ACQUISITION REQUIRED)						**H**	1.00
CONRAC O & M COST						**H**	1.00
COST OF ROADWAYS (ALIGNMENT/RAMPS/ELEVATION CHANGES)						**H**	1.00
AMOUNT OF GROUND RENT (SITE AREA REQUIRED FOR CONRAC)						**H**	1.00
REVENUE FROM COLLATERAL DEVELOPMENT (AREA/SHAPE OF BLOCKS/LINK TO METRO)						**L**	0.10
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
FLEXIBILITY							
FUTURE EXPANSION						**H**	1.00
FUTURE REALLOCATION OF CONRAC READY/RETURN BY COMPANY						**H**	1.00
ACCOMMODATE CURRENT MARKET SHARE PERCENTAGE						**H**	1.00
ACCOMMODATE CHANGES IN SERVICE MODEL						**H**	1.00
MAINTAIN SUSTAINABILITY DUE TO CHANGES IN THE INDUSTRY						**H**	1.00
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
MARKET ACCESS							
VISIBIILTY TO ALL CUSTOMER SERVICE COUNTERS FOR EACH COMPANY						**H**	1.00
CUSTOMER SERVICE EQUIVELANCY (IS THERE COMMON QUALITY OF CONVENIENCE?)						**M**	0.50
OPERATIONAL EQUIVELANCY (LEVEL OF INTERFACE AMONG FUCNTIONS)						**M**	0.50
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
TIME FOR IMPLEMENTATION							
ACCOMMODATE PHASED CONSTRUCTION						**H**	1.00
NOT DEPENDENT ON SCHOOL RELOCATION						**M**	0.50
NOT DEPENDENT ON CALTRANS						**M**	0.50
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
URBAN CONTEXT OF PROPOSED MANCHESTER SQUARE DEVELOPMENT							
IS THERE AN OPPORTUNITY FOR DEVELOPING A "GATEWAY IMAGE"?						**M**	0.50
BALANCE MASSING - HOW DOES CONRAC COMPARE TO ADJACENT DEVELOPMENT?						**L**	0.25
IS THERE OPPORTUNITY TO ACCESS APM FROM COLLATERAL DEVELOPMENT?						**L**	0.25
IS THERE AREA AVAILABLE FOR PUBLIC OR EMPLOYEE PARKING?						**H**	1.00
ACCESS TO APM FROM PARKING						**M**	0.25
Weighted Rank	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
OVERALL RANK	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***		

Not Ideal	1
Needs Refinement	2
Preferred	3

Level of Importance/Weighting Factors **H** **High** **M** **Medium**
L **Low** **VL** **Very Low**

LAX CONRAC – RAC Industry Meeting No. 4 – On-Airport Operators

October 21, 2014 10:00 – 12:00pm PDT.
Location: LA NEXT Conference Room, LAWA Administration Building

Attending:
LAWA - Cynthia Guidry, Diego Alvarez, Rachelle Yuvienco, Marcia Katnich, Fatima Hashim, Pat Tomcheck, Debbie Bowers, Ulises Aguirre
Advantage – Joe Olivera, Richard Christensen, Jonathan Carrillo,
Avis – Lorraine Tallarico (phone), Mike Luedtke, Jerry Marifke, Jeff Eisenbarth
Enterprise-Peter Van Valkenburg, Scott Goldstein, Bill Bettison
Fox Rent A Car-Arnold Goehring
Hertz-Connie Gurich
TranSystems (TSC) – Jeff Jarvis, Chuck Rowe, Doug Steen, Norman Lin, Gary Luczak

The purpose of the meeting was to update the Rental Car Industry (RACs) on the rental car facilities program; review the refinement of three ConRAC/Site development concepts; hypothetical allocation strategies and potential phasing ideas. A copy of the presentation accompanies these minutes.

Jeff Jarvis led the review. The items discussed and the feedback/refinements suggested by LAWA and the rental car representatives are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis explained the purpose for today is to review the ConRAC concepts and so the rental car companies can indicate to the airport which option they would prefer be pursued for project definition.
2. Cost estimates will be presented for each concept at the November meeting. The costs will include the extension of the APM from the APM station planned for the 96th St. Metro Station to the ConRAC. **Peter Van Valkenburg indicated the RAC industry will want LAWA to share the projected costs for the entire APM system. He also expects land acquisition and O & M costs to be included in the business planning for the ConRAC.**
3. Mr. Van Valkenburg pointed out that consideration of single level bussing operation, expected to be in place prior to APM, needs to be factored into finance plan and business case.
4. Pat Tomcheck responded that the single level bussing is independent from the ConRAC and ITF projects. He anticipates that single level busin wll be installed in some form in 2015, subsequent to completion of the CTA upper level roadway improvements.
5. Mr. Van Valkenburg shared his guestimate that vertical transportation required to accommodate the single-level bussing would be $100 M. He is concerned the current vertical circulation plan,to support single-level bussing, may not have included the car rental customer perspective. He also indicated the RAC industry will need to review walking distances for the single level bus operation.
6. Diego Alvarez stated the LAWA staff presented an APM plan to the Board of Commissioners in September. That plan is for the single spine alignment, within the center of the CTA, with three stations. With parking improvements, the net APM construction costs appears to be around $2 billion.
7. Jeff Jarvis indicated the program from the ConRAC had been refined to reflect that 10% of returned vehicles are assumed to be taken out-of-service. This reduces the number of fuel positions and

8. wash bays required in the QTA. The overall QTA program has increased slightly to reflect that secure access is to be provided between the Ready/Return and Idle storage Areas to the QTA.
9. Jeff Jarvis reviewed the three ConRAC concepts. All the concepts have been refined to incorporate RAC industry input from the Sept. 4th meeting. Smaller companies had concern for walk distances at the last meeting. To minimize customer walking distances, the CSB in all 3 schemes reflects a mini-mall configuration with a central circulation area and doubled-loaded customer service modules. This results in an increase to the CSB space program.
10. A comparison of each scheme, from the versions presented on Sept. 4th , is summarized below:

Concept A1

a. Employee parking now indicated as a separate component (in blue) from the idle storage support area (shown in green) on each concept.
b. QTA is now located in between the Ready/Return and Support, with continuous traffic flow.
c. The APM is at the same level as the CSB. The APM extends over the light rail tracks located on the west side of Aviation Blvd.
d. There will be an intermediate level mezzanine, set 25' above grade, to allow for vehicle and people transition below the APM station and to connect from the parking garage to the light-rail station.
e. TSC will review the potential to lower the CSB in this scheme, to minimize the vertical transition to the Ready/Return levels.
f. Public parking and rental car customers have separate access points. The parking costs will be separate from the rental car project costs.
g. Employee parking traffic is separated out.
h. CSB, with 200+ counters, is about 600' long
i. All RAC operations occur on 2 levels in this scheme, but the area is spreads out across a very large footprint
j. Much of Ready/Return area is outside of the accepted 350' walking distance.

Concept A3

k. Employee parking is now on the roof, saving space on the ground and providing cover over Support space on the north garage.
l. Separate circulation for parking and car rental customers
m. Buses do not make any level changes. The bus plaza is configured with a one way loop and no intersections, for continuous traffic flow.
n. Includes two separate APM stations. The RACs cited as an example the AirTrain at SFO. The next to last stop (before the ConRAC) is little used.
o. Bridges can be provided at Levels 2 and 3, between the Ready/Return areas , where needed, to provide flexibility in accommodating allocation requirements.
p. The scheme appears similar to MSP T1, except with QTA on all levels in A3, rather than below as it is at MSP.
q. Employee parking (located at level 5) is uncovered and could share helix with car rental traffic, with helix providing continuous flow. The RACs indicated they did not believe it was worth the extra cost to separate customer and employee traffic. They suggested

review of employee traffic peaks and valleys will likely not overlap with car rental industry traffic.

r. Could include solar panels, potentially, as a weather protection over the employee parking in the future.

Concept B1

s. Employee parking now on the top level of the Support garage (at Level 4).
t. Most of Ready/Return is covered and is within 350' walking radius
u. Each brand family is on a different level and secured between Ready/Return, QTA and storage areas
v. Level 1 is 42%, with others split, with EHI on 1 level and Avis Budget on the other level, along with small operators..
w. Maintains clean structure lines.
x. Reflects 2013 revenue market share calculations, without small operators
y. Less flexibility for reallocation – hypothetical allocation concepts will show proposed company allocation to each level. Can only accommodate market share adjustment preconstruction.

11. Due to the integration of various modes of ground transportation, the RAC industry has concerns regarding the allocation of cost of the APM, with other customers using it for transportation including Kiss N' Fly, parking, off airport car rental and hotel shuttles and others.
12. Mr. Jarvis reviewed the hypothetical allocation strategies for each concept.
    a. In Concept A3, small operators wouldn't necessarily have separate internal secure circulation; would require additional circulation area, taken from program
    b. Concept B1 allocation is easy, completed by brand families
    c. Could be many small operators, currently about 20 – 25 companies "off airport"
13. Small operators are accommodated within 5% of the project program.
14. If the small operators are not in the ConRAC, will have to bus their customers from their independent sites to the ConRAC to be transferred to the CTA.
15. Mr. Jarvis reviewed a range of ideas for phased development of the ConRAC. The intent is to show accommodation of at least 25% of the market in the initial phase.
16. Mr. Van Valkenburg was concerned about providing premature access to site. He is under the impression that most of the off airport operators are not collecting CFC. He also is concerned that LAWA would sue the CFC to relocate some companies.
17. Mr. Tomcheck stated that any relocations initiated by LAWA would not be a ConRAC project cost.
18. BOS or PHL and others have had to deal with similar phasing issues
19. Mr. Tomcheck pointed out that the APM, parking replacement, ITF and other overall development components will be phased in as required to make the overall landside program happen
20. In discussing the initial phase concept for Concept A1, Mr. Jarvis pointed out the companies using this facility would continue using their own busses, not common bussing or APM.
21. In the initial construction phase, the surrounding infrastructure (i.e. 98th St. corridor, Metro Station etc.) may or may not be in place.

22. To address Mr. Van Valkenburg's concern about whether the phasing discussion as without an understanding of how the various projects were to be funded, Mr. Jarvis explained that TranSystems had been asked by LAWA to look at ways to phase the construction.
23. In intent of the interim phases is that any component of the ConRAC would be constructed as the complete unit required for the ultimate development of the project – i.e. no "throw-away costs".
24. Currently there is no determination on phasing timing. This will be addressed in future meetings. Ideally, the entire project would be under continuous construction. ,
25. Mr. Jarvis acknowledged Mr. Van Valkenburg's questions regarding the allocation of the costs of the parking structure and the second APM station for the ConRAC shown in A3 and B1. He reminded the group that the parking structure will not be part of the ConRAC cost. He also pointed out the APM will only be a small portion of the ConRAC program costs.
26. Mr. Van Valkenburg (with concurrence from the other RACs) indicated they cannot make decisions based on concepts only without, at least, high level understanding of costs.
27. Mr. Jarvis asked the RACs to share their thoughts of the function, flow and customer experience, of each concept with the understanding the rough order of magnitude project costs, will be presented at the next meeting.
28. Advantage preferred Concept A3 subject to cost verification and right to change decision later.
29. Concept B1 would provide Hertz what it needs *operationally*. It keeps the brands together. Hertz can secure their area from the others. Hertz however declined to select a favorite scheme.
30. Fox preference, without management review, would be for Concept B1.
31. Avis does not like A1.
32. Avis likes Concept A3 with the idle storage on a different level, and secure access to QTA and idle storage. The vertical separation in Concept A3, the vehicle travel distances are shorter overall, for customers and employees. Concept A3 can adjust market share
33. EHI supports Concept A3, with caveat of costs and financing plan
34. In response to a question regarding the queuing capacity in the QTA, Chuck Rowe stated the ratio of staging to the number of fuel positions was approximately 3:1.
35. EHI asked that TSC look at expanding the A3 QTA width to accommodate more staging positions.
36. Because Concept A1 may likely be least the expensive concept, the RACs need to see the cost differential before finalizing their decisions.
37. A presentation to the Board of Airport Commissioners is scheduled for Dec. 4th (previously Nov. 6th). This will be a very broad brushed review of the project. It is the first opportunity to bring the Board up to date since the project started in March 2014.
38. LAWA may not be able to send the Board presentation in advance, however, the meeting will be taped and streaming live, as well; available on LAWA web site
39. November 18th is the next ConRAC industry meeting
40. The agenda for the November 18th meeting will include a discussion of the business plan for the ConRAC. Need starting point
41. January 13, 2015 will be RAC Meeting No. 6.

Attachments: Presentation – Rental Car Industry Meeting October 21, 2014

Cc: Attendees

Steve Martin	LAWA
Andrew Jaksich	Avis
Bob Bouta	Avis
Jeff Mirkin	Budget
Jim Reed	Budget
Justin Neel	TranSystems
Gina Trimarco	TranSystems
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers
Jill Liu	Fehr & Peers

TranSystems

ATTENDANCE ROSTER

Project	Con RAC Programming and Planning	Date:	October 21, 2014
	Los Angeles International Airport	Time:	10:00am
Re::	RAC Industry Meeting = On Airport Operators	Location:	Admin. Bldg. – LA NEXT Conference Room

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LAX CONRAC – RAC Industry Meeting with Independent Operators

October 21, 2014 1:30 – 2:30pm PDT.
Location: LA NEXT Conference Room, LAWA Administration Building

Attending:
LAWA - Diego Alvarez, Rachelle Yuvienco, Marcia Katnich, Fatima Hashim, Pat Tomcheck,
FlightCars – Arthur Ray
Sixt – Clemens Schoenberger, Tim Vetta, Jerry Copelan
Midway-Gary Macdonald, Jorge Arevalo
Beverly Hills Rent-A-Car - David Sajasi
EZ Rental Car – Daria Briggs (phone)
TranSystems (TSC) – Jeff Jarvis, Chuck Rowe, Doug Steen, Norman Lin,

The purpose of the meeting was to update the Rental Car Industry (RACs) on the rental car facilities program; review the refinement of three ConRAC/Site development concepts; hypothetical allocation strategies and potential phasing ideas. A copy of the presentation accompanies these minutes.

Jeff Jarvis led the review. The items discussed and the feedback/refinements suggested by LAWA and the rental car representatives are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis explained the purpose for today is to review the ConRAC concepts so the rental car companies could provide direction to LAWA in regard to which option they would prefer.
2. Jeff Jarvis indicated the program from the ConRAC had been refined to reflect that 10% of returned vehicles are assumed to be taken out-of-service. This reduces the number of fuel positions and wash bays required in the QTA. The overall QTA program has increased slightly to reflect that secure access is to be provided between the Ready/Return and Idle storage Areas to the QTA.
3. The CSB on all three concepts shows an area which will accommodate a mini-mall configuration with common lobby. There is area within the CSB to accommodate independent companies.
4. Mr. Jarvis reviewed the three ConRAC concepts. Some of the characteristics of each scheme are summarized below:

Concept A1

a. Employee parking is now indicated as a separate component (in blue) from the idle storage support area (in green) on each concept.
b. All operations on each floor with 50% on each of 2 levels.
c. Public parking above, with CSB on upper level, 4th floor.
d. Shared APM station with the transit station.
e. 2 level change from CSB to Ready/Return.
f. Escalators and elevators connecting between each floor through vertical cores connecting to the Level 4 CSB.
g. Metro plans on development of a bus transit center at the southwest corner of Arbor Vitae Street and Aviation Blvd. – this is common to all schemes.

h. Due to the size of the ready/return decks, smaller operators will be located outside of the 350' maximum walking distance zone.

Concept A3

i. 2 levels for Ready/Return in the center decks of the garage, with idle storage located on levels above and below.
j. Garage is separated into 2 pieces, north and south.
k. 350' arcs, for maximum walking distance, are more effective in this solution, with little area outside of the maximum walking distance zones.
l. Mini-mall CSB space spans cover the bus plaza to connect to both garages.

Concept B1

m. 3 floors, sized for each of major on-airport operators.
n. Employee parking also on upper level.
o. More of a challenge to reallocation, but limits flexibility for future use.

5. Mr. Jarvis reviewed the hypothetical allocation strategies for each concept.
6. Mr. Jarvis reviewed a range of ideas for phased development of the ConRAC. These phasing strategies show how one or more companies potentially could be accommodated within the initial development of the project prior to others.
7. The phasing approach would avoid duplicative costs. Whatever components were built in phase one, would be used for the ultimate development.
8. Ideally, there should be no lag time between construction of subsequent phases.
9. LAWA would like to have RAC industry share their preferences for which concept is appropriate for further development. Those preferences should reflect the Original 5 core values established for the planning of the project: 1): use of money; 2) flexibility; 3)equal access to customers; 4) customer service; and 5) operational efficiency.
10. Rough-order-magnitude of estimated costs will be presented at the November meeting.
11. The goal of the ConRAC program is for all operations to be accommodated on the site, except for heavy maintenance and regional operations.
12. Concept A3 was favored by all larger operators, except for Hertz
13. All three concepts will be shown to LAWA Board of Commissioners – meeting scheduled for December 4th.
14. The business agreement will determine how the project costs are allocated.
15. Next meeting scheduled for November 18th may combine independent and large operators

Attachments: Presentation – Rental Car Industry Meeting October 21, 2014.

Cc: Attendees

Steve Martin	LAWA
Cynthia Guidry	LAWA
Michael Kaa	Silvercar
Kay Stroman	Silvercar
Clifford Weber	LAX Transportation
Yasuko Kubo	LAX Transportation
Justin Neel	TranSystems
Gina Trimarco	TranSystems
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers
Jill Liu	Fehr & Peers

TranSystems

ATTENDANCE ROSTER

Project	Con RAC Programming and Planning	Date:	October 21, 2014
	Los Angeles International Airport	Time:	1:30am
Re::	RAC Industry Meeting = Off Airport Operators	Location:	Admin. Bldg. – LA NEXT Conference Room

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Jorge Arevalô	Midway	(310) 466-~~6010~~ 0910	jorgea@midwaycarrental.com	

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Rosa Kuo	Raw International	(213) 622-4993	rkuo@rawinternatiional.com	
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Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING OCTOBER 21, 2014

LAX
Los Angeles World Airports

TranSystems

1. Review of Updated Program
2. Refinement of 3 ConRAC Concepts
3. Comparison of 3 Concepts
4. Allocation Strategies
5. Phasing Plans
6. Look Ahead to November 18th RAC Industry Meeting

AGENDA – Oct. 21st Preview Meeting

(yellow) indicates area updated from previous program

	Design Basis			SF	Acre
Ready/Return Area	7,620	equivalent ready stalls		2,400,300	55.1
QTA					
fuel positions	170	360	sq. ft./position	61,200	1.4
wash bays	48	1,650	sq. ft./bay	79,200	1.8
maintenance bays	60	720	sq. ft./bay	43,200	1.0
stacking/queuing stalls for vehicl	590	300	sq. ft./stall	177,000	4.1
add 58% x operational areas for circulation/support/offices				209,000	4.8
5% Contingency for small operators				28,500	0.7
QTA Area				598,100	13.7
CSB					
Leisure Counters	208	300	sq. ft./counter	62,400	1.4
Premium Counters	31	300	sq. ft./counter	9,200	0.2
Add 1.55 x Counter Area for Restrooms/Passenger Amenities/Circulation/Support				111,000	2.5
5% Contingency for small operators				9,100	0.2
CSB	equivalent to	800	sq.ft./counter	191,700	4.4
Support Facilities					
Idle Storage Required	11,000	191	sq. ft./stall [1]	2,206,050	50.6
Employee Parking	1,700	320	sq. ft./stall [1]	571,200	13.1
Total Support Facilities (includes contingency for small operators)				2,777,250	63.8
QTA Support and Additional Site Functions					
Visitor parking	100	320	sq. ft./stall [1]	32,000	0.7
Fuel Farm and Drop				8,800	0.2
Loading Dock/Service Yard				88,000	2.0
Car Carriers Load and Unload	15	720	sq. ft./carrier	10,800	0.2
QTA Support and Additional Site Functions				139,600	3.2
TOTAL CONRAC PROJECT				6,106,950	140.2
PUBLIC PARKING					
Phase I minimum		4,200	spaces	1,260,000	28.9
Phase 2		3,800	spaces	1,140,000	26.2
TOTAL PUBLIC PARKING		8,000	spaces	2,400,000	55.1
RAC Shuttle Bus Bays		10	bays		
Kiss N' Fly Parking Spaces		30	spaces		

Additional Site Requirements
- Landscaping
- Retention
- Roadways
- Setbacks

Not Included in the Program
- Regional Offices
- Tow Backs
- Heavy Maintenance
- Accident Storage
- Massive Recalls

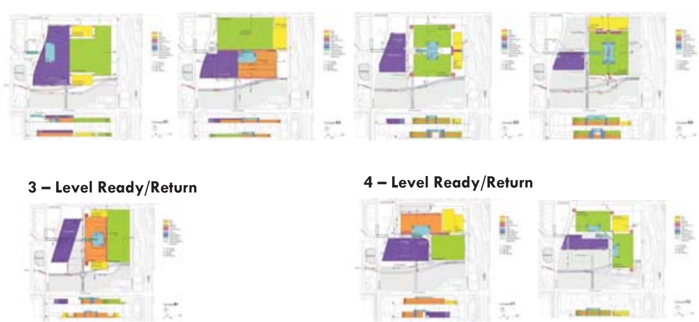
Manchester Square area available is approximately 127 acres.

Updated Program

2 – Level Ready/Return

3 – Level Ready/Return

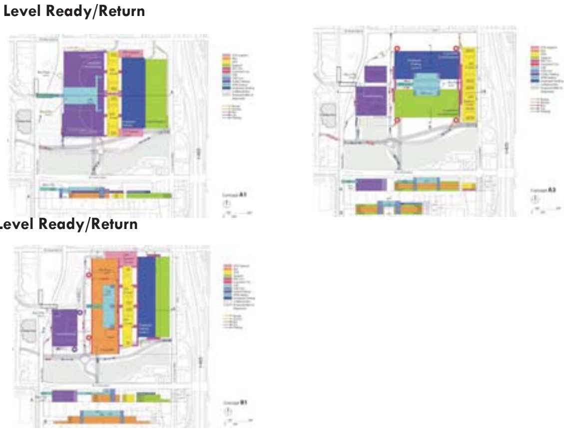
4 – Level Ready/Return



ConRAC Concepts – RAC Mtg. Sept. 4th

2 – Level Ready/Return

3 – Level Ready/Return

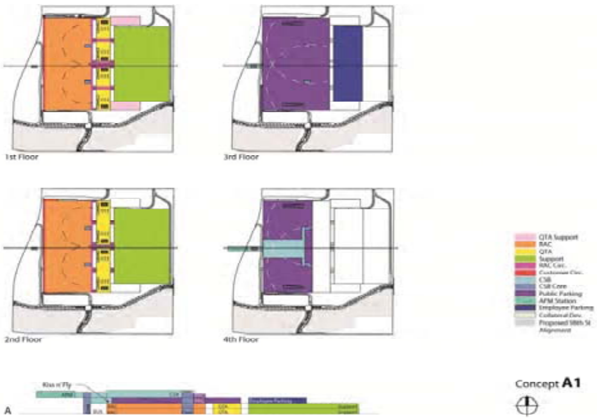


ConRAC Shortlisted Concepts

September 4th Shown to RACs

October 21 Refined Concept

ConRAC Concept A-1



ConRAC Concept A-1

Consolidated Rental Car Facility at Los Angeles International Airport

ConRAC Concept A-1

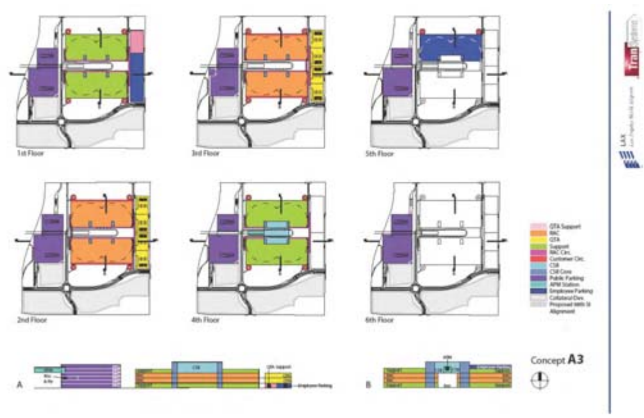
Consolidated Rental Car Facility at Los Angeles International Airport

September 4th Shown to RACs

October 21 Refined Concept

ConRAC Concept A-3

Consolidated Rental Car Facility at Los Angeles International Airport



ConRAC Concept A-3

Consolidated Rental Car Facility at Los Angeles International Airport

ConRAC Concept A-3

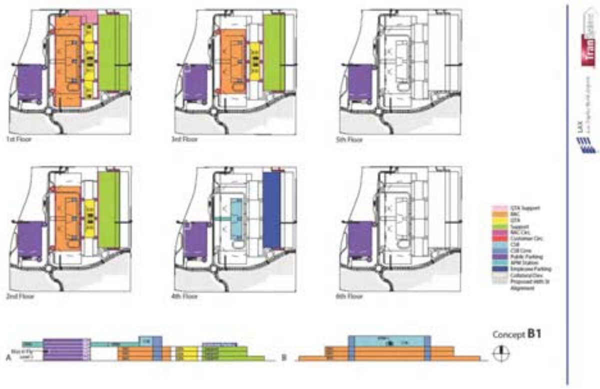
Consolidated Rental Car Facility at Los Angeles International Airport

September 4th Shown to RACs

October 21 Refined Concept

ConRAC Concept B-1

Consolidated Rental Car Facility at Los Angeles International Airport



ConRAC Concept B-1

ConRAC Concept B-1

Concept	Operational Efficiency					
	RAC-QTA		Support-QTA		RAC-Support	
	Distance	Floor	Distance	Floor	Distance	Floor
A1 (Ave.)	1188'	Same	1,211'	Same	1,169'	Same
A1 (Max.)	2,340'	Same	2,280'	Same	3,390'	Same
A3 (Ave.)	1,269'	Same	1269'	Different	1,340'	Different
A3 (Max.)	2,030'	Same	2030'	Different	2,101'	Different
B1 (Ave.)	966'	Same	689'	Same	975'	Same
B1 (Max.)	1,300	Same	1,432'	Same	2370'	Same

Concept	Concept Footprint (acres)				% of RAC Area	% of Parking Area
	ConRAC Footprint	Parking Footprint	Total Footprint	% of Site Occupied	within 350' Walking	within 600' Walking
A1	67.4	0	67.4	53%	80%	94%
A3	55.1	10.8	65.9	52%	83%	95%
B1	70.0	8.0	78.0	61%	76%	100%

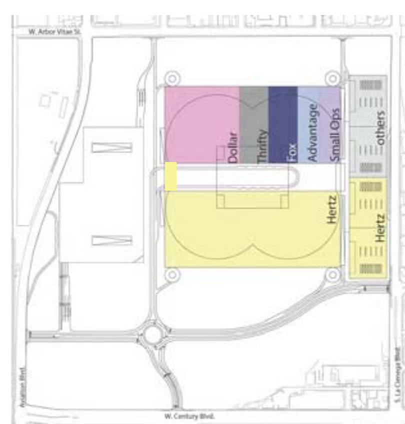
*Parking included in ConRAC footprint

** Site area 127 acres

ConRAC Concepts – Comparison Data

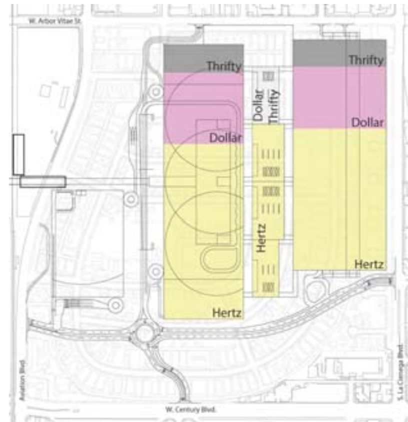
Allocation Strategy – Concept A1- L1

Allocation Strategy – Concept A1- L2

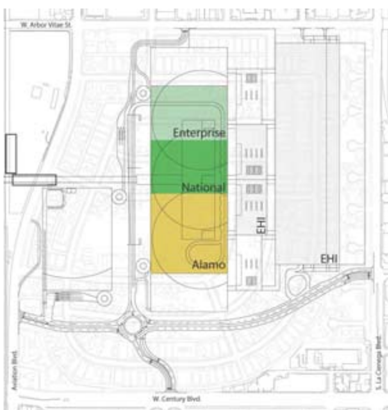


Allocation Strategy – Concept A3 – L2

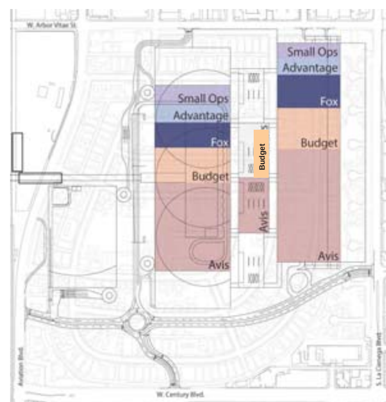
Allocation Strategy – Concept A3 – L3



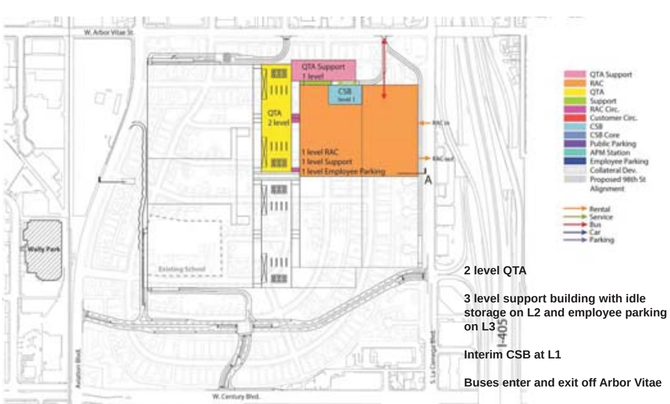
Allocation Strategy – Concept B1- L1



Allocation Strategy – Concept B1- L2



Allocation Strategy – Concept B1- L3



2 level QTA

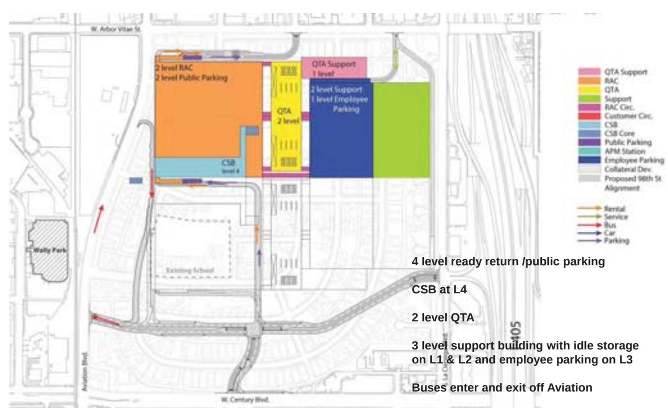
3 level support building with idle storage on L2 and employee parking on L3

Interim CSB at L1

Buses enter and exit off Arbor Vitae

Customers enter and exit off La Cienega

Phase 1 – Concept A1 – Initial Development



4 level ready return /public parking

CSB at L4

2 level QTA

3 level support building with idle storage on L1 & L2 and employee parking on L3

Buses enter and exit off Aviation

Customers enter from 98th St. and exit onto Arbor Vitae

Phase 1 – Concept A1 – 50% Developed

5 level garage with ready return at L2 & L3, idle storage at L1 & L4 and employee parking at L5

Interim CSB at L1

3 level QTA with QTA Support at L1

Buses enter and exit off Aviation

Customers enter and exit off Arbor Vitae

Phase 1 – Concept A3 – 50% Developed

LAX Los Angeles World Airports

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3 level QTA

3 level support building with idle storage on L2 and employee parking on L3

Interim CSB at L1

Buses enter and exit from Arbor Vitae

Customers enter and exit from La Cienega

Phase 1 – Concept B1- Initial Development

LAX Los Angeles World Airports

TranSystems

Nov. 6th – Board of Commissioner's Meeting – ConRAC Review – 10am

Nov. 6th – LAWA Review for RAC Industry Meeting No. 5 – 2pm

Nov. 18th - RAC Industry Meeting No. 5 – 10am

- Cost estimates for each concept
- Business agreement

Jan. 5thth – LAWA Review for RAC Industry Meeting No. 6 – 9am

Jan. 13th - RAC Industry Meeting No. 6 – 10am

Feb. 17th - Project Definition Report Delivered

Next Steps

LAX Los Angeles World Airports

TranSystems

Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING NOVEMBER 18, 2014

LAX Los Angeles World Airports

TranSystems

1. Review of Updated Program
2. Refinement of 3 ConRAC Concepts
3. Comparison of 3 Concepts
4. Cost Estimates
5. Initial Affordability Assessment
6. Look Ahead to January 13, 2015 RAC Industry Meeting

AGENDA – Nov. 18 RAC Industry Meeting

	Design Basis			Ultimate Development SF	Ultimate Development Acres
Ready/Return Area	7,600	equivalent ready stalls			
				2,394,000	55.0
QTA					
fuel nozzles	170	360	sq. ft./nozzle	61,200	1.4
wash bays	48	1,650	sq. ft./bay	79,200	1.8
maintenance bays	60	720	sq. ft./bay	43,200	1.0
stacking/queuing stalls for vehicle	680	300	sq. ft./stall	204,000	4.7
add 68% x operational areas for circulation/support/offices				264,000	6.1
5% Contingency for small operators				33,000	0.8
QTA Area				684,600	15.7
CSB					
Leisure Counters	208	300	sq. ft./counter	62,400	1.4
Premium Counters	31	300	sq. ft./counter	9,200	0.2
Add 1.55 x Counter Area for Restrooms/Passenger Amenities/Circulation/Sup				111,000	2.5
5% Contingency for small operators				9,100	0.2
CSB Area	equivalent to	800	sq.ft../counter	191,700	4.4
Idle Storage Required	11,000	191	sq. ft./stall 1/	2,206,000	50.6
Employee Parking	1,700	320	sq. ft./stall 1/	571,000	13.1
QTA Support and Additional Site Functions					
Visitor parking	100	320	sq. ft./stall 1/	32,000	0.7
Fuel Farm and Drop				8,800	0.2
Loading Dock/Service Yard				88,000	2.0
Car Carriers Load and Unload	15	720	sq. ft./carrier	10,800	0.2
QTA Support and Additional Site Functions				139,600	3.2
TOTAL CONRAC PROJECT				6,186,900	142.0

indicates area updated from Oct. 21st program

Additional Site Requirements
- Landscaping
- Retention
- Roadways
- Setbacks

Not Included in the Program
- Regional Offices
- Tow Backs
- Heavy Maintenance
- Accident Storage
- Massive Recalls

Updated Program – Ultimate Development

2 – Level Ready/Return

3 – Level Ready/Return

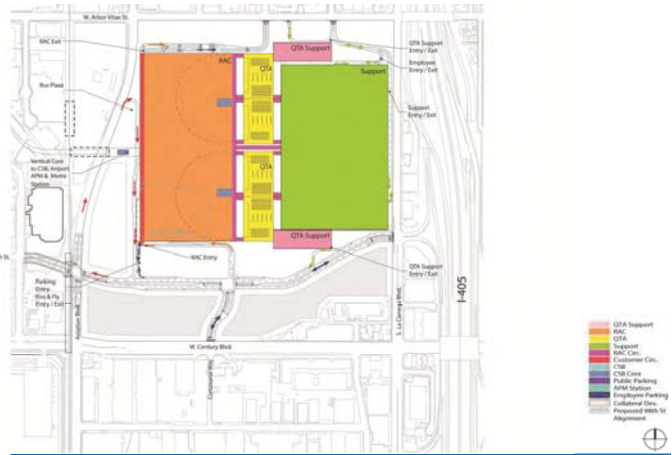
ConRAC Concepts – RAC Mtg. Oct. 21st

October 21 Version (former A-1)

November 18 Refined Alternative

ConRAC Alternative 1

ConRAC Alternative 1- Overall Plan



ConRAC Alternative 1- Site Plan

ConRAC Alternative 1- Floor Plans

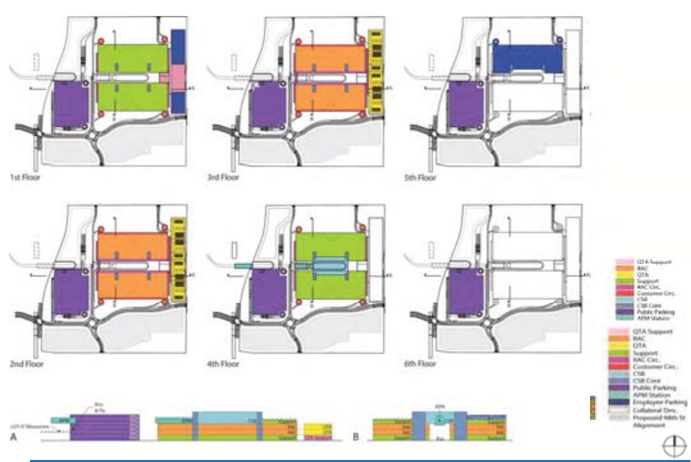
October 21 Version (former A-3)

November 18 Refined Alternative

ConRAC Alternative 2

ConRAC Alternative 2 – Overall Plan

ConRAC Alternative 2 – Site Plan



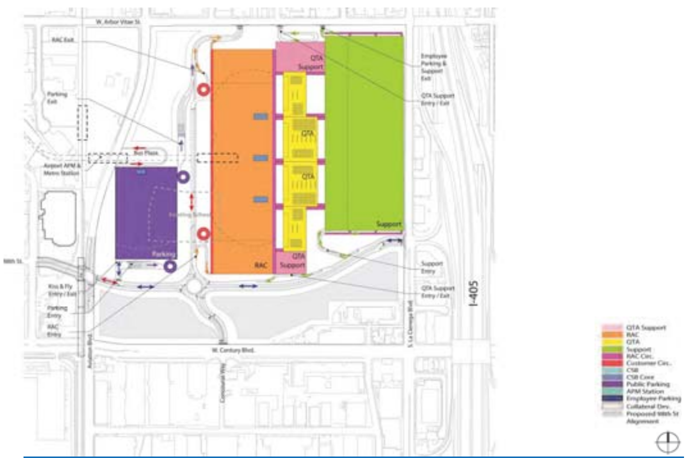
ConRAC Alternative 2 – Floor Plans

October 21 Version (former B-1)

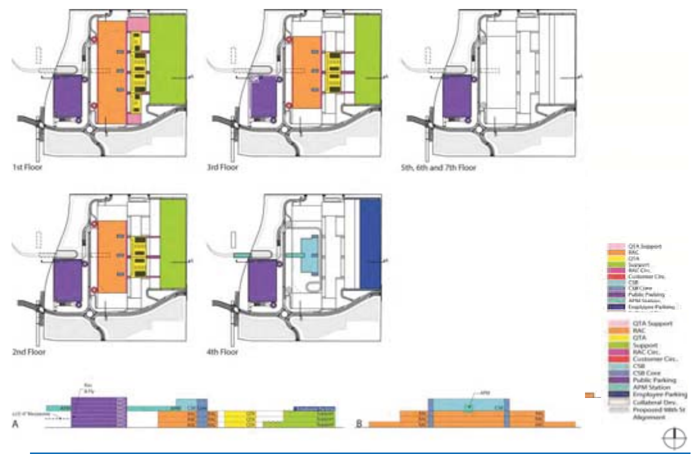
November 18 Refined Alternative

ConRAC Alternative 3

ConRAC Alternative 3 – Overall Plan



ConRAC Alternative 3 – Site Plan



ConRAC Alternative 3 – Floor Plans

Alternative	Concept Footprint (acres)			
	ConRAC Footprint	Parking Footprint	Total Footprint	% of Site Occupied**
Alt. 1*	65.2	0	65.2	51%
Alt. 2	39.4	8.6	48	38%
Alt. 3	56.1	10.7	66.8	53%

*Parking included in ConRAC footprint
** Site area 127 acres

- **Alternative 2 takes up the least site area due to stacking of Ready/Return and Idle Storage/Employee Parking**

ConRAC Concepts – Comparison Data

Alternative	% of RAC Area within 350' Walking	% of Public Parking Area within 600'	Average Walk Bus Curb to CSB	Max. walk APM to CSB Core
Alt. 1	48%	34%	653'	1,217'
Alt. 2	92%	80%	629'	706'
Alt. 3	87%***	86%	534'	494'

*** Average of all 3 levels

- **Alternative 2 has the least walking distance within Ready/Return area due to 4 vertical cores**

ConRAC Concepts – Comparison Data

Alternative	Operational Efficiency						RAC Levels
	RAC-QTA (Roundtrip)		Support-QTA		RAC-Support		
	Distance	Floor	Distance	Floor	Distance	Floor	
Alt. 1 (Ave.)	1,263'	Same	969'	Same	799'	Same	2
Alt.1 (Max.)	2,089'	Same	1,396'	Same	1,869'	Same	
Alt. 2 (Ave.)	2,792'	Same	2,602'	Different	1,692'	Different	2
Alt. 2 (Max.)	3,974'	Same	3,269'	Different	2,878'	Different	
Alt. 3 -L1 (Ave.)	1,189'	Same	844'	Same	946'	Same	3
Alt. 3 -L1 (Max.)	1,948'	Same	1,371'	Same	2,907'	Same	
Alt. 3 -L2/L3 (Ave.)	1,367'	Same	755'	Same	1,039'	Same	
Alt. 3 -L2/L3 (Max.)	1,367'	Same	1,371'	Same	2,637'	Same	

- ❑ **Alternatives 1 and 3 have direct vehicle shuttle routes due to the QTA location between the RAC and Support facilities with no level changes.**

ConRAC Concepts – Comparison Data

	Design Basis			Ultimate Development SF	Ultimate Development Acres	Initial Phase SF	Initial Phase Acres
Ready/Return Area	**7,600**	equivalent ready stalls				**6,610**	stalls
				2,394,000	**55.0**	**2,083,000**	**47.8**
QTA							
fuel nozzles	**170**	360	sq. ft./nozzle	61,200	1.4	**146**	nozzles
wash bays	**48**	1,650	sq. ft./bay	79,200	1.8	**48**	bays
maintenance bays	**60**	720	sq. ft./bay	43,200	1.0	**60**	bays
stacking/queuing stalls for vehicle	**680**	300	sq. ft./stall	204,000	4.7	**600**	stalls
add 68% x operational areas for circulation/support/offices				264,000	6.1		
5% Contingency for small operators				33,000	0.8		
QTA Area				**684,600**	**15.7**	**595,600**	**13.7**
CSB							
Leisure Counters	**208**	300	sq. ft./counter	62,400	1.4	**208**	counters
Premium Counters	**31**	300	sq. ft./counter	9,200	0.2	**31**	counters
Add 1.55 x Counter Area for Restrooms/Passenger Amenities/Circulation/Su				111,000	2.5		
5% Contingency for small operators				9,100	0.2		
CSB Area	equivalent to	800	sq.ft. /counter	**191,700**	**4.4**	**191,700**	**4.4**
Idle Storage Required	**11,000**	191	sq. ft./stall 1/	**2,206,000**	**50.6**	**1,919,000**	**44.1**
Employee Parking	**1,700**	320	sq. ft./stall 1/	**571,000**	**13.1**	**423,000**	**9.7**
QTA Support and Additional Site Functions							
Visitor parking	**100**	320	sq. ft./stall 1/	32,000	0.7		
Fuel Farm and Drop				8,800	0.2		
Loading Dock/Service Yard				88,000	2.0		
Car Carriers Load and Unload	**15**	720	sq. ft./carrier	10,800	0.2		
QTA Support and Additional Site Functions				**139,600**	**3.2**	**121,500**	**2.8**
TOTAL CONRAC PROJECT				**6,186,900**	**142.0**	**5,333,800**	**122.4**

Initial Phase Program – 24% Growth Per EIR/EIS

Alternative 2 – Initial Phase Program – 24% Growth

		ALTERNATIVE 1		ALTERNATIVE 2		ALTERNATIVE 3
CONRAC						
CUSTOMER SERVICE BUILDING (CSB)	$	56,816,000	$	54,393,000	$	46,891,000
QTA & QTA SUPPORT FACILITIES	$	87,376,000	$	99,331,000	$	95,816,000
READY/RETURN FACILITY	$	115,599,000	$	121,073,000	$	135,849,000
HELICES	$	-	$	10,200,000	$	4,229,000
IDLE STORAGE/SUPPORT	$	135,292,000	$	132,799,000	$	138,460,000
EMPLOYEE PARKING	$	19,930,000	$	19,223,000	$	18,851,000
SITE IMPROVEMENTS	$	37,463,000	$	48,918,000	$	45,296,000
SITE CLEARING & GRADING	$	13,324,000	$	13,324,000	$	13,231,000
SUBTOTAL - NET SUBCONTRACT COSTS	$	465,820,000	$	499,261,000	$	498,643,000
GC O/H & PROFIT	$	55,898,000	$	59,911,000	$	59,837,000
DESIGN EVOLUTION CONTINGENCY	$	37,265,000	$	39,941,000	$	39,891,000
ESCALATION/INFLATION	$	61,488,000	$	65,902,000	$	65,821,000
ART & OCIP	$	12,978,000	$	13,844,000	$	13,753,000
LAWA SOFT COSTS:	$	114,787,000	$	123,026,000	$	122,876,000
Program/Design Management						
Design Consultants Team						
Construction Administration Services						
Construction Management Consultant						
Airport Administration						
Testing/Inspection and Permitting						
PROJECT/CONSTRUCTION CONTINGENCY (7%)	$	43,433,000	$	46,551,000	$	46,494,000
TOTAL CONRAC	$	791,669,000	$	848,438,000	$	847,315,000
% COST DIFFERENCE COMPARED TO ALTERNATIVE 1		0%		7.2%		7.0%
ULTIMATE BUILD-OUT 42% GROWTH	$	921,000,000	$	981,000,000	$	980,000,000
ENABLING PROJECTS						
ROADWAYS	$	12,139,000	$	12,640,000	$	11,243,000
OFF SITE IMPROVEMENTS	$	15,823,000	$	15,823,000	$	15,823,000

Scope/Basis

- Standard Foundations – concrete pads
- Standard commercial facades, roof and finishes to CSB
- Standard garage facades and finishes to QTA/Support, RAC, and Employee Parking
- QTA includes carwash systems, fuel distribution and connecting bridges
- Top floors structured for solar installation by third party
- Site Improvements cover landscaping (drought resistant), walkway paving and site utilities
- Roadway costs include street lighting, sidewalks, curbs, traffic control signals, and utilities
- Wayfinding Signage
- Site clearing includes trees, driveways, utilities and site grading

Exclusions

- Land acquisition costs
- Legal and accounting costs
- Hazardous material mitigations and removals
- Removal of unforeseen underground obstructions
- Relocation of owner's furniture, furnishings and equipment
- Loose furniture and equipment
- TI fit-outs to CSB, i.e. rental car company counters, branding, etc.
- CNG and electrical charging stations
- PV panels
- FIDS, BIDS

ROM Cost Summary – Initial Phase & Ultimate Programs

Dec. 4th – Board of Commissioner's Meeting – ConRAC Progress Review – 10am

Jan. 5thth – LAWA Review for RAC Industry Meeting No. 6 – 9am

Jan. 13th - RAC Industry Meeting No. 6 – 10am

- Development of Preferred Concept
- Cost Estimate for Preferred Concept
- Initial Affordability Assessment

Feb. 17th - Project Definition Report to be Delivered

Next Steps

Los Angeles International Airport Consolidated Rental Car Facility

Initial Affordability Assessment

RENTAL CAR INDUSTRY MEETING November 18, 2014

LAX Los Angeles World Airports

TranSystems

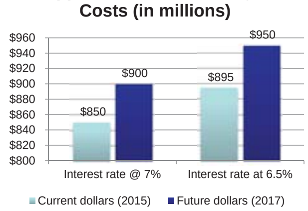
- **Provide an initial assessment of financial affordability for the ConRAC project**
- **Discuss the assumptions used to derive initial financial affordability results**
- **Review the priorities for using CFC revenues**
- **Review detailed financing assumptions**
- **Provide initial ConRAC business deal potential framework**
- **Next steps**

Purpose of Discussion

FINDINGS

- **A ConRAC project cost of $900m to $950m is supportable (in 2017 dollars)**
- **The CFC is assumed to be at the maximum legally permitted level and secured by 1/1/2018**
- **Taxable special facility (SFB) bonds are expected to fund costs**

Supportable ConRAC Project Costs (in millions)



MAJOR ASSUMPTIONS

- **CFC at $10 per transaction until start of construction (2017 assumed)**
- **Change CFC to $7.50 per transaction day at start of construction (2017 assumed)**
- **Change CFC to $9.00 per transaction day on ConRAC opening (2020 assumed)**
- **4.0 average transaction days; 15% discount used for 5-day max**
- **Rolling coverage of 30% of debt service**
- **To date, CFC collections to be used to pay for design and bond interest costs during construction**

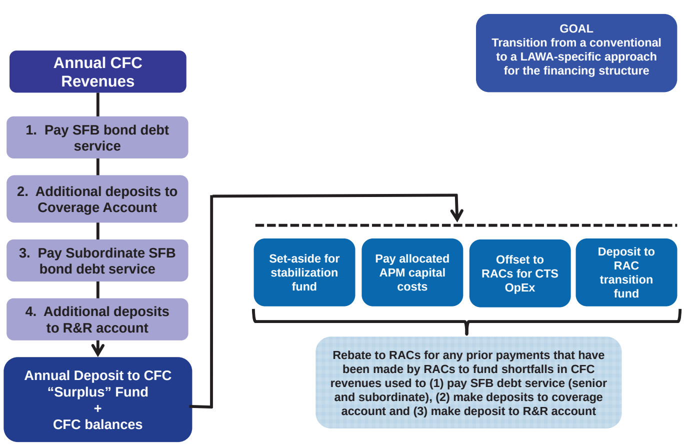
Preliminary Findings/Assumptions

	Source of Funds	CFC Revenues	Rental Car Companies
ConRAC Facility			
Capital costs	SFBs	X	
Operating expenses			X
Ground rent			X
Renewal and replacement	SFBs	X	
Transition allowance	SFBs	X	
Tenant improvement allowance	SFBs		X
Common Transportation System			
O&M Expenses		X-TBD	X-TBD
Capital costs	GARBs	X	

SFBs = Special Facility Bonds; GARBs = General Airport Revenue Bonds.

- **Planning, design and other costs paid from CFCs**
- **O&M expenses for CTS to include interim busing costs, and any CFC-eligible single level busing terminal infrastructure costs**

Prioritization of CFCs



"Flow of Funds" to Pay ConRAC Costs

- **Align common vision and incentives to deliver a cost effective ConRAC facility**
- **Presents an initial structure that prioritizes the ConRAC facility, but provides flexibility to address other costs as well**
- **The financing structure also prioritizes CFC use to pay debt service to achieve lowest possible financing costs**
- **Effectively creates a "residual" approach in the use of CFCs, whereby available CFCs (after items 1-4 and other obligations in the CFC surplus fund) can be used in a later year to reimburse rental car company contributions in any year when there are CFC shortfalls to pay debt service**

Advantages of Approach

IMPORTANT
Actual transaction day data

- **The CFC would change/increase based on milestones/performance triggers:**
  - $10 per transaction until construction starts
  - At construction (2017), increase the CFC to $7.50 per transaction day
  - When ConRAC opens (2020), increase CFC to $9.00 per day
  - Receive approval to change CFC prior to January 1, 2018
- **Assumed (but not data validated) an average of 4.0 transaction days; excluded 15% of transactions for the 5-day cap**
  - Allowance for now, subject to updated based on rental car provided data
  - Difference between actual and estimated transaction days will impact overall affordability levels
  - Gaining access to transaction day information as soon as possible will allow us to refine affordability levels and better manage rating agency process when the SFBs are issued
- **Transaction days assumed to increase at 2% per year, consistent with long-term passenger growth reflected in recent LAX bond documents (= proxy for transaction day growth)**

CFC Assumptions

GOAL
Transition from a conventional to a LAWA-specific approach for the financing structure

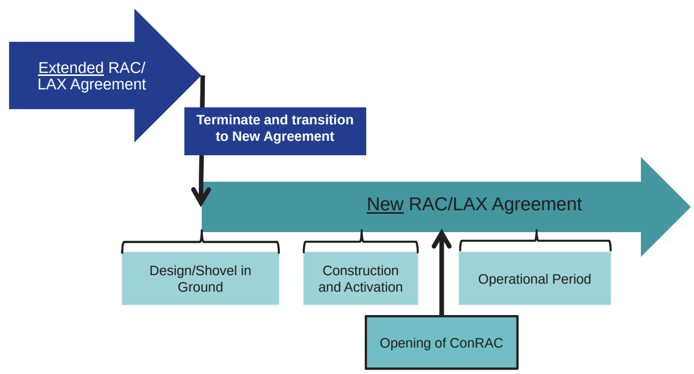
- **Issue SFBs backed by CFC revenues**
  - Annual CFC revenues in 2024 used to determine affordability
  - Amortize SFBs over 30 year period
- **To date, CFC collections to be used to pay interest during construction, which will increase overall affordability; defer the issuance of bonds as long as possible to minimize interest costs**
- **Financing costs assumed to be funded from SFB proceeds**
  - Debt service reserve account (one year of principal and interest)
  - Costs of issuance (2% of bond principal amount)
  - Rolling coverage account (equal to 30% of annual debt service)
  - Renewal and replacement account (3% of project cost as initial deposit)

Financing Details

Alternative 1—Higher Interest Rate	
Bond interest rate	**7.0%**
Term	30 years
Construction period	3 years
Annual debt service payments	$92,396,000
Financing costs at bond sale	
Debt service reserve fund	$92,396,000
Rolling coverage	$27,718,000
Renewal and replacement	$27,000,000
Costs of issuance	$20,830,000
Total financing costs	**$167,944,000**
Interest paid with CFC balances during construction	**$204,936,000**

Alternative 2—Lower Interest Rate	
Bond interest rate	**6.5%**
Term	30 years
Construction period	3 years
Annual debt service payments	$92,879,000
Financing costs at bond sale	
Debt service reserve fund	$92,879,000
Rolling coverage	$27,864,000
Renewal and replacement	$28,500,000
Costs of issuance	$21,864,000
Total financing costs	**$171,107,000**
Interest paid with CFC balances during construction	**$200,326,000**

Affordability Assumptions



Overlap of RAC Agreements

GOAL
Transition from a conventional to a LAWA-specific approach

- **Types of agreements**
  - Concession agreement—serves as the umbrella agreement; potentially 10-year plus two 5-year options
  - Facility lease agreement—term TBD
- **Summary level business provisions**
  - Gross revenue definition and privilege fee level*
  - Minimum annual guarantee*
  - Affiliate definition*
  - Ground rent payments based on the FMV of unimproved ConRAC land
  - Facility rent payments (if SFBs are no longer outstanding)
  - Obligation to use common transportation system
  - Contributions by rental car companies in situations where CFCs are not sufficient to pay SFB debt service and meet other funding requirements; RACs to be reimbursed from CFC revenues after other financial obligations have been met

* = similar in form to extended LAX agreements

- **Other provisions, including, but not limited to (a) operating and maintenance responsibilities, (b) environmental provisions* and (c) insurance requirements***

Initial ConRAC Business Framework

- **Extend the current LAX agreements**
- **Refine financing capacity analysis; *accurate transaction day data critical***
- **Prepare/discuss comprehensive business term sheet**
- **Confirm preferred alternative**
- **Develop and agree to Letter of Intent with rental car companies**
- **Execute agreements for new ConRAC that replace existing LAX agreements**

Next Steps/Process

LAX CONRAC – RAC Industry Meeting No. 6
January 21, 2015 10:00 – 12:00pm PST
Location: LA NEXT Conference Room, LAWA Administration Building

Attending:
LAWA – Steve Martin, Cynthia Guidry, Diego Alvarez, Rachelle Yuvienco, Marcia Katnich, Fatima Hashim, Pat Tomcheck, Debbie Bowers, Tamami Yamaguchi
Advantage – Joe Olivera (phone), Richard Christensen, Jonathan Carrillo,
Avis – Lorraine Tallarico, Andrew Jaksich
Enterprise (EHI)-Peter VanValkenburg, Scott Goldstein (phone), Bill Bettison
Fox Rent A Car-Arnold Goehring
Hertz-Connie Gurich, Salavatore Bonasoro
Sixt – Jeff Heileson, Clemens Schoenberger
Midway - Jorge Arevalo, Gary MacDonald
Fehr & Peers – Jill Liu
WJ Advisors (WJA) – Warren Adams
TranSystems (TSC) – Jeff Jarvis, Chuck Rowe, Doug Steen
Faithful & Gould (F+G) – Wing Long

The purpose of the meeting was to review the traffic analysis of the proposed development for Manchester Square; review the adjustment to the ConRAC program for employee parking; review the refinements to the ConRAC alternatives and the cost reduction options associated with those refinements; provide an update to the financial analysis and business agreement structure; and review the items associated with the tenant occupied areas and the rough-order of magnitude (ROM) budget estimates for those items which will be supplied by the tenants. The items discussed and the feedback/refinements suggested by LAWA and the rental car representatives are noted below. Items in Bold Font represent action items to which the design team, the RACs or LAWA will respond.

Expectations for Alternative Powered Vehicles

1. Pat Tomcheck asked the RACs for their expectations for electric powered vehicles to be integrated into their future fleets.
2. Hertz indicated they are interested in sustainability. The use of hybrid technologies is more prevalent than full electric. There are EV charging stations at SFO because there is a demand for those vehicles in that market; however, none of the RACs met the target for use of EV vehicles in that case.
3. Enterprise indicated due to the range limitations of the vehicles and charge time, they see light demand for electric vehicles; however, they believe it should be part of discussion for the future. While customers are interested in electric vehicles, they also have anxiety as to the ability to recharge the vehicle. Decision to provide EV is also a function of the coverage of other charging stations throughout the region. Enterprise is supportive of supplying EV chargers in the ConRAC. They cannot commit to a percentage of the fleet that might be electrically powered.
4. Avis indicated the requirements will be dictated by technology and customer demand. The ConRAC facility needs to have flexibility to accommodate new technologies. They cannot commit to percentage of the fleet that might be electrically powered. The fleet that would be available for rental at the ConRAC is not exclusive to the LAX market. The availability of electric vehicles is also driven by manufacturers.
5. TSC suggested planning for 5% of total fleet for electric vehicles initially, with capacity to expand up to 15%.
6. RACs believe 5% seems high.

7. TSC will send a request to the RACs to document their suggested criteria and will provide the collective data to LAWA to determine what provisions to include in the new facility.

Traffic Analysis by Fehr & Peers

8. Jill Liu identified a range of improvements proposed for the surrounding roadways, including the new southbound on-ramp from West Arbor Vitae Street to southbound I-405.
9. To minimize delays caused by the at-grade crossing of the Crenshaw Light Rail Line, the Los Angeles Department of Transportation (LADOT) will coordinate the signal timing along West Arbor Vitae Street to be synchronized with the approaching light rail trains.
10. The RACs asked to what extent shuttle traffic to offsite maintenance facilities had been taken into account. TSC indicated they would follow-up with an answer to this question (Answer: In addition to the rental car customers and employee traffic, there could be additional in-fleet and out-fleet delivery trucks and vehicles or vehicles on low back trucks being transferred to and from multiple off-site heavy maintenance facilities. This off-site traffic, during the airport and ConRAC peak periods, is expected to be minimal (up to 30 vehicles/hour) representing less than 1% of traffic arriving at Manchester Square. In order to minimize the disruption to the rental car transactions and operation of the facility, it is recommended that these trips be scheduled during the non-peak traffic periods where possible).
11. In response to the RAC questions regarding who pays for roadway improvements, LAWA explained that local surface street improvements would be funded by LAWA and that the funding of improvements associated with the regional freeway network would be a point of future discussion between LAWA and the transportation agencies.
12. RACs stated that they have had experience on other ConRAC projects where the costs of roadway improvements were included in the ConRAC project. This is unacceptable to the RACs. They will not support financing improvements which do not directly benefit the industry and rental car customers.
13. The traffic analysis is being used to support the environmental documentation. The detailed engineering of the roadways will be developed in the future
14. The customer vehicle access to and from the 4 helix ramps is separated from other local traffic.
15. The periods studied include the Monday AM ConRAC rental peak, the Friday PM airport peak and the weekday AM and PM commute peaks.
16. The traffic analysis indicated the need for a westbound-to-northbound bypass lane in advance of the roundabout to allow for unimpeded RAC customer flow into the ConRAC entry road.
17. The traffic analysis will identify the need for improvements to the surrounding roadways.
18. Enterprise asked if the traffic model takes into account the use of roadways by people unfamiliar with the area. Jill Liu explained that the model replicates the characteristics of vehicle movements at LAX studied and documented over several years.
19. Jill Liu explained that the goal of the traffic analysis is to identify continuity and consistency of the traffic between the ConRAC and other components of the LAX roadway network.
20. Enterprise expressed a concern about the proposed roundabout and drivers' familiarity with their use.
21. TSC will distribute the Fehr & Peers presentation.

ConRAC Program/Refinements to Alternative 2/Cost Reduction Options

22. Jeff Jarvis reviewed the revision to the employee parking program based on transaction data for the Monday AM rental peak (program was based on reported employee counts and escalated for growth).
23. Mr. Jarvis reviewed the three ConRAC alternatives that were presented and discussed at the November 18th, 2014RAC meeting. ConRAC Alternative 2 (formerly Concept A-3) provides the best customer service and would require the smallest ground rent. It is a very efficient scheme for vehicle movements between the ready/return and QTA areas.

24. Mr. Jarvis reviewed Alternative 3 (formerly Concept B-1). This concept doesn't have the flexibility to handle changing market share between companies. It doesn't lend itself to future reallocation as easily as Alternative 2.
25. Enterprise indicated they now preferred Alternative 3, with the 3 separate levels. Enterprise suggested TSC needs to look at 2014 market share distribution – Hertz has dropped and the Avis Budget and EHI portions have grown. (Note: at the November 18thmeeting, it appeared that EHI had preferred Alternative 2. It appears that this may be a result of renumbering of alternatives prior to the November 18th meeting, in preparation for the December 4th Board of Airport Commissioner's meeting. *(Note: At the November 18th. RAC Industry meeting, previous Concept A-3 was renamed Alternative 2. And previous Concept B-1 was renamed Alternative 3. In retrospect, it appears that Enterprise may have been indicating support for Concept A-3 when they actually intended to refer to Alternative 3).*
26. Hertz reinforced their preference for Alternative 3.
27. Enterprise explained they prefer having their own floor verses having to share a deck with multiple operators.
28. The RACs observed that there is hardly any cost differences between Alternatives 2 and 3. They suggested, for business discussions, both schemes would fall into the amount used for the financial analysis.
29. Mr. Jarvis pointed out there were several value engineered (VE) options that could be applied to Alternative 2 (i.e. relocation of employee parking or idle storage to grade level) which could not be applied to Alternative 3, because there is no ground space available on the site plan for Alternative 3 for other uses.
30. Enterprise suggested that Alternative 3 be refined to make all three levels equal, which would freeup the ground space and provide a floor plate with the flexibility for Avis/Budget and Enterprise brand families to grow.
31. Mr. Jarvis walked through the range of potential cost reductions (see Summary of Cost Refinement Options for Alternative 2 included in the ConRAC Facilities presentation). Option 1 proposes to reduce costs by building the ConRAC in phases, with the initial phase sized to accommodate 24% growth over the 2013 demand as opposed to the 42% growth for which the project is currently planned.
32. The RACs pointed out that any proposed phasing needs to allow for easy expansion without interrupting ConRAC operations. Their observation is that it would be best to build as much of the ultimate building as possible from day one to avoid significant disruption to their operation and cause driver inconvenience in the future. Avis/Budget stated that they were concerned about phasing, but would consider supporting it as long as they understood how it could be accomplished while not impacting their operation.
33. Mr. Jarvis explained that the intent of presenting the different cost reduction options is to help LAWA understand the level of priorities for each of these VE options – which ones could be supported by the RACs and which ones could not.
34. Cost Refinement Option 2 proposes converting a major portion of the QTA roof to a metal canopy and Option 4.1 proposes to remove the employee parking at Level 5 and replace the concrete roof over the Level 4 idle storage with a metal canopy to be supplied by a solar energy contractor to support photo voltaic (PV) panels.
35. Avis/Budget shared that the option of a metal canopy was considered on the San Jose ConRAC, in lieu of a concrete roof, with the conclusion that the costs were almost equal due to economies of scale. The contractor building the ConRAC stated at the time that since they had their crews and materials already in place, that concrete was less expensive.
36. Avis Budget had reservations about a solar supplier being relied on to provide a weather tight roof.
37. All the RACs communicated it is not possible for them to support the project without understanding the financial implications. Much more detail on the allocation of costs needs to be provided. Furthermore, the financing strategy needs to include the total project costs, not just RAC related.

Anything that is needed to make the project happen, such as bus or APM O&M, roadway construction, APM and bus capital costs, etc., needs to be included.

Financial Affordability and Business Deal Structure

38. Warren Adams (WJA) shared the CFC cap deadline is expected to be implemented by January 1, 2017.
39. WJA discussed the allocation of the busing and APM costs. A share of the APM costs will likely be paid through PFCs and the airline rates and charges. The pie-chart on Page 7 of the financial and business agreement presentation is an illustration only of the likely source of revenues for the APM system. It is not intended to indicate what the actual allocation may be.
40. Enterprise shared that it is important that costs intended to be covered by the various sources of funds remain in place for the length of the proposed concession agreement.
41. Avis Budget suggested that the RACs would expect to continue to work with LAWA/TSC to develop the right program that is sized correctly to help keep the costs as reasonable as possible. If the construction is phased, the future phases will need to be completed in a way that minimizes significant impact on the RAC operations.
42. LAWA shared that the RACs should focus on identifying the right facility required to meet their operational requirements, but that the size of the facility would likely mean that some costs are paid through rent or become the responsibility of the rental car companies.
43. WJA also mentioned that the structure of the “flow of funds” for CFC revenues was such that optimizing the size and cost of the ConRAC will create more money that can pay for all CFC-eligible costs.
44. Avis Budget stated their concern with common busing is that the independent car rental companies will be allowed to provide a more attractive level of bus service because they will bus their customers directly to the CTA.
45. LAWA stated that any rental car operators who are not tenants in the ConRAC will not be allowed to bus their customers directly to the CTA. Their customers will be “double-bused”. In other words, they will be required to transfer their customers from their own facilities to the ConRAC. From the ConRAC, those passengers would travel to the CTA, initially via the common bus, and ultimately via the APM.
46. The RACs stated that they need much more detail on which costs they will be responsible for. Advantage suggested consideration be given to establishing a timeline for evaluation of the project costs and affordability with specific milestones for making go/no-go decisions. This process is being used on the new San Antonio ConRAC.
47. LAWA stated there is not a “do nothing” scenario. The roadway congestion problem at the airport is not going to go away. LAWA wants to work with the RACs to determine the right program for the future facility. A risk assessment process, as suggested by the RACs, will be put in place.
48. WJA reported that 84% of people who were sent transaction day surveys responded. Not everyone reported the transaction day data into what was 5 days or less. WJA would like the remaining data (the Budget transaction day data is the most outstanding in this regard) for verification. (Note: The Budget data was provided immediately after the meeting.)
49. Based on the transaction day survey responses, the average number of transaction days after the 5-day maximum cap is 3.43. WJA had hoped it would be higher. The new amended concession agreement requires the transaction data to be reported monthly. As this information is recorded, WJA will be able to confirm the assumption in regard to the average number of transaction days and adjust the affordability analysis accordingly.
50. The ground rent will be based on the term of the contracts with the rental car companies. .
51. The RACs insisted the master agreement term needs to be concurrent with the bonds.

52. Avis Budget will send to WJA a excerpt from the Government Code which allows airports to collect fees for transit related projects in California. They indicated SFO was able to institute a surcharge for collecting fees for the APM using this clause.
53. RACs indicated the Cost Refinement Option 1 suggesting a phased construction should be removed from consideration. The RACs indicated they will be reluctant to support a project that does not accommodate their operational requirements, from opening day, for all tenants.
54. The RAC industry indicated a preference for a ConRAC alternative, like Alternative 3, where all functions, including light maintenance can be individually secured. It appears their preference is for the 3 level ready/return – QTA – idle storage configuration shown in Alternative 3 vs. the 2 level ready/return option shown in Alternative 2.
55. TSC will meet individually with each brand family representative to review and confirm the preferred ConRAC alternative.
56. TSC's goal is to provide a project definition document to LAWA in the next few months.

Next Meeting

57. The next RAC Industry meeting will be on March 10, 2015 from 10am to noon PST in the NEXT Conference Room in the LAWA Administration Building at LAX. The RACs suggested scheduling future meetings on a consistent day and week of the month.
58. WJA suggested a call with the RACs in February to go over the financial/business agreement issues.

Attachments:
Presentation – Rental Car Industry Meeting – Facilities – January 21, 2015
Presentation – Rental Car Industry Meeting – Affordability/Business Agreement – January 21, 2015
Presentation - Traffic Circulation (Fehr & Peers) – January 21, 2015
Tenant Installation & FFE Scope and Budget Estimates (Faithful & Gould) – January 13, 2015
Attendance Roster – January 21, 2015

Cc: Attendees

Richard Christensen	Advantage
Bob Bouta	Avis
Norman Lin	TranSystems
, Justin Neel	TranSystems
Gina Trimarco	TranSystems
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers

Los Angeles International Airport Consolidated Rental Car Facil

RENTAL CAR INDUSTRY MEETING JANUARY, 21 2015

FACILITIES

LAX
Los Angeles W

Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING JANUARY, 21 2015

FACILITIES

LAX Los Angeles World Airports

TranSystems

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1. Poll Industry on Expectations for Electric Powered Vehicles
2. Traffic Analysis
3. Program Adjustment – Employee Parking
4. Review of Employee Parking Calculation
5. Refinement to ConRAC Alternative 2
6. Cost Impact of Proposed Refinements to Alternative 2
7. Review of Tenant Supplied Items and Projected Costs
8. Update to Financial Analysis/Business Planning
9. Look Ahead to Future RAC Industry Meeting
10. Next Steps

AGENDA – Jan 21 2015 RAC Industry Meeting

	Design Basis			SF	Acres
Ready/Return Area	7,600	equivalent ready stalls			
				2,394,000	55.0
QTA					
fuel nozzles	170	360	sq. ft./nozzle	61,200	1.4
wash bays	48	1,650	sq. ft./bay	79,200	1.8
maintenance bays	60	720	sq. ft./bay	43,200	1.0
stacking/queuing stalls for vehicle	680	300	sq. ft./stall	204,000	4.7
add 68% x operational areas for circulation/support/offices				264,000	6.1
5% Contingency for small operators				33,000	0.8
QTA Area				**684,600**	**15.7**
CSB					
Leisure Counters	208	300	sq. ft./counter	62,400	1.4
Premium Counters	31	300	sq. ft./counter	9,200	0.2
Add 1.55 x Counter Area for Restrooms/Passenger Amenities/Circulation/Sup				111,000	2.5
5% Contingency for small operators				9,100	0.2
CSB Area	equivalent to	800	sq.ft../counter	**191,700**	**4.4**
Idle Storage Required	11,000	191	sq. ft./stall 1/	**2,206,000**	**50.6**
Employee Parking	1,102	260	sq. ft./stall 1/	**286,520**	**7.0**
QTA Support and Additional Site Functions					
Visitor parking	100	320	sq. ft./stall 1/	32,000	0.7
Fuel Farm and Drop				8,800	0.2
Loading Dock/Service Yard				88,000	2.0
Car Carriers Load and Unload	15	720	sq. ft./carrier	10,800	0.2
QTA Support and Additional Site Functions				**139,600**	**3.2**
TOTAL CONRAC PROJECT				**5,902,420**	**135.9**

indicates area updated from Nov. 18th program

Additional Site Requirements
- Landscaping
- Retention
- Roadways
- Setbacks

Not Included in the Program
- Regional Offices
- Tow Backs
- Heavy Maintenance
- Accident Storage
- Massive Recalls

Updated Program – Ultimate Development

LAX ConRAC Employees

Staff Requirements for Peak Shift of Activity

Number of Fuel Positions	170		
Number of Counters	239		
Service	60		
Subtotal CSB Staff	**469**		
Jockeys	**93**		
Storage	40		
Return	30	2/BRAND	
Exit Booth	45	3/BRAND	
Customer Service Booths	45	3/BRAND	
SUB TOTAL	**722**		
Support	866	20%	for administration and supervisors
Third Party	8		
LAWA Personnel	0		
TOTAL	**874**		
Contingency	874	0%	
Parking	787	90%	assumes 10% of employees use transit or car pool
Second Shift	315	40%	second shift off-peak
LOT SIZE	**1,102**	SPACES	

ROUNDTRIP TIME FOR VEHICLE FROM READY/RETURN TO QTA				
2013 Returns	655	cars		
42% Growth	930	cars		
Roundtrip Distance	2,400	FT	2,232,240	DT. total for all return trips
Average Speed	15	MPH		
Time for Each Trip	0.03	HRS		
Drive Time Per Car	1.82	MIN		
Total Time	**6**	**MIN/CAR**		
Processing Rate Per Jockey	**10**	**CAR/HR/JOCKEY**		
		Includes Wash Time and 2400 FT Drive Time and Walking to the next car		

RAC Employee Parking Calculations

Alternative 1 (former A-1)
2 – Level Ready/Return – QTA – Idle Storage

Alternative 2 (former A-3)
2 – Level Ready/Return & QTA
Idle Storage Above & Below Ready Return

Alternative 3 (former B-1)
3 - Level Ready/Return – QTA – Idle Storage

TOTAL PROJECT ESTIMATED COST – ULTIMATE DEVELOPMENT	
Alternative 1 (former A-1)	**$921,000,000**
Alternative 2 (former A-3)	**$981,000,000**
Alternative 3 (former B-1)	**$983,000,000**

ConRAC Concepts – RAC Mtg. Jan 21st

ConRAC Alternative 2 – Overall Plan

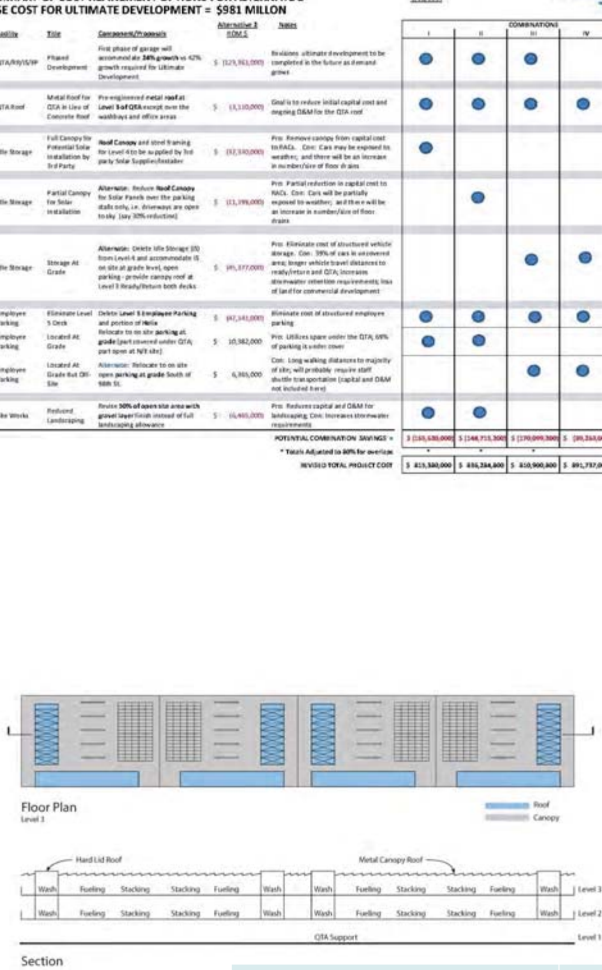
LAX CONRAC — DRAFT FOR DISCUSSION ONLY — 1/16/2015 — FAITHFUL GOULD

SUMMARY OF COST REFINEMENT OPTIONS FOR ALTERNATE 2
BASE COST FOR ULTIMATE DEVELOPMENT = $981 MILLON

	Facility	Title	Component/Proposals	Alternative 2 ROM $	Notes	Combinations I	II	III	IV	V
1	QTA/RAY/IS/EP	Phased Development	First phase of garage will accommodate 24% growth vs 42% growth required for Ultimate Development	$ (123,961,000)	Assumes ultimate development to be completed in the future as demand grows	●	●	●		●
2	QTA Roof	Metal Roof for QTA in Lieu of Concrete Roof	Pre-engineered metal roof at Level 3 of QTA except over the washbays and office areas	$ (3,110,000)	Goal is to reduce initial capital cost and ongoing O&M for the QTA roof	●	●	●	●	
3a	Idle Storage	Full Canopy for Potential Solar Installation by 3rd Party	Roof Canopy and steel framing for Level 4 to be supplied by 3rd party Solar Supplier/Installer	$ (37,330,000)	Pro: Remove canopy from capital cost to RACs. Con: Cars may be exposed to weather; and there will be an increase in number/size of floor drains	●				
3b	Idle Storage	Partial Canopy for Solar Installation	Alternate: Reduce Roof Canopy for Solar Panels over the parking stalls only, i.e. driveways are open to sky (say 30% reduction)	$ (11,196,000)	Pro: Partial reduction in capital cost to RACs. Con: Cars will be partially exposed to weather; and there will be an increase in number/size of floor drains		●			
3c	Idle Storage	Storage At Grade	Alternate: Delete Idle Storage (IS) from Level 4 and accommodate IS on site at grade level, open parking - provide canopy roof at Level 3 Ready/Return both decks	$ (45,377,000)	Pro: Eliminate cost of structured vehicle storage. Con: 39% of cars in uncovered area; longer vehicle travel distances to ready/return and QTA; increases stormwater retention requirements; loss of land for commercial development			●	●	
4.1	Employee Parking	Eliminate Level 5 Deck	Delete Level 5 Employee Parking and portion of Helix	$ (47,141,000)	Eliminate cost of structured employee parking	●	●	●	●	
4.2a	Employee Parking	Located At Grade	Relocate to on site parking at grade (part covered under QTA; part open at N/E site)	$ 10,382,000	Pro: Utilizes space under the QTA; 68% of parking is under cover	●	●			
4.2b	Employee Parking	Located At Grade But Off-Site	Alternate: Relocate to on site open parking at grade South of 98th St.	$ 6,365,000	Con: Long walking distances to majority of site; will probably require staff shuttle transportation (capital and O&M not included here)			●	●	
5	Site Works	Reduced Landscaping	Revise 50% of open site area with gravel layer finish instead of full landscaping allowance	$ (6,465,000)	Pro: Reduces capital and O&M for landscaping. Con: Increases stormwater requirements	●	●			●
					POTENTIAL COMBINATION SAVINGS =	$ (165,630,000)*	$ (144,715,300)*	$ (170,099,300)*	$ (89,263,000)	$ (129,826,000)
					* Totals Adjusted to 80% for overlaps					
					REVISED TOTAL PROJECT COST	$ 815,380,000	$ 836,284,600	$ 810,900,800	$ 891,737,000	$ 851,174,000

Phased Construction for 24% Growth	($ 123.4 M)

Cost Refinements – Option 1



Metal Canopy Over Level 3 of QTA – Except for Washbays/Offices/Etc.	($ 3.11 M)

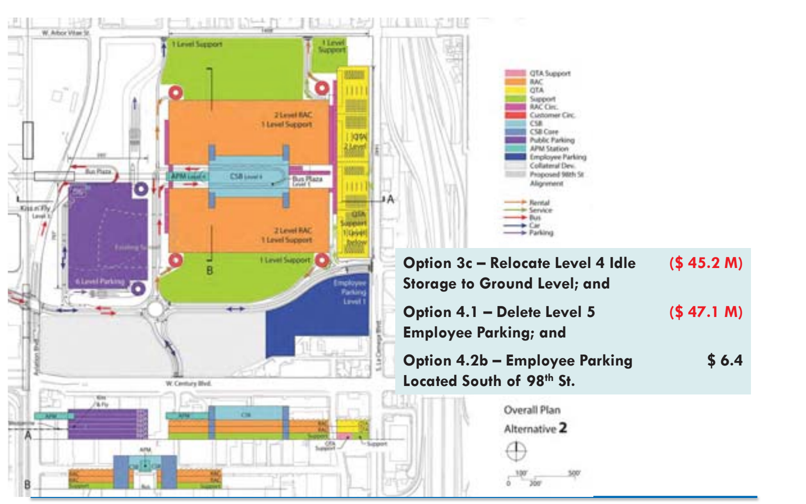
Cost Refinements – Option 2

Option 3a – Level 4 Idle Storage Canopy by Solar Installer; or	($ 37.3.M)
Option 3b – Canopy Over Level 4 Idle Storage Stalls Only; and	($ 11.2 M)
Option 4.1 – Remove Level 5 Employee Parking	($ 47.1 M)

Cost Refinements – Eliminate or Modify Level 4 Canopy & Remove Level 5 Employee Parking

Relocate Employee Parking to Grade Under the QTA and North of the QTA	$ 10.4 M

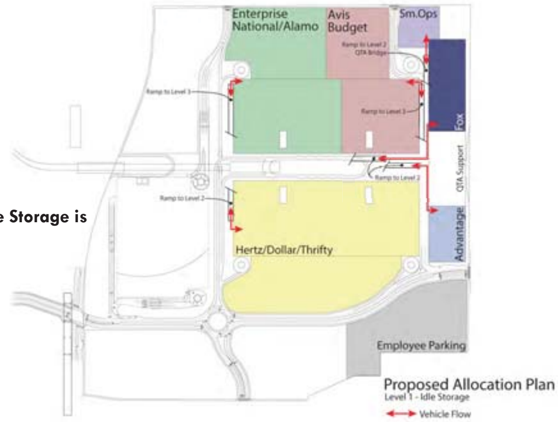
Cost Refinements – Option 4.2a



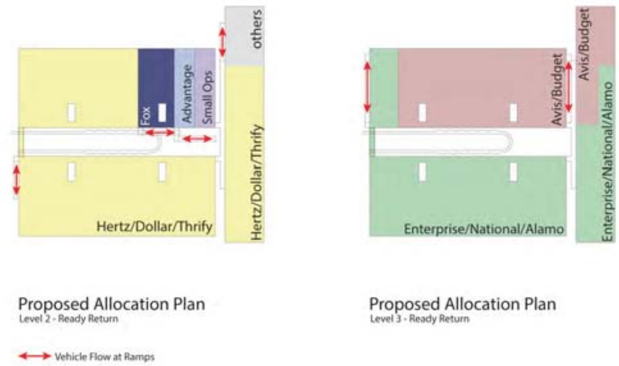
Option 3c – Relocate Level 4 Idle Storage to Ground Level; and	($ 45.2 M)
Option 4.1 – Delete Level 5 Employee Parking; and	($ 47.1 M)
Option 4.2b – Employee Parking Located South of 98th St.	$ 6.4

Cost Refinements – Relocate Level 5 Employee Parking and Level 4 Idle Storage to Grade

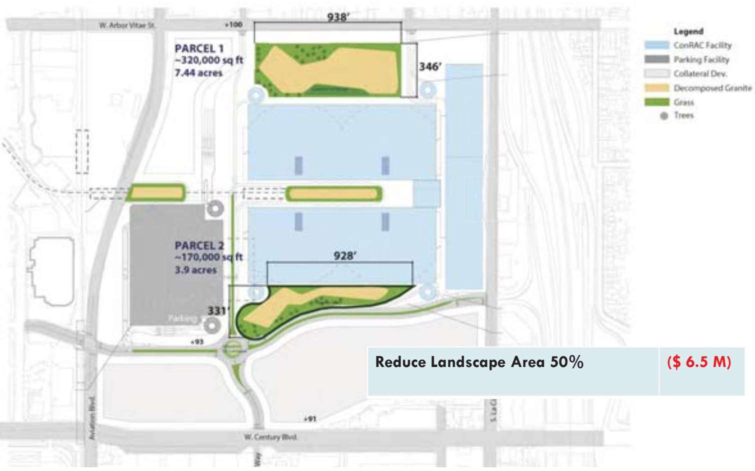
39 % of Idle Storage is in the Open



Cost Refinements – Option 3c + 4.1 + 4.2b
Ground Level Allocation Plan



Cost Refinements – Option 3c + 4.1 + 4.2b
Levels 2 and 3 Allocation Plan



Reduce Landscape Area 50%	($ 6.5 M)

Cost Refinements – Option 5

LAX CONRAC — DRAFT FOR DISCUSSION ONLY

SUMMARY OF COST REFINEMENT OPTIONS FOR ALTERNATE 2
BASE COST FOR ULTIMATE DEVELOPMENT = $981 MILLON

1/16/2015 — FAITHFUL+GOULD

	Facility	Title	Component/Proposals	Alternative 2 ROM $	Notes	COMBINATIONS I	II	III	IV	V
1	QTA/RR/IS/EP	Phased Development	First phase of garage will accommodate 34% growth vs 42% growth required for Ultimate Development	$ (129,961,000)	Envisions ultimate development to be completed in the future as demand grows	●	●	●		●
2	QTA Roof	Metal Roof for QTA in Lieu of Concrete Roof	Pre-engineered metal roof at Level 3 of QTA except over the washbays and office areas	$ (3,110,000)	Goal is to reduce initial capital cost and ongoing O&M for the QTA roof	●	●	●	●	
3a	Idle Storage	Full Canopy for Potential Solar Installation by 3rd Party	Roof Canopy and steel framing for Level 4 to be supplied by 3rd party Solar Supplier/Installer	$ (32,340,000)	Pro: Remove canopy from capital cost to RACs. Con: Cars may be exposed to weather; and there will be an increase in number/size of floor drains	●				
3b	Idle Storage	Partial Canopy for Solar Installation	Alternate: Reduce Roof Canopy for Solar Panels over the parking stalls only, i.e. driveways are open to sky (say 30% reduction)	$ (11,199,000)	Pro: Partial reduction in capital cost to RACs. Con: Cars will be partially exposed to weather; and there will be an increase in number/size of floor drains		●			
3c	Idle Storage	Storage At Grade	Alternate: Delete Idle Storage (IS) from Level 4 and accommodate IS on site at grade level, open parking - provide canopy roof at Level 3 Ready/Return both decks	$ (95,377,000)	Pro: Eliminate cost of structured vehicle storage. Con: 39% of cars in uncovered area; longer vehicle travel distances to ready/return and QTA; increases stormwater retention requirements; loss of land for commercial development			●	●	
4.1	Employee Parking	Eliminate Level 5 Deck	Delete Level 5 Employee Parking and portion of Helix	$ (47,141,000)	Eliminate cost of structured employee parking	●	●	●	●	
4.2a	Employee Parking	Located At Grade	Relocate to on site parking at grade (part covered under QTA; part open at N/E site)	$ 10,382,000	Pro: Utilizes space under the QTA; 69% of parking is under cover	●	●			
4.2b	Employee Parking	Located At Grade But Off-Site	Alternate: Relocate to on site open parking at grade South of 98th St.	$ 6,305,000	Con: Long walking distances to majority of site; will probably require staff shuttle transportation (capital and O&M not included here)			●	●	
5	Site Works	Reduced Landscaping	Revise 50% of open site area with gravel layer finish instead of full landscaping allowance	$ (6,465,000)	Pro: Reduces capital and O&M for landscaping. Con: Increases stormwater requirements	●	●			●
					POTENTIAL COMBINATION SAVINGS =	$ (165,620,000)*	$ (144,715,200)*	$ (170,099,200)*	$ (89,263,000)	$ (129,826,000)
					* Totals Adjusted to 80% for overlaps					
					REVISED TOTAL PROJECT COST	$ 815,380,000	$ 836,284,800	$ 810,900,800	$ 891,737,000	$ 851,174,000

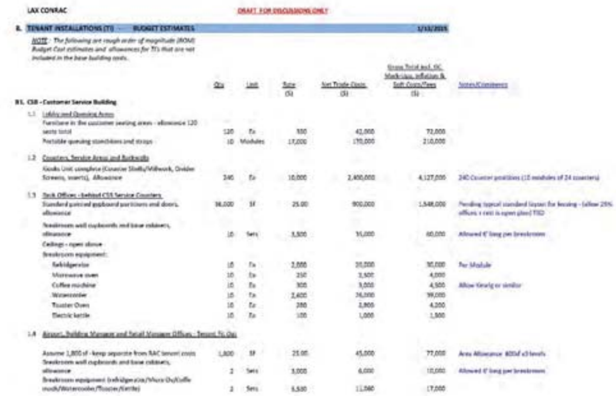
LAX CONRAC — DRAFT FOR DISCUSSIONS ONLY

A. ITEMS INCLUDED IN BASE BUILDING — 1/13/2015

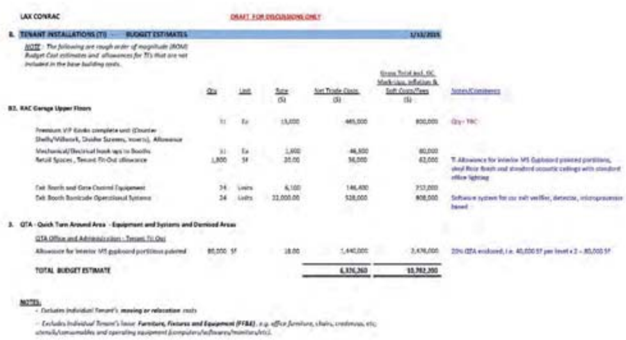
	Qty	Unit	Net Trade Costs ($)	Gross Total Incl. GC Mark-Ups, Inflation & Soft Costs/Fees ($)	Notes/Comments
A1. CSB - Customer Service Building					
1.1 Lobby and Queuing Areas					
Partitions to CSB Modules (standard gypboard partitions)			In Base Building	In Base Building	Main dividing partition into 10 module sectors per attached plan
Standard vinyl/carpet floor finish, allowance			In Base Building	In Base Building	
Ceilings - open above			In Base Building	In Base Building	
1.2 Counters, Service Areas and Backwalls					
Communications, Voice & Data (empty conduits)			In Base Building	In Base Building	
Electrical Service - power points			In Base Building	In Base Building	
Standard lighting			In Base Building	In Base Building	
1.3 Back Offices - behind CSB Service Counters - Tenant Fit Outs					
Breakroom sink	10	Ea	In Base Building	In Base Building	
Standard vinyl/carpet floor finish, allowance			In Base Building	In Base Building	
Ceilings - open above					
1.4 Airport, Building Manager and Retail Manager Offices - Tenant Fit Out					
Breakroom sink	2	Ea	In Base Building	In Base Building	
Standard carpet floor finish, allowance			In Base Building	In Base Building	
Ceilings - standard acoustic T system, 2x4			In Base Building	In Base Building	
A2. RAC Garage Upper Floors - RAC Supplied Items					
Communications, Voice & Data (empty conduits)			In Base Building	In Base Building	
Electrical Service - power points			In Base Building	In Base Building	
Floor Striping - Primary Circulation and stalls			In Base Building	In Base Building	
Floor Striping - Stalls			In Base Building	In Base Building	Per RAC Striping Plan
Emergency eyewashs			In Base Building	In Base Building	
Maintenance Lift Equipment			In Base Building	In Base Building	Only built in hydraulic lifts; loose/portable equipment by Operating Tenant

Tenant Areas – Constructed as Part of Building Shell & Core

Tenant Areas – Constructed as Part of Building Shell & Core



Cost Estimates/Allowances for Tenant Improvements by Tenant



Cost Estimates/Allowances for Tenant Improvements by Tenant

Tenant FF&E to be Provided by Tenant

Schedule Next RAC Industry Meeting

Project Definition Document to be Completed – End of February

Next Steps

Objectives and Organization

KEY OBJECTIVES

- **Establish that the preferred alternative is affordable**
- **Agree on what issues need to be resolved, and/or information that is needed to reach agreement on an MOA by December 31, 2015**
- **MOA structure and key business terms that will increase the certainty of achieving a favorable outcome for LAWA/RAC**

ORGANIZATION OF DOCUMENT

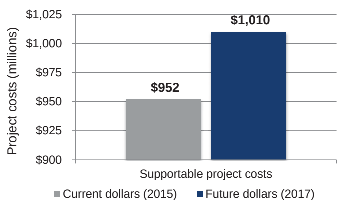
- **Affordability analysis**
- **Business deal elements**
- **Flow of funds**
- **Next steps**

Affordability Results

Updated Results

Additional Information in Appendix A

- **A ConRAC project cost of approximately $1.0b is supportable (in 2017 dollars)**



- **The CFC is assumed to ramp up to maximum legally permitted level and secured by 1/1/2018**
- **Taxable special facility (SFB) bonds are expected to fund costs**
- **Actual average transaction days charged a CFC (data excluding 5-day max)**

Transaction Days @ 3.43	
Bond interest rate	**6.5%**
Term	30 years
Construction period	4 years
Annual debt service payments	$93,637,000
Financing costs at bond sale	
Debt service reserve fund	$93,637,000
Rolling coverage	$28,091,000
Renewal and replacement	$30,300,000
Costs of issuance	$23,208,000
Total financing costs	**$175,236,000**
Interest paid with CFC balances during construction	**$301,700,000**

Key Risks, Mitigation, Conclusion

KEY RISKS

- **Construction cost escalation is greater than assumed; costs of materials greater than expected**
- **Transactions do not increase at the projected rate (2% per year)**
- **Minimal net CFC revenues after debt service, resulting in (1) greater likelihood of triggering supplemental consideration and (2) lower probability of subsequent reimbursements and offsets**
- **CFC revenues are suspended (Section 4.j of Third Amendment)**

MITIGATION

- **Separate "wants" and "needs" in ConRAC project**
- **Convert specific project elements into rent**
- **Develop strategy for supplemental consideration for the post-construction period**

CONCLUSION

- **We can fund the cost of Alternative 2 up to $1.0 billion in project costs in 2017 dollars, or $952 million in 2015 dollars (using a 3% discount rate), but manageable risks exist**

Prioritizing Use of CFCs

	New Column				New Column
	CFC eligible costs (a)	**Source of Funds**	**CFC Revenues**	**Rental Car Companies**	**LAWA**
ConRAC Facility					
Capital costs	**X**	SFBs	X		
Operating expenses				X	
Ground rent				X	
Renewal and replacement	**X**	SFBs	X		
Transition allowance	**X**	SFBs	X		
Tenant improvement allowance	**X**	SFBs		X	
Common Transportation System					
O&M Expenses	**X**		X-TBD	X-TBD	**X-TBD (b)**
Capital costs	**X**	GARBs	X-TBD		**X-TBD (b)**

SFBs = Special Facility Bonds; GARBs = General Airport Revenue Bonds.

(a) Actual eligibility to be determined and approved pursuant to Section 1936 of the State of California Civil Code for those costs proposed to be funded by CFC revenues.

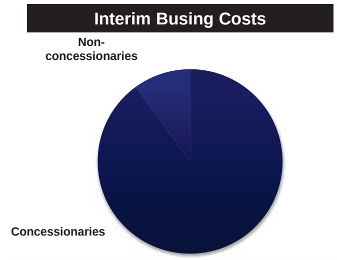
(b) That portion of the common transportation system, if any, between the proposed ConRAC and the Central Terminal Area that would be funded from sources other than CFC revenues and/or rental car companies.

- **Planning, design and other costs paid from CFCs**
- **O&M expenses for CTS to include interim busing costs, and any CFC-eligible single level busing terminal infrastructure costs**

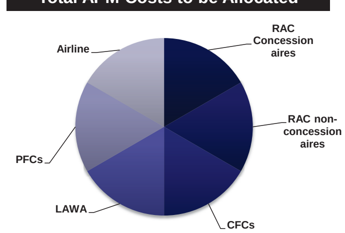
Illustrative: Interim Busing Costs/APM

- **Without a reduction in the ConRAC facility, interim busing costs would be paid by concessionaires and CFCs from non-concessionaires**
  - **CFCs from non-concessionaires will be based on common use transportation costs**
- **Double-busing ordinance would apply to interim busing and APM; non-concessionaires would collect a CFC based on common transportation costs**
- **Common transportation costs would also be paid from CFCs collected non-concessionaries**

Interim Busing Costs



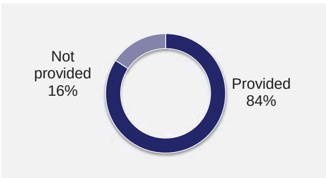
Total APM Costs to be Allocated



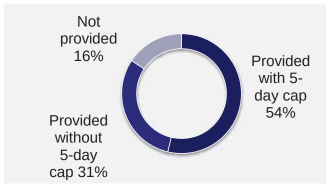
RAC Provided Data

- Requests for transaction day data were distributed to the industry following the November 18 meeting
- <u>*Confidentiality of the data has been maintained*</u>
- 84% of on-Airport rental car companies have reported transaction day data (left chart)
- 54% of responding RACs provided transaction days equal to 5-days or less

Percentage of on-Airport Companies that have Reported

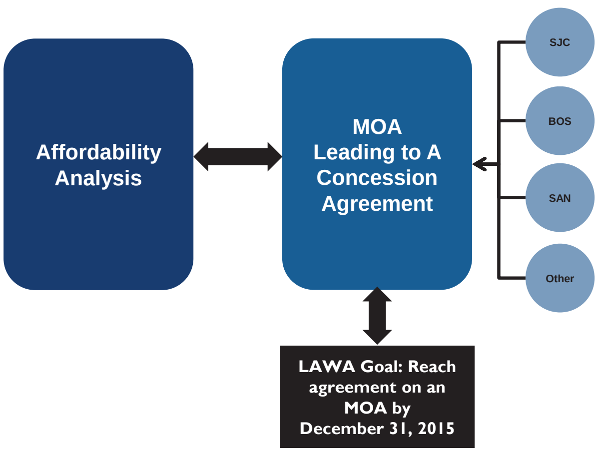


Reporting Types



Business Deal Structure

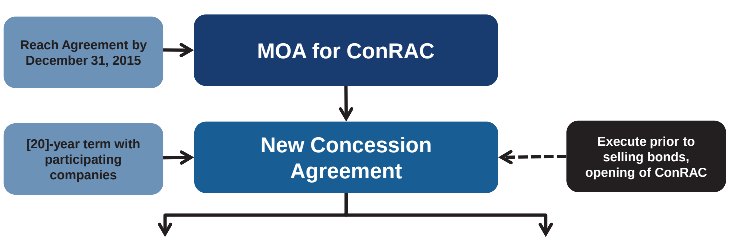
Affordability and MOA



MOA

- Need to identify those business terms that need to be resolved with RACs and/or what information is necessary to reach agreement on the MOA by December 31, 2015
- The MOA would lead to the execution of a new long-term ConRAC concession agreement, which would serve as an umbrella agreement for occupancy in the ConRAC
- Use BOS as a template for an MOA
- The focus should be on those provisions that will increase the level of certainty for the RACs

MOA and Concession Agreement



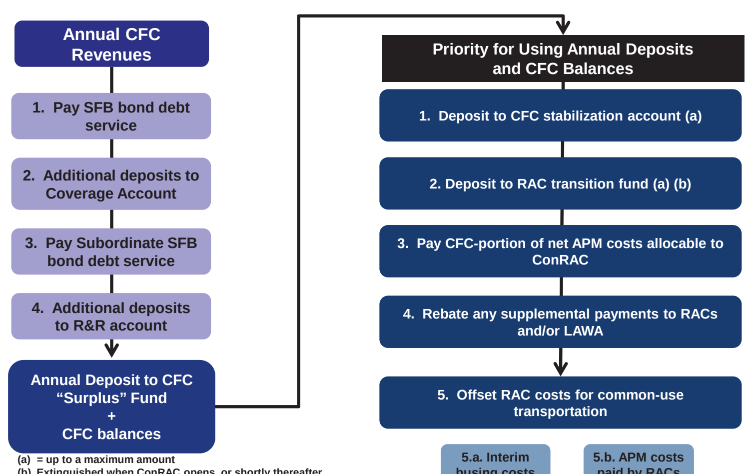
STIPULATES

- Companies to collect a CFC, pay the privilege fee, MAG, etc.
- Payment of interim-busing costs/portion of APM system
- LAWA to make available space in the ConRAC; right to enter into facility lease
- Collection of CFC by off-Airport companies for common use transportation

PROVIDES

- Concession rights in ConRAC for [20]-years; terminate Third Amendment
- Priority for how CFCs will be used, including reimbursement of supplemental consideration and other offsets
- Double-busing obligations
- Reallocation provisions

Preliminary Use of CFC Revenues



(a) = up to a maximum amount
(b) Extinguished when ConRAC opens, or shortly thereafter.
(c) No longer in operation upon opening of APM.

- **Would be enabled under the new ConRAC concession agreement**
- **Term would be for [10] years**
- **Would principally cover the use and lease of ConRAC facilities**
- **Rent obligations would be**
  - Rent for any tenant improvement allowance made available by LAWA
  - Payment for ConRAC operating expenses
  - Ground rent
- **Default under the new concession agreement would lead to facility lease termination**

Facility Lease

- **Confirm preferred physical planning alternative**
- **Collect transaction data pursuant to the RAC amendments; update affordability analysis as more transaction day data becomes available**
- **Get RAC reaction to risk factors and mitigants**
- **Develop and agree to MOA with rental car companies**
- **Execute new concession agreement for ConRAC that replaces existing LAX agreements**

Next Steps/Process

Appendix A

- **The CFC would change/increase based on milestones/performance triggers:**
  - $10 per transaction until construction starts
  - At construction (2017), increase the CFC to $7.50 per transaction day
  - When ConRAC opens (2021), increase CFC to $9.00 per day
  - Receive approval to change CFC prior to January 1, 2018
- **Use actual average transaction days of 3.43 (after the 5-day cap)**
  - Does not include data from two rental car companies
  - Historical data from some companies does not separately identify transaction days above the 5-day max
- **Transaction days assumed to increase at 2% per year, consistent with long-term passenger growth reflected in recent LAX bond documents (= proxy for transaction day growth)**

CFC Assumptions

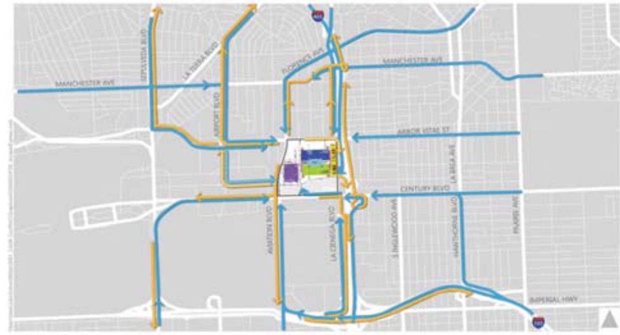
- **Issue SFBs backed by CFC revenues**
  - Annual CFC revenues in 2024 used to determine affordability
  - Amortize SFBs over 30 year period
- **To date, CFC collections to be used to pay interest during construction, which will increase overall affordability; defer the issuance of bonds as long as possible to minimize interest costs**
- **Financing costs assumed to be funded from SFB proceeds**
  - Debt service reserve account (one year of principal and interest)
  - Costs of issuance (2% of bond principal amount)
  - Rolling coverage account (equal to 30% of annual debt service)
  - Renewal and replacement account (3% of project cost as initial deposit)

Financing Details

Purpose of Traffic Analysis

- Provide high-level overview of the traffic and multi modal circulation patterns surrounding the Manchester Square
- Understand how future traffic patterns may influence the shape and location of the ConRAC program components
- Identify right-of-way requirements and intersection geometry for project internal and external roadways
- Ensure safe/efficient operations for the rental car facilities

Future CONRAC Traffic Patterns

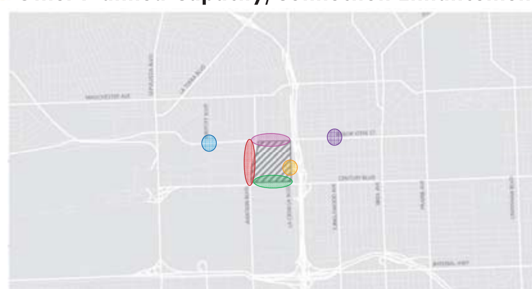


CONRAC Site
Existing Site Access
New Site Access
Existing Site Egress
New Site Egress

Future Access/Egress Routes

Opportunities for New Arbor Vitae On-Ramp to I-450/I-105

Other Planned Capacity/Connection Enhancements



- Arbor Vitae Street: Add one through lane in each direction
- Aviation Boulevard: Add one through lane in each direction
- Century Boulevard: Streetscape Improvements
- I-405 ramps at La Cienega: Widen off-ramp from 2 to 3 lanes; Restripe La Cienega to provide additional left turn capacity
- Restripe Arbor Vitae and Airport approaches to increase through capacity
- Restripe Inglewood approach to increase through capacity

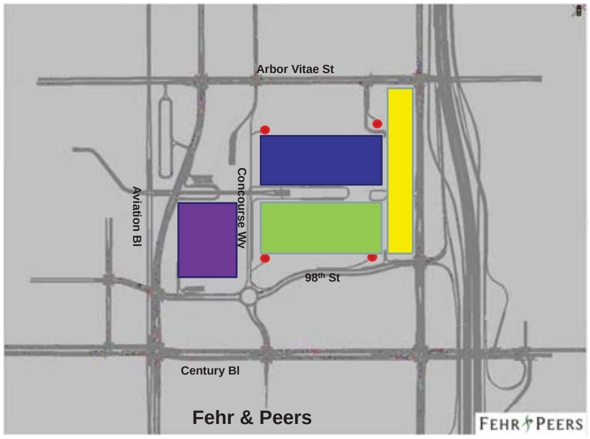
Resources and Analysis Tools

- Rental car transaction data
- LAWA parking and driveway traffic count data
- LAX Passenger Survey
- City's travel demand forecasting model for LAX Specific Plan Amendment Area
- Multi-Model Traffic Simulation/Operations Model

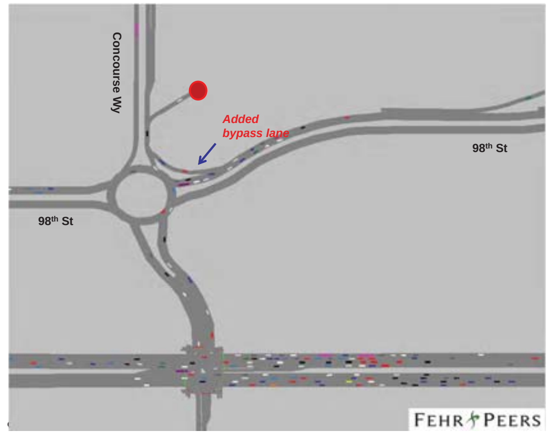
Key Data Inputs for Microsimulation

- Traffic forecasts
  - Rental Cars Customers and Employees
  - LAWA Employees
  - Park-and-fly, Shuttles, and Buses (East ITF)
  - Other non-ConRAC related traffic growth
- Corridor control, geometry, signal timings, etc
- Crenshaw LRT grade-crossing preemption/operations
- Bus/Shuttle routes, frequencies, and stops

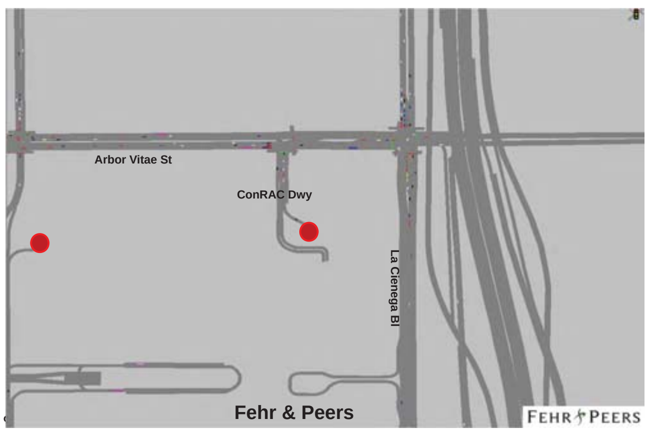
Midday Peak Hour Traffic Simulation Overview



Midday Peak Hour Traffic Simulation Snapshots Roundabout

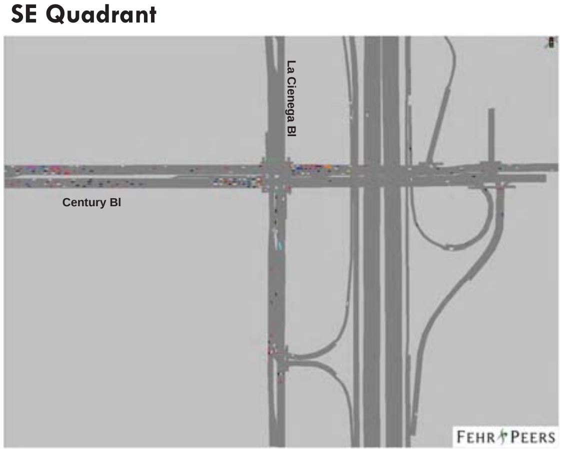


Midday Peak Hour Traffic Simulation Snapshots NE Quadrant



Midday Peak Hour Traffic Simulation Snapshots NW Quadrant

Midday Peak Hour Traffic Simulation Model Snapshots SE Quadrant



Next Steps

- Develop cross-section of the surrounding roadways
- Finalize roadway geometry to ensure safe/efficient operations for the rental car facilities
- Continue identifying opportunities for freeway and surface road connections

TranSystems

ATTENDANCE ROSTER

Project	Con RAC Programming and Planning Los Angeles International Airport	Date:	January 21, 2015
		Time:	10:00am
Re::	RAC Industry Meeting	Location:	Admin. Bldg. – LA NEXT Conference Room

Name	Representing	Telephone Number	Email Address	
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Tamami Yamaguchi	LA City Atty		~~[illegible]~~ tyamaguchi@lawa.org	
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LAX CONRAC – RAC Industry Meeting No. 7
March 10, 2015 10:00 – 12:00pm PST
Location: LA NEXT Conference Room, LAWA Administration Building

Attending:
LAWA – Steve Martin, Cynthia Guidry, , Debbie Bowers, , Fatima Hashim, Pat Tomcheck.
Advantage – Joe Olivera (phone),
Avis – Lorraine Tallarico (phone),
Enterprise (EHI)-Peter VanValkenburg, Bill Bettison
Fox Rent A Car-Arnold Goehring
Hertz-Connie Gurich
Sixt – Jeff Heileson, Clemens Schoenberger, Tim Vetters
WJ Advisors (WJA) – Warren Adams
TranSystems (TSC) – Jeff Jarvis, Chuck Rowe, Doug Steen, Norman Lin, Justin Neel

The purpose of the meeting was to review the review the development of a new concept – including estimated costs - using the previous ConRAC Alternative 3 as a base, requested by the RACs at the January 21, 2015 meeting. This new option is Alternative 4. An update to the financial analysis and business agreement structure was also presented. The items discussed and the feedback/refinements suggested by LAWA and the rental car representatives are noted below. Items in Bold Font represent action items to which the design team, the RACs or LAWA will respond.

ConRAC Program/Refinements and New Alternative 4

1. Pat Tomcheck provided an update of the overall Landside Access Modernization Program (LAMP). Steve Martin presented an update to the Board on February 19th. The EIR on the LAMP program (of which the ConRAC is a component) is anticipated for completion in 2017.
2. Jeff Jarvis began the presentation of the new Alternative 4 by reviewing the RAC program – it has remained the same, since the January 21st meeting.
3. In response to the RACs request, Alternate 3 has been modified so the floor plate for all three levels is the same (Alternate 3 had different sized plates with Level L1 larger than the other two.
4. In Alternative 4, the walking distances from the vertical cores to the ready/return areas are the same on each level.
5. The Idle Storage in Alternative 4 is now positioned between the Ready/Return and the QTA. The vehicular connections are direct and secure between all areas; Ready/Return, Idle Storage and QTA.
6. Alternate 4 has two three-level QTA modules, with at - grade support located between the two modules. In addition, there are two at-grade QTAs for use by small operators envisioned to be accessible from Ready/Return located on either Levels 1 or 2.
7. Mr. Jarvis explained that independent operators would not be on Level 3
8. In Alternative 4, there will be a bus ramp, located on the west side of the garage, to provide access to the CSB on Level 4, with a drop off and pick up curb on the east side of the CSB.
9. The proposed APM station is located on the west side of the CSB.
10. Peter VanValkenburg commented the sharing of the bus ramp with employee parking access is a concern. The buses should have their own dedicated access, even though the bus operation will only be used prior to the opening of the APM.
11. Jeff Heileson is concerned the 5% allowance in the program for independent operators will not provide for expanded facilities.
12. Jeff Jarvis pointed out the Ready/Return floor plates can accommodate changes in market share, with additional flexibility to expand the at grade QTAs

13. The projected costs for Alternative 4 are slightly less than Alternative 3 because the structured roof over the Level 3 Ready/Return area is used for employee parking on Level 4.
14. Jeff Jarvis, in response to a question from Joe Olivera, confirmed that the same program was used for Alternates 3 and 4.
15. Hypothetical allocation plans were shown to demonstrate possible/sample configurations only, not to represent actual circumstances.
16. The design team will be using this concept as the project moves forward. Mr. Jarvis indicated we owe more information on the QTA. The circulation issues with bus and employee parking will also be reconsidered.
17. The RACs indicated they believe Alternative 4 is generally headed in the right direction
18. LAWA indicated the ConRAC program was developed using current the concessionaires operational requirements, with the added 5% to accommodate independent operators whom would be interested in participating in the future ConRAC.. LAWA believes the overall capacity of the ConRAC will handle the full scale of the program, with flexibility within the design to handle varying proportions of both independent and corporate operators.
19. Peter VanValkenburg reinforced that it is important to know what the program needs are for the entire operation. He believes the concession fee should be paid now, by all interested participants, so that the market can be tracked to allow for accurate allocation in the future.
20. Steve Martin indicated the LAWA board will not allow charging independent operators who have previously been denied access. LAWA needs to develop a process by which all interested concessionaires have access to the project. This is LAWA's intention going forward.
21. Joe Olivera pointed out that it is not correct to assume smaller companies are not paying into the project now. Advantage and EZ are already included as independent operators
22. Steve Martin stated it will be a matter of timing to determine who will be in for the long term. LAWA will come up with a process outlining a set of rules for non-concessionaires
23. Lorrie Tallarico observed this is a dilemma that every airport faces, with companies that may not currently be on airport. She also shared the following comments:
    a. 5% placeholder is somewhat arbitrary – there is historical data throughout the country that indicates independent operators do not have more than 1% of the overall market.
    b. You can only afford and build so much space – there is a balance between real requirements and accommodating future growth.
    c. You cannot take away from space needs of known companies.
    d. The issue to resolve is how much of the space to be built can be given for independent operators,
    e. The program should have the flexibility to allow adjustments, when the real numbers are known; but historically there has not been an indication the market share will be more than 5% for independent operators.
24. Jeff Jarvis indicated the new entrants should submit data to help validate the 42% growth planned.
25. The 5% ratio for independent operators equates to about 380 ready/return spaces
26. Arnold Goehring shared that at ORD all interested parties had the opportunity to bid; subject to the CFC. All companies were allowed to pick up on airport.
27. On April 16th Steve Martin and Pat Tomcheck will request the LAWA board approve an amendment to the TranSystems contract to proceed with more advanced level of planning and design, especially for the QTA. This will include working with safety and fire code officials on the code compliance for the QTA. TranSystems is also being asked to develop conceptual design for the Customer Service Building

Financial Affordability and Business Deal Structure

28. Steve Martin, provided an introduction to the financial discussion, indicating the RACs should continue to work on the development of Alternative 4 to resolve the customer experience issues; a better level of service that will result in less complaints. Meanwhile, LAWA will work with the RACs to ratchet up the predictability in the business deal. LAWA is committed to identifying a business arrangement with costs that all can take on. The intention is to develop a business framework that will allow the Airport and the RACs to move forward.
29. The LAWA Board is used to using concession agreements for operators at the airport. Mr. Martin described an approach where there would be a concession agreement to allow a company to operate at LAX, combined with a lease/occupancy agreement to ensure a place for the company to operate. The occupancy agreement would be subordinate to the concession agreement
30. The concession agreement may have a 20 year term with extensions.
31. It will be a challenge to sell to the LAWA Board an agreement with a 30 year term.
32. It would be LAWA's obligation to provide land for the ConRAC, under the occupancy agreement
33. The existing concession agreement would end in 1.5 years from now once the new agreement becomes effective.
34. Joe Olivera stated that to carry a concession agreement on the books for 20 years, rather than 10 would add increased liability to the RACs.
35. Steve Martin indicated it would be the Airport's obligation to house the companies signatory to the agreement for the length of the term, with the concession agreement as an umbrella. LAWA understands the industry needs certainty on where they would be housed
36. Lorraine Tallarico shared her concern in regard to the amortization with a 10 year lease for capital improvements, as a short write off period. Warren Adams reminded the rental car companies that LAWA currently intends to fund tenant improvements, so linking agreement term with depreciation is not important.
37. LAWA believes the lease term could link the Concession Agreement in such a way as to allow the proposed capital improvements to be retired over a time period longer than current model.
38. LAWA doesn't do long term leases with airlines at LAX.
39. Peter VanValkenburg observed that since the RACs will be giving up current space, the need to know they can operate in the new space as their home for the useful life of project
    a. Peter stated EHI can't have terms changing over time – he expects the ground rent should be fixed for the entire term.
    b. He also suggested the MAG commitment needs to be flexible; can't have risk of changes in rent and other costs
40. Connie Gurich said the RACs should be treated like the airlines, for which she said LAWA has spent $3B for airlines.
41. Mr. VanValkenburg observed there is no other use for an airline terminal; whereas there are other uses possible for a ConRAC, such as public parking or other development
42. LAWA suggested they will continue to work with the RACs to address the balance of these issues; but they need to know who will be in for the long haul. Steve Martin believes LAWA can work through the many future changes that can be accommodated within a lease/agreement.
43. The agreement structure could be structured to allow for different starting times.
44. Warren Adams presented an updated financial analysis based on the cost of the project at around $993M, as presented in Alternative 4 could be built based on the future projected CFC flows.
45. The $6/SF assumed ground rent, in 2015 dollars, is based on Avis Budget recent appraisal. Upon occupancy of the ConRAC, the ground rent would be reduced, since the project is going vertically, rather than horizontally. The site area is estimated at 68 acres.

46. The financial analysis assumes the Industry would likely have a third party operator to manage the operation and maintenance of the facility, including the fuel system. The third party operator may be retained through a consortium created by and paid for by the RACs.
47. In response to a question from Avis/Budget, LAWA explained that the proposed Fair Market Value (FMV) reset for the ground rent every 5 years is a City Charter requirement – it would require an amendment to the charter to eliminate the 5 year FMV reset.
48. LAWA explained the FMV reset of the ground rent is intended to alleviate the RAC's concern that the land acquisition will be more than the actual value of the land.
49. The ground rent used is based on an allowance for a 5 year appraisal of the FMV of the existing Avis Budget; site.
50. Peter VanValkenburg reiterated that the RACs should not be put in a situation where they are vulnerable to additional costs and increases in fees.
51. RACs would make a contribution of the airport transportation system. This amount would be linked to actual costs of their current busing operations estimated at $40M to $47 M (in 2015 $)
52. The APM is CFC eligible; to cover the RAC portion of the APM, the CFC would have to be set at $14 - $15/day;
53. As an alternative to raising the CFC to cover the RAC portion of the APM, the projected amount of CFCs available, based on the current charge, could be allocated to the common transportation system costs. The result of doing this is a ConRAC that could only cost $450M.
54. At the January 2015 meeting, Avis Budget referred to language specific to the SFO facility allowing for application of a city and county transportation fee for the SFO APM. LAWA explained this was unique to SFO. California law would not allow a transportation fee for the LAX APM.
55. The analysis assumes a 2.3%/year growth in transactions. As insurance for a short-fall in transaction days, the RACS would cover the difference in actual and projected CFCs.
56. The analysis of known costs indicates the facility operation costs to be determined. The RACs pointed out that facility O&M is allowed for CFC in other states. Mr. VanValkenburg again stated that the project needed to cover all the RAC costs - not some of the costs. Adams reiterated that California law does not allow CFC revenues to pay for ConRAC facility O&M costs.
57. The analysis projects a $12.5M/year cap for the Transaction Day Contingent Fee in 2026, equal to 50% of the debt service costs for the Idle Storage Area ($273M). LAWA will split the risk in any year with 50% on LAWA and 50% on the industry.
58. The transaction day contingent rent proposal would be triggered when there an approximate 35% drop in transactions - or a reduction in the transaction day rate of growth of 7% down each year for 5 years.
59. Mr. VanValkenburg believes contingent fee, versus the contingent rent, has better implications from a tax perspective
60. Tenant Improvement (TI) financing is available from bond proceeds. This amount needs to be fixed – it cannot be unlimited.
61. Avis Budget and EHI suggested that each company determine what their current operating costs are to compare to a projection of what their operating costs will be in the ConRAC.
62. The RACs indicated this approach is heading in the right direction. LAWA expects to receive further feedback from the RACs.
63. Mr. Adams has only received annual bussing cost information from EHI – he still needs it from the other companies. Avis/Budget and Advantage indicated their information is on the way.
64. Warren also needs to get a better handle on 5 day versus non - 5 day transaction data from the car rental companies based on the transaction day data that is supposed to be submitted to LAWA under the third amendment to the RAC agreeements.
65. The next financial and business meeting will be May 19, 2015 at 10am in the Next Conference Room at the LAWA Administration Building.

Attachments:
Presentation – Rental Car Industry Meeting – Facilities – March 10, 2015
Presentation – Rental Car Industry Meeting – Business Agreement and Financing Analysis – March 10, 2015
Attendance Roster – March 10, 2015

Cc: Attendees

Diego Alvarez,	LAWA
Rachelle Yuvienco	LAWA
Marcia Katnich	LAWA
Richard Christensen	Advantage
Jonathan Carrillo,	Advantage
Bob Bouta	Avis
Andrew Jaksich	Avis
Scott Goldstein	Enterprise
Gina Trimarco	TranSystems
Mark Pilwallis	Gannett Fleming
Larry Coleman	Lea + Elliott
Ben Feldman	Mia Lehrer
Roland Wiley	RAW International
Pari Ashabi	Walker Parking Consultants
John Muggridge	Fehr & Peers

Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING MARCH 10, 2015

FACILITIES

LAX
Los Angeles World Airports

TranSystems

1. Review of Program
2. New Alternative 4
3. Cost of Alternative 4
4. Allocation Strategy for Alternative 4
5. Update to Financial Analysis/Business Planning
6. Next Steps

AGENDA – Jan 21 2015 RAC Industry Meeting

	Design Basis			SF	Acres
Ready/Return Area	7,600	equivalent ready stalls			
				2,394,000	55.0
QTA					
fuel nozzles	170	360	sq. ft./nozzle	61,200	1.4
wash bays	48	1,650	sq. ft./bay	79,200	1.8
maintenance bays	60	720	sq. ft./bay	43,200	1.0
stacking/queuing stalls for vehicles	680	300	sq. ft./stall	204,000	4.7
add 68% x operational areas for circulation/support/offices				264,000	6.1
5% Contingency for small operators				33,000	0.8
QTA Area				684,600	15.7
CSB					
Leisure Counters	208	300	sq. ft./counter	62,400	1.4
Premium Counters	31	300	sq. ft./counter	9,200	0.2
Add 1.55 x Counter Area for Restrooms/Passenger Amenities/Circulation/Support				111,000	2.5
5% Contingency for small operators				9,100	0.2
CSB Area	equivalent to	800	sq.ft../counter	191,700	4.4
Idle Storage Required	11,000	191	sq. ft./stall 1/	2,206,000	50.6
Employee Parking	1,102	260	sq. ft./stall 1/	286,520	7.0
QTA Support and Additional Site Functions					
Visitor parking	100	320	sq. ft./stall 1/	32,000	0.7
Fuel Farm and Drop				8,800	0.2
Loading Dock/Service Yard				88,000	2.0
Car Carriers Load and Unload	15	720	sq. ft./carrier	10,800	0.2
QTA Support and Additional Site Functions				139,600	3.2
TOTAL CONRAC PROJECT				5,902,420	135.9

Additional Site Requirements

- Landscaping
- Retention
- Roadways
- Setbacks

Not Included in the Program

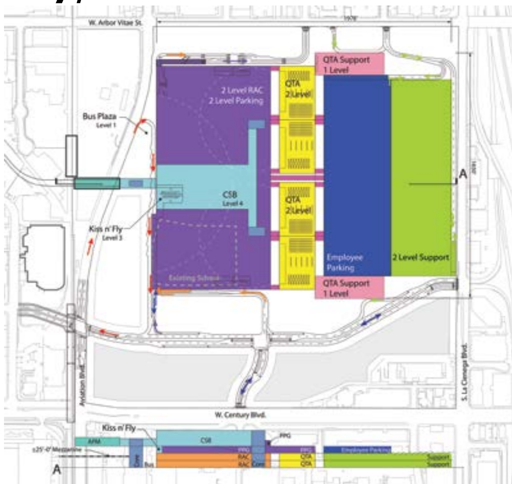
- Regional Offices
- Tow Backs
- Heavy Maintenance
- Accident Storage
- Massive Recalls

Updated Program – Ultimate Development

LAX
Los Angeles World Airports

TranSystems

Alternative 1 (former A-1)
2 Level Ready/Return – QTA – Idle Storage

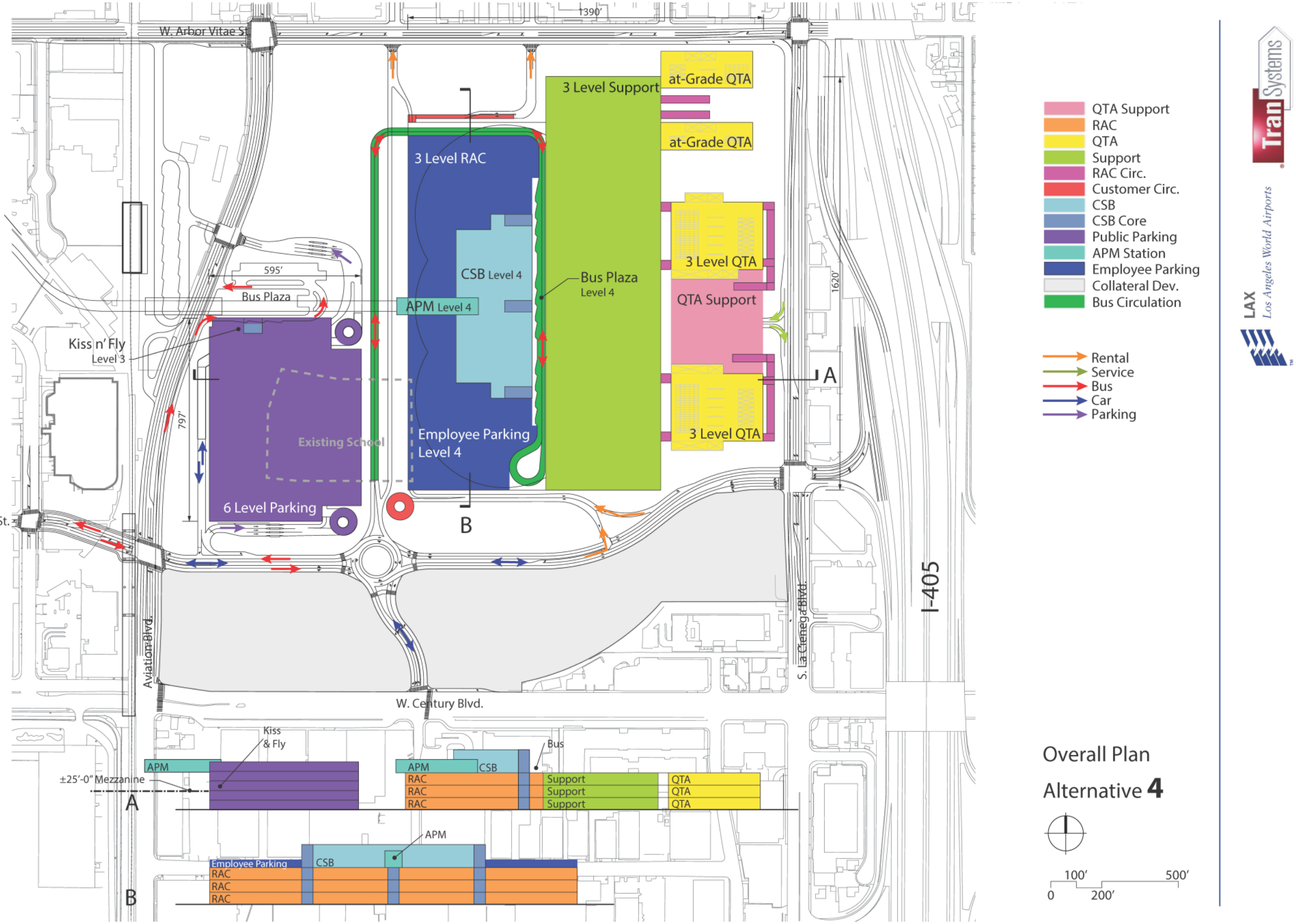


Alternative 2 (former A-3)
2 Level Ready/Return & QTA
Idle Storage Above & Below Ready Return

Alternative 3 (former B-1)
3 Level Ready/Return – QTA – Idle Storage

TOTAL ESTIMATED COST – ULTIMATE DEVELOPMENT	
Alternative 1 (former A-1)	$931,000,000
Alternative 2 (former A-3)	$981,000,000
Alternative 3 (former B-1)	$996,000,000

ConRAC Concepts – RAC Mtg. Jan 21st

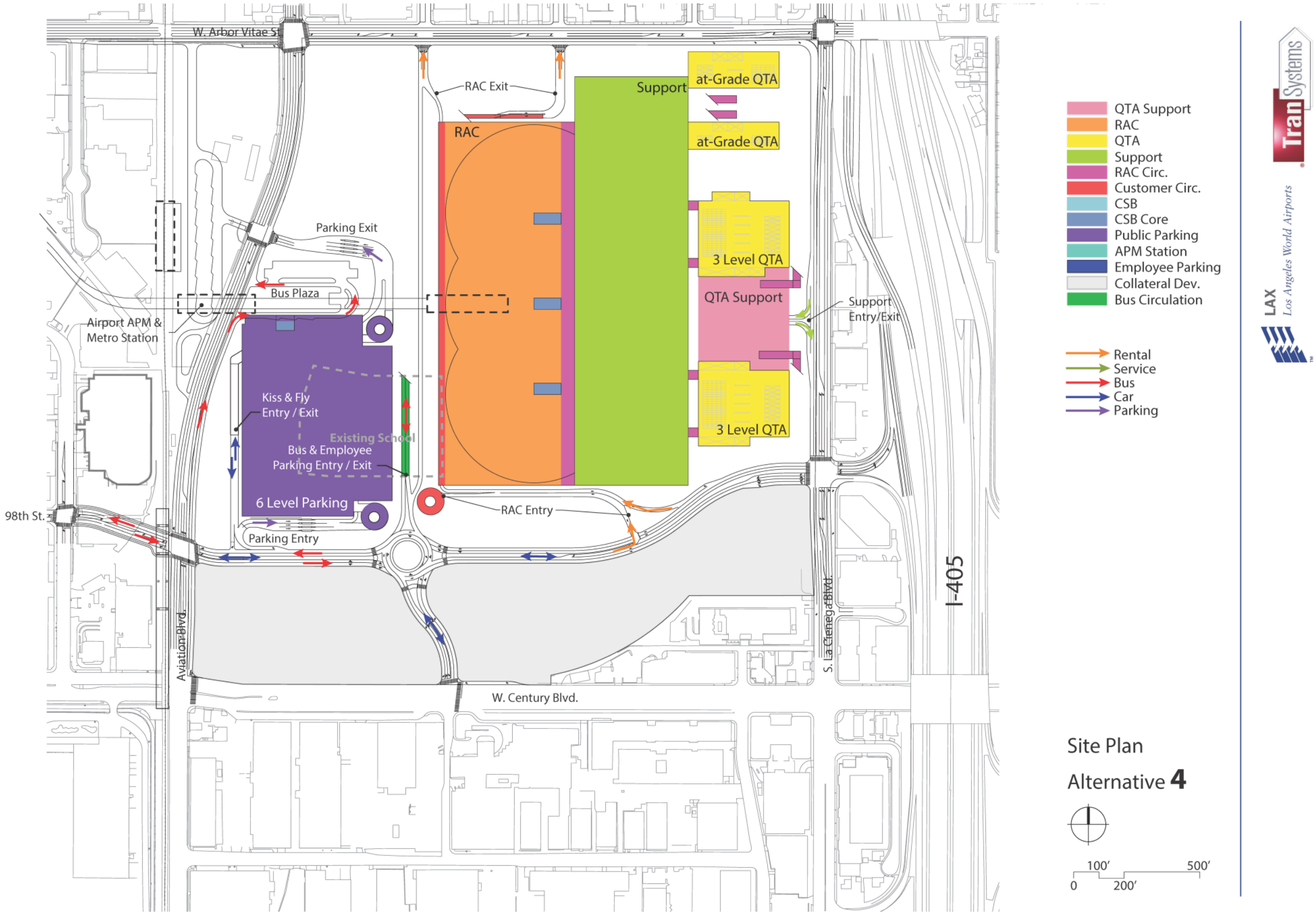


3 Level Ready/Return – Idle Storage - QTA

ConRAC Alternative 4 – Overall Plan

LAX
Los Angeles World Airports

TranSystems



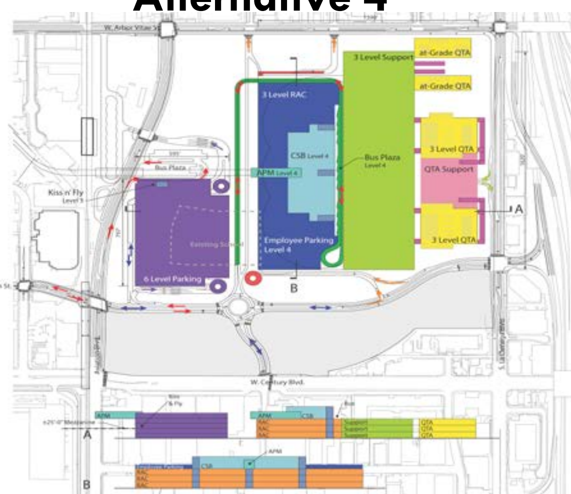
ConRAC Alternative 4 – Site Plan

Alternative 1

Alternative 2

Alternative 3

Alternative 4

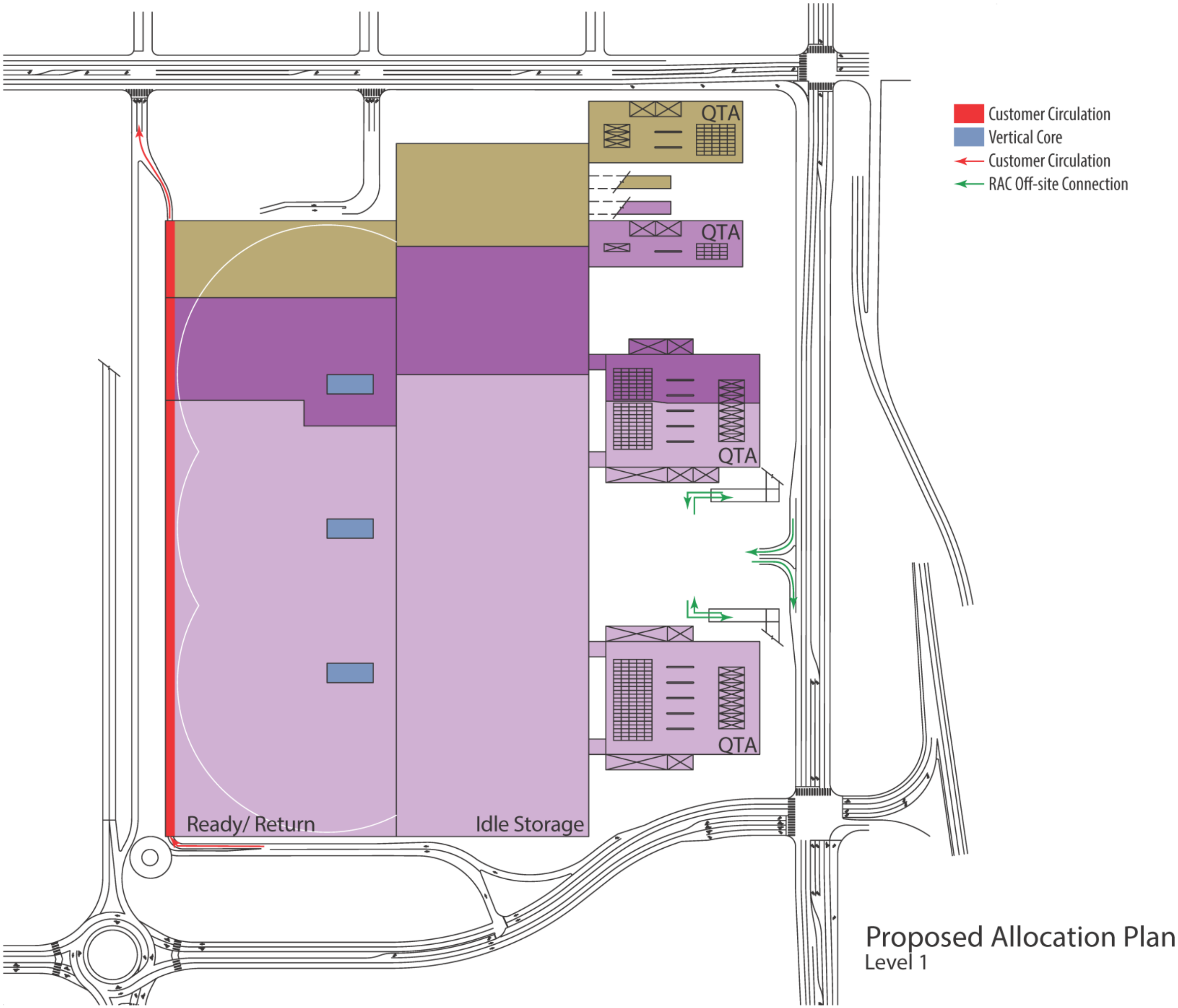


TOTAL ESTIMATED COST – ULTIMATE DEVELOPMENT	
Alternative 1	$931,000,000
Alternative 2	$981,000,000
Alternative 3	$996,000,000
Alternative 4	$993,000,000

ConRAC Concepts –Cost Comparison

LAX Los Angeles World Airports

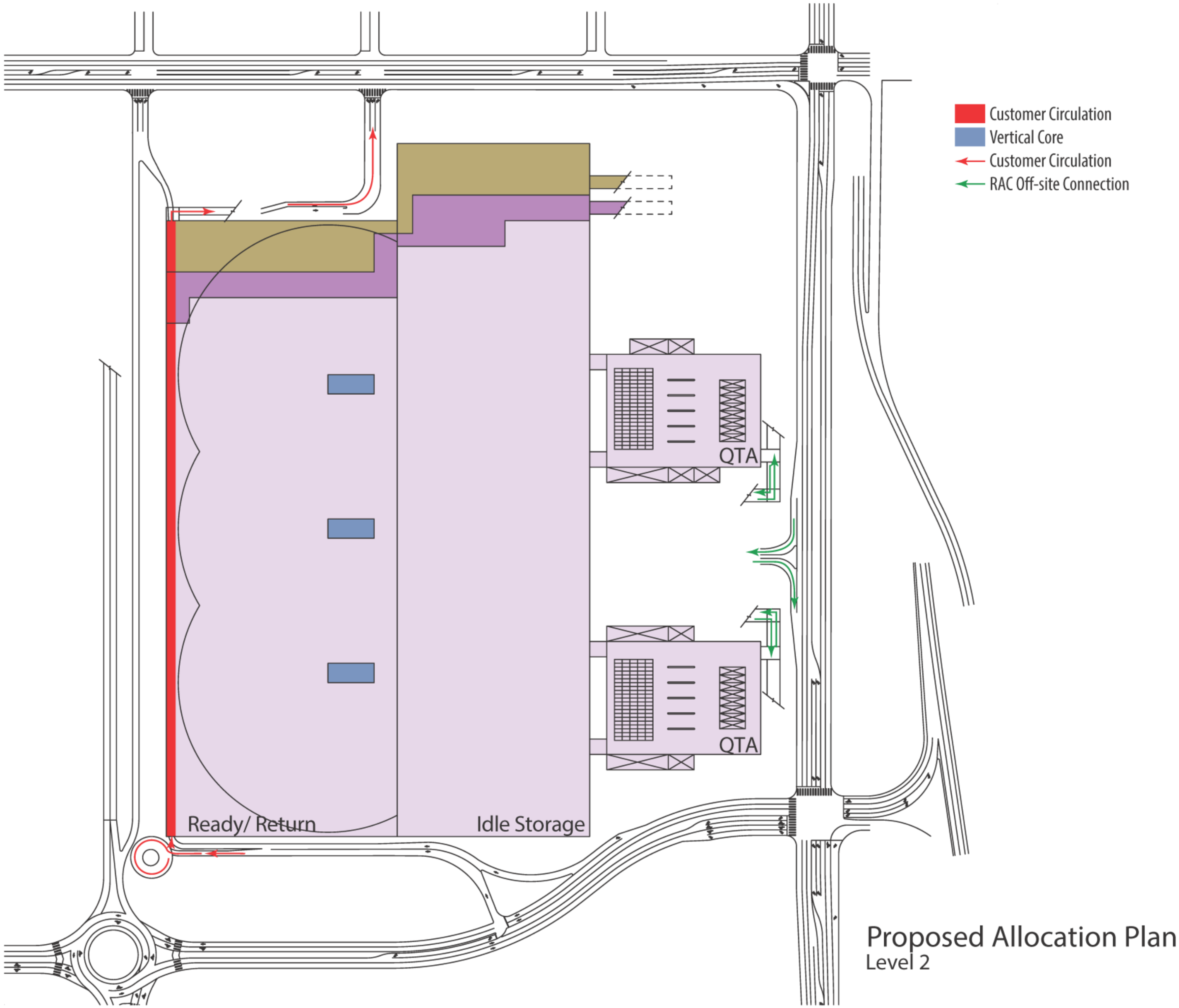
TranSystems



ConRAC Alternative 4 – Allocation Plan

LAX
Los Angeles World Airports

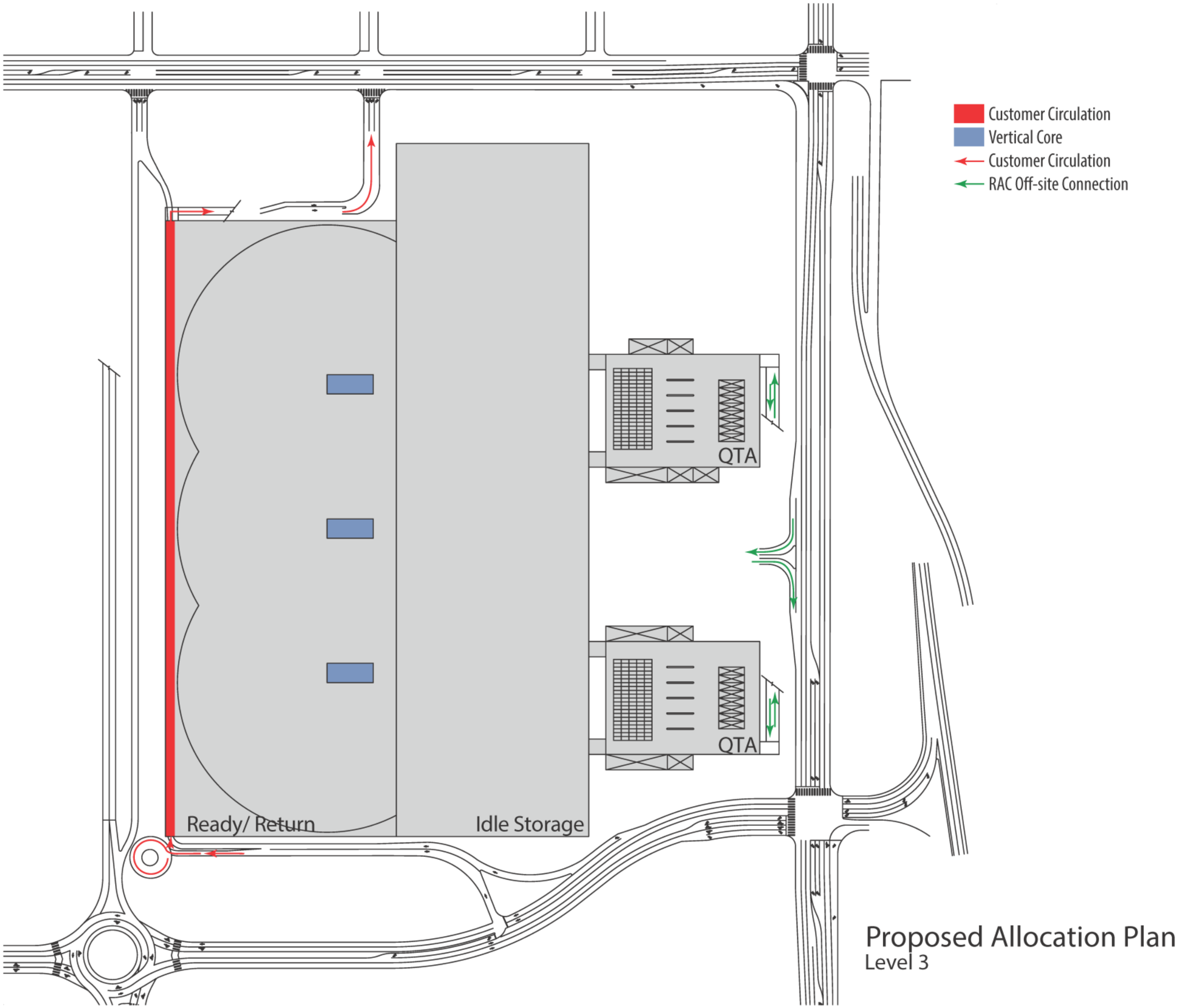
TranSystems



ConRAC Alternative 4 – Allocation Plan

LAX
Los Angeles World Airports

TranSystems



ConRAC Alternative 4 – Allocation Plan

LAX
Los Angeles World Airports

TranSystems

April 16, 2015 Board of Airport Commissioner's Meeting – 10am

April 21, 2015 Next RAC Industry Meeting - Tentative

Next Steps

W J ADVISORS
AVIATION MANAGEMENT CONSULTANTS



RENTAL CAR INDUSTRY MEETING
March 10, 2015

Los Angeles International Airport Consolidated Rental Car Facility

Prepared for:
Los Angeles World Airports | Los Angeles, California

Prepared by:
WJ Advisors LLC | Denver, Colorado

www.wj-advisors.com

LAWA Priorities

1. **Build the ConRAC that is the preferred alternative of the industry**
   - Finance project at $993m (2019$)

2. **Improve customer experience and increase the appeal of renting cars at LAX for all companies**
   - In LAWA and companies interest to grow the rental car business

3. **Provide rental car companies predictability during construction and when relocating to ConRAC**
   - Enter into mutually acceptable long-term concession agreement
   - Agreement would define business relationship prior to construction, during construction, and after opening

4. **Achieve the above while managing annual costs**
   - Save on ground rent
   - Defined common transportation system (CTS) contribution
   - Provide tenant improvement allowance
   - Transaction day back-stop

SAN-type "residual" Structure

January 21 RAC Meeting

www.wj-advisors.com

Annual CFC Revenues

1. **Pay SFB bond debt service**
2. **Additional deposits to Coverage Account**
3. **Pay Subordinate SFB bond debt service**
4. **Additional deposits to R&R account**

Annual Deposit to CFC "Surplus" Fund
\+
CFC balances

Priority for Using Annual Deposits and CFC Balances

1. Deposit to **CFC stabilization account** (a)
2. **Deposit to RAC transition fund** (a) (b)
3. **Pay CFC-portion of net APM costs allocable to ConRAC**
4. **Rebate any supplemental payments** to **RACs and/or LAWA**
5. Offset RAC costs for common-use transportation

5.a. Interim busing costs

5.b. APM costs paid by RACs

(a) = up to a maximum amount
(b) Extinguished when ConRAC opens, or shortly thereafter.
(c) No longer in operation upon opening of APM.

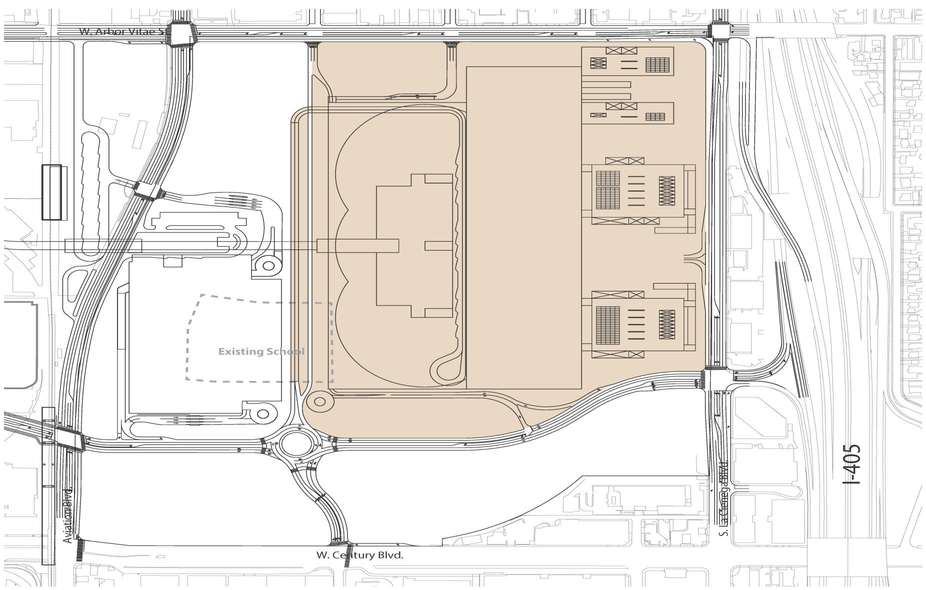
Alternative Provisional Framework

- **Concession agreement with 20-year term, plus two 5-year options**
- **Initial facility lease in ConRAC with 10-year term**
- **Concession agreement and facility lease to have cross default provision**

	Basis	Annual Amount	Benefit
CFC levels	• CFC increases to $7.50 per day at construction (2017) and to $9.00 when facility opens (2021)	$104m +/- (2021$)	Build preferred ConRAC
ConRAC ground rent	• 2.9 million square feet • Annual increase with CPI; FMV reset every 5-years • Allocation of ground rent among companies TBD	$17.7m +/- (2015$)	Reduces costs
ConRAC facility operations pass-through	• RACs will be provided opportunity to operate ConRAC through consortium • Each RAC pays share of costs	*TBD*	Efficiency/ predictability
Common transportation system	• RAC contribution based on current bus operations • Annual amount to increase at CPI and transactions • Revisit amount of RAC contribution in 2028	$40m +/- (2015$)	Limits future cost exposure
Transaction day contingent fee	• 5-year protection from fee, starting ConRAC DBO • Based on transaction day shortfall versus projection • Contingent fee capped up to a maximum annual level • Fee triggered only if CFC balances are less than 2-years of CFC collections	Up to maximum per year, starting in 2026	Defined cost exposure
Tenant improvement rent	• Project financed • Amortization period = facility lease term	*TBD*	Reduce capital outlay

Annual Ground Savings

- Unimproved value of land = basis for ground rent in ConRAC
- Acreage of 140 acres in existing sites, and 68 (+/-) acres in ConRAC (horizontal build only)
- Estimated annual ground rent in new ConRAC: $17.7m per year (+/-)
  - $6.00 (+/-) rate per square feet for unimproved land
  - 2.9m square feet
- Estimated annual savings: $18.8m per year (+/-)



	Acreage
Acreage, existing RAC sites	140
ConRAC acreage	68
Acreage decline	**(49%)**

RAC Contribution to CTS

- RAC CTS contribution starts at DBO of ConRAC
- LAWA assumes cost exposure for funding CTS costs, but would be paid by CFCs and rental car contributions
- RACs to operate consolidated busing, while CFCs and CTS contributions by RACs would pay for consolidated busing
- LAWA to use third party operator for APM system
- Rental car contribution to CTS to be based on cost of bus operation, not allocated cost of APM; rental car contribution to be allocated to RACs based on transactions
- Revisit RAC contribution in 2028

Transaction Day Contingent Fee

- 5-year protection from fee, starting at DBO of ConRAC

- Fee based on shortfall in transaction days versus projection, and allocated to companies based on gross revenue market share

- Maximum contribution in any year equal to 50% of debt service costs to provide idle storage area ($12.5m, 2026$)
  - LAWA to split risk with RACs 50%/50%

RAC Benefits and Costs

- **Long-term, efficient ConRAC, sized for RAC-preferred growth (estimate = 42%)**
- **Managed costs**
- **Predictable business structure**
- **Minimize capital outlays for tenant improvements**

	Annual amount (2015$) (+/-)
KNOWN COSTS	
Ground rent payments	$17.1m
Common transportation contribution	40.0m
Facility operation costs	TBD
Total	**$57.1m, +/-**
MAXIMUM TRIGGERED COST	
Transaction day contingent fee	$12.5m (2026$),

Follow-up from Last Meeting

- California transportation fee
- CFC level needed to finance all costs (ConRAC facility debt service plus CTS)
- Cost of ConRAC project such that CFC at $9.00 can fund all costs (ConRAC debt service plus CTS)
- CFC at $9.00 per transaction day on January 1, 2016

Next Steps/Process

- Confirm preferred physical planning alternative
- Collect individual RAC shuttle bus data from companies
- Follow-up with each rental car company regarding today's meeting
- Use transactions/transaction days pursuant to the RAC amendments; update affordability analysis; define a BOS-type "go/no-go" provision
- Establish business framework for concession RFP process or MOA
- Commence process to tender a new concession agreement for ConRAC that replaces existing LAX agreements

Appendix A

Preliminary Assumptions—Consolidated Busing

Preliminary Assumptions, Interim Busing	Assumption
Number of routes	3
Fleet size	95
Passengers per bus	24
Total buses in operation	84
Buses per route	28
Peak headway per route	2.1 minutes
Peak hour RAC passengers	2,700

TranSystems

ATTENDANCE ROSTER

Project	Con RAC Programming and Planning	Date:	March 10, 2015
	Los Angeles International Airport	Time:	10:00am
Re::	RAC Industry Meeting	Location:	Admin. Bldg. – LA NEXT Conference Room

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Rick Mullinax	Midway		rickm@midwaycarrental.com	
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Name	Representing	Telephone Number	Email Address	
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Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING March 10, 2015

1. **Build the ConRAC that is the preferred alternative of the industry**
   - Finance project at $993m (2019$)
2. **Improve customer experience and increase the appeal of renting cars at LAX for all companies**
   - In LAWAs and companies interest to grow the rental car business
3. **Provide rental car companies predictability when relocating to ConRAC**
   - Enter into mutually acceptable long-term concession agreement
   - Agreement would define business relationship prior to and during construction, and after opening
4. **Achieve the above while managing annual costs**
   - Save on ground rent
   - Defined common transportation system (CTS) contribution
   - Provide tenant improvement allowance

LAWA Priorities

Annual CFC Revenues

1. Pay SFB bond debt service
2. Additional deposits to Coverage Account
3. Pay Subordinate SFB bond debt service
4. Additional deposits to R&R account

Annual Deposit to CFC "Surplus" Fund + CFC balances

Priority for Using Annual Deposits and CFC Balances

1. Deposit to CFC stabilization account (a)
2. Deposit to RAC transition fund (a) (b)
3. Pay CFC-portion of net APM costs allocable to ConRAC
4. Rebate any supplemental payments to RACs and/or LAWA
5. Offset RAC costs for common-use transportation

5.a. Interim busing costs

5.b. APM costs paid by RACs

(a) = up to a maximum amount
(b) Extinguished when ConRAC opens, or shortly thereafter.
(c) No longer in operation upon opening of APM.

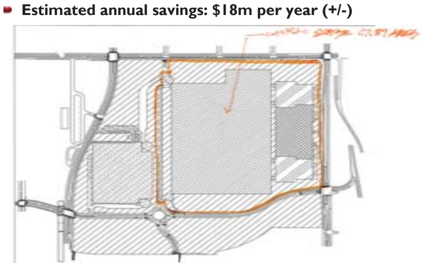
January 21 Meeting

- **Concession agreement with 20-year term, plus two 5-year options**
- **Initial facility lease in ConRAC with 10-year term**
- **Concession agreement and facility lease to have cross default termination**

	Basis	Annual Amount	Benefit
CFC levels	• CFC will increase to $7.50 per day at construction (2017) and to $9.00 when facility opens (2021)	$104m +/- (2021$)	Build preferred ConRAC
ConRAC ground rent	• 2.9 million square feet • Annual increase with CPI; FMV reset every 5-years • Allocation of ground rent among companies TBD	$18m +/- (2015$)	Reduces costs
ConRAC facility operations pass-through	• RACs will be provided opportunity to operate ConRAC through consortium • Each RAC pays share of costs	TBD	Efficiency/ predictability
Common transportation system	• RAC contribution based on current bus operations • Annual amount to increase at CPI and transactions • Revisit amount of RAC contribution in 2028	$40m +/- (2015$)	Limit future cost exposure
Idle storage contingent fee	• 5-year protection from fee, starting ConRAC DBO • Based on transaction day shortfall versus projection • Contingent fee up to maximum annual level • Only if CFC balances are less than $208m	Up to maximum per year, starting in 2026	Defined cost exposure
Tenant improvement rent	• Project financed • Amortization period = facility lease term	TBD	Reduce capital outlay

Provisional Framework

- **Unimproved value of land = basis for ground rent in ConRAC**
- **Acreage of 140 acres in existing sites, and 68 (+/-) acres in ConRAC (horizontal build only)**
- **Estimated annual ground rent in new ConRAC: $18m per year (+/-)**
  - $6.00 (+/-) rate per square feet for unimproved land
  - 2.9m square feet
- **Estimated annual savings: $18m per year (+/-)**



	Acreage
Acreage, existing RAC sites	140
ConRAC acreage	68
Acreage decline	**(49%)**

Annual Ground Savings

- **LAWA assumes cost exposure for funding CTS costs, but would be paid by CFCs and rental car contributions**
- **RACs expected to operate interim busing**
- **LAWA to use third party operator for APM system**
- **Rental car contribution to CTS to be based on cost of bus operation, not allocated cost of APM; rental car contribution to be allocated to RACs based on transactions**
- **Rental car contribution equal to the cost of individual rental car busing, escalated**
- **Revisit RAC contribution in 2028**

RAC Contribution to CTS

- 5-year protection from contingent fee, starting at ConRAC opening
- Idle storage contingent fee based on shortfall in transaction days versus projection
- Maximum contribution in any year equal to debt service costs to provide idle storage area ($25m, 2026$)
- LAWA assumes risk of CFC insufficiency in any year and right to cancel ConRAC project due to
  - Construction risks and cost of financing
  - Higher than expected CTS costs, less rental car contribution

Idle Storage Contingent Fee

- Long-term, efficient ConRAC, sized for RAC-preferred growth
- Managed costs
- Predictable business structure
- Minimize capital outlays for tenant improvements

	Annual amount (2015$) (+/-)
PREDICTABLE COSTS	
Ground rent payments	$18m
Common transportation contribution	40m
Facility operation costs	TBD
Total	**$58m, +/-**
MAXIMUM TRIGGERED COST	
Idle storage contingent fee	$25m (2026$),

RAC Benefits and Costs

- California transportation fee
- CFC level needed to finance all costs (ConRAC facility debt service plus CTS)
- Cost of ConRAC project such that CFC at $9.00 can fund all costs (ConRAC debt service plus CTS)
- CFC at $9.00 per transaction day on January 1, 2016

Follow-up from Last Meeting

- Confirm preferred physical planning alternative
- Warren to follow-up with each rental car company regarding today's meeting
- Collect individual RAC shuttle bus data from companies and transaction day data
- Start to collect transactions/transaction days pursuant to the RAC amendments; update affordability analysis
- Establish business framework for concession RFP process or MOA
- Execute new concession agreement for ConRAC that replaces existing LAX agreements

Next Steps/Process

Appendix A

Preliminary Assumptions, Interim Busing	Assumption
Number of routes	3
Fleet size	95
Passengers per bus	24
Total buses in operation	84
Buses per route	28
Peak headway per route	2.1 minutes
Peak hour RAC passengers	2,700

Preliminary Assumptions—Busing

Los Angeles International Airport Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING MARCH 10, 2015

FACILITIES

LAX Los Angeles World Airports

TranSystems

1. Review of Program
2. New Alternative 4
3. Cost of Alternative 4
4. Allocation Strategy for Alternative 4
5. Update to Financial Analysis/Business Planning
6. Next Steps

AGENDA – Jan 21 2015 RAC Industry Meeting

		Design Basis	SF	Acres
Ready/Return Area	7,600	equivalent ready stalls		
			2,394,000	55.0
QTA				
fuel nozzles	170	360 sq. ft./nozzle	61,200	1.4
wash bays	48	1,650 sq. ft./bay	79,200	1.8
maintenance bays	60	720 sq. ft./bay	43,200	1.0
stacking/queuing stalls for vehicles	680	300 sq. ft./stall	204,000	4.7
add 68% x operational areas for circulation/support/offices			264,000	6.1
5% Contingency for small operators			33,000	0.8
QTA Area			684,600	15.7
CSB				
Leisure Counters	208	300 sq. ft./counter	62,400	1.4
Premium Counters	31	300 sq. ft./counter	9,200	0.2
Add 1.55 x Counter Area for Restrooms/Passenger Amenities/Circulation/Support			111,000	2.5
5% Contingency for small operators			9,100	0.2
CSB Area	equivalent to	800 sq.ft./counter	191,700	4.4
Idle Storage Required	11,000	191 sq. ft./stall [1/]	2,206,000	50.6
Employee Parking	1,102	260 sq. ft./stall [1/]	286,520	7.0
QTA Support and Additional Site Functions				
Visitor parking	100	320 sq. ft./stall [1/]	32,000	0.7
Fuel Farm and Drop			8,800	0.2
Loading Dock/Service Yard			88,000	2.0
Car Carriers Load and Unload	15	720 sq. ft./carrier	10,800	0.2
QTA Support and Additional Site Functions			139,600	3.2
TOTAL CONRAC PROJECT			5,902,420	135.9

Additional Site Requirements
- Landscaping
- Retention
- Roadways
- Setbacks

Not Included in the Program
- Regional Offices
- Tow Backs
- Heavy Maintenance
- Accident Storage
- Massive Recalls

Updated Program – Ultimate Development

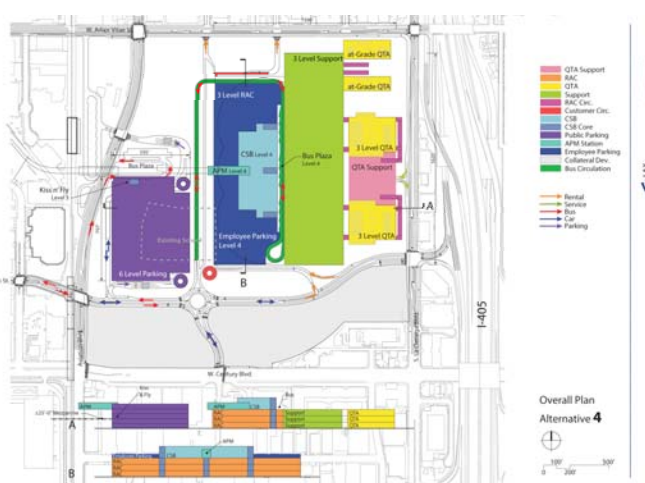
Alternative 1 (former A-1)
2 Level Ready/Return – QTA – Idle Storage

Alternative 2 (former A-3)
2 Level Ready/Return & QTA
Idle Storage Above & Below Ready Return

Alternative 3 (former B-1)
3 Level Ready/Return – QTA – Idle Storage

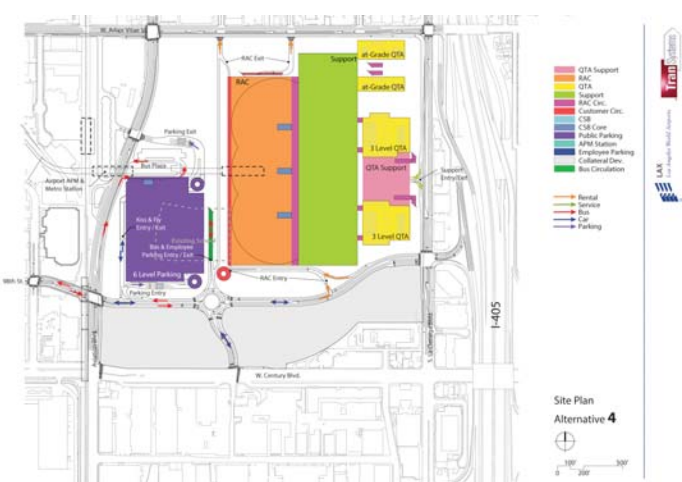
TOTAL ESTIMATED COST – ULTIMATE DEVELOPMENT	
Alternative 1 (former A-1)	$931,000,000
Alternative 2 (former A-3)	$981,000,000
Alternative 3 (former B-1)	$996,000,000

ConRAC Concepts – RAC Mtg. Jan 21st



3 Level Ready/Return – Idle Storage - QTA

ConRAC Alternative 4 – Overall Plan



ConRAC Alternative 4 – Site Plan

Alternative 1

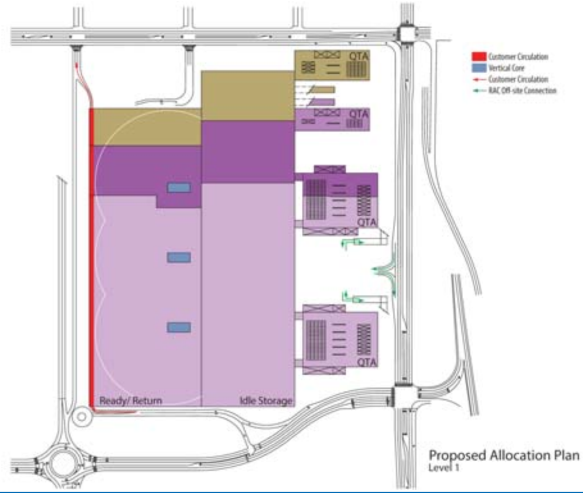
Alternative 2

Alternative 3

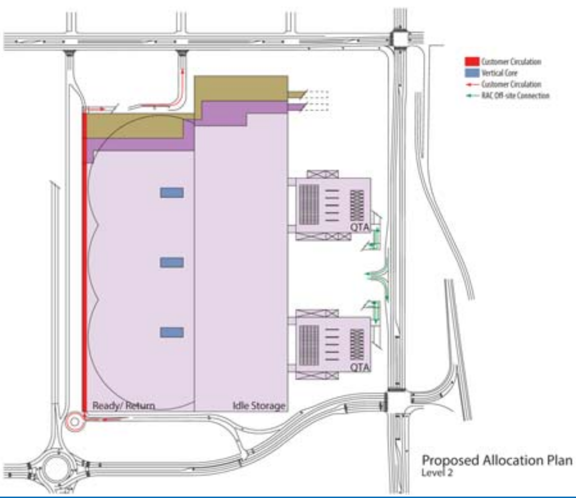
Alternative 4

TOTAL ESTIMATED COST – ULTIMATE DEVELOPMENT	
Alternative 1	$931,000,000
Alternative 2	$981,000,000
Alternative 3	$996,000,000
Alternative 4	$993,000,000

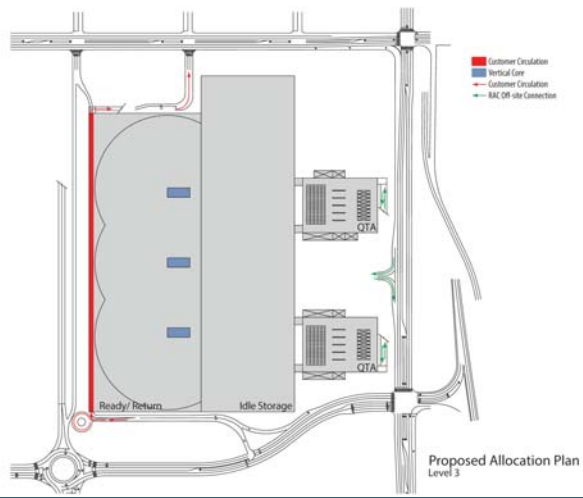
ConRAC Concepts –Cost Comparison



ConRAC Alternative 4 – Allocation Plan



ConRAC Alternative 4 – Allocation Plan



ConRAC Alternative 4 – Allocation Plan

April 16, 2015 Board of Airport Commissioner's Meeting – 10am

April 21, 2015 Next RAC Industry Meeting - Tentative

Next Steps

FOR DISTRIBUTION - ISSUED JULY 1, 2015

LAX ConRAC – RAC Industry Meeting

Meeting Date: Tuesday, June 16, 2015, 10:00am – 12:00pm PDT
Location: LA NEXT Conference Room, LAWA Administration Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the scope, schedule and latest design developments on specific elements of the proposed LAX Consolidated Rental Car Facility (ConRAC). Copy of the meeting presentation, Quick Turn Around (QTA) design options and Customer Service Building (CSB) design options are included as Attachments A2, A3 and A4. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis of TranSystems provided a reminder of the top functional values to be used as facility design criteria. These values are 1) customer service, 2) operational efficiencies, 3) efficient use of money, 4) flexibility, and 5) level competitive playing field. An additional functional value - 6) safety and security - was added at the request of LAWA.
2. The current design scope for TranSystems includes developing the ready/return, idle storage and customer service building design to 10% level, which would be used as the basis of design for a future design/build team. The preferred concept relies on implementation of a stacked QTA. TranSystems' scope is to develop the QTA to 30% schematic design. At this phase, the Design Team will review multi-level QTA design options with various City departments (Fire, Building and Safety) to address code issues and incorporate mitigations into the design.
3. Design schedule was reviewed. By July, refined concepts will be presented. Dynamic models will be developed to demonstrate how operations for individual brand families or brands will be accommodated. By Fall 2015, the design team will present a single concept. Pat Tomcheck of LAWA noted that a project update will likely be given to the Board of Airport Commissioners by the end of the year.
4. Mr. Jarvis provided an overview of the Site Plan Alternative 4, which was first presented to the RACs in March, focusing on refinements that have been made to the plan since that time. The revised concept now includes an at-grade bus plaza. This bus plaza was moved from the roof to Level 1 since it is now believed that the opening dates for the Automated People Mover (APM) and the ConRAC will be less than two years. Having the at-grade bus plaza reduces project costs, fulfills redundancy requirements and offers greater flexibility for use of the roof. The top level is expected to be used to provide a combination of employee, visitor and public parking spaces, but it can also be used for RAC overflow vehicle storage. **ACTION: TranSystems will provide information on the cost difference between the bus curb on the roof and bus curb at grade.**
5. Peter Van Valkenburg of EHI asked when the Metro 96th Street Station will be operational. Mr. Tomcheck did not have this information with him during the meeting but noted that he will provide this information as part of the minutes. [Mr. Tomcheck confirmed that Metro plans to start operation of the 96th Street Station along the Crenshaw Light Rail Line around the same time as the start the operation for the APM, in 2023.]
6. Program is based on peak activity with 42% growth from 2013 transaction data, derived from anticipated 42% airport growth to 95 million annual passengers, with 27% of total fleet used as basis.
7. The Idle Storage areas represent $275 million of the project costs.

8. LAWA expects to complete the Environmental Impact Report in the second quarter of 2017. Until that time, voluntary property acquisitions will continue with the remaining property owners within Manchester Square. After the EIR is certified, the eminent domain process can begin. This process could delay the start of construction. Construction start in expected in 2018, with a construction duration of between 3 and 3.5 years.
9. Due to its significant size, this ConRAC will be new to the RACs. As a result, we need everyone's best thinking – what works at other locations may not translate to this situation, and a small error in an assumption or a design feature could have significant implications.
10. Mr. Van Valkenburg noted that the RACs have encountered some facilities that have reached maximum capacity sooner than expected, such as in San Francisco and Miami, the latter of which is only into one-third of the 30-year expected life of the project.
11. Mr. Jarvis noted that balance between project cost and facility size will be critical. TranSystems will engage with each individual RAC brand family (or brand) to understand their operation and utilize dynamic modeling to demonstrate how this facility will operate under future conditions. Due to the proprietary nature of the information, results will not be shared with the rest of the industry.
12. Graphics comparing the sizes of other constructed and planned ConRAC facilities with the proposed LAX ConRAC were shown. For understanding of scale, the footprint of the proposed LAX ConRAC is as large as 26 football fields placed side by side.
13. At the previous meeting, representatives from Avis/Budget asked about how their combined operation in the new facility will compare with their existing operations, in terms of size. TranSystems provided a comparison of their operations as part of the presentation at this meeting. The 42% growth in passenger levels is a straight-line projection, but in reality the future airport peak period is expected to be broader, spanning between 5 to 6 hours. In addition, when the two separate Avis and Budget facilities are combined, it is expected that they will be able to operate more efficiently. There will be better overall utilization of fleet, by combining brands with focuses on business and leisure customers with different peaks.
14. LAWA and design team representatives met with the Los Angeles Fire Department. This initial meeting served as an introduction of the project to the fire department personnel. Additional meetings will take place as design progresses and will also involve the Los Angeles Department of Building and Safety.
15. One of the design considerations for this project will be the location of drain pipes through the RAC floor decks. At other ConRACs, drain pipes do cause the clear distance between columns to be reduced. If 62-foot bays are provided, we would be able to accommodate the drain pipes and still provide 9'-6" wide return lanes. However, the increase in the width of the bay would mean one fewer bay overall (to keep footprint and cost of project the same). RACs noted that having 60-foot bays is acceptable, but that the Design Team should consider sloping the outer three or four bays out and reduce drain pipes to only one out of every three of four interior bays, to minimize the impacts of drain pipes to the RAC floor decks.
16. Another design consideration is whether to provide slots within the Ready/Return RAC and Idle Storage floor decks to allow in air, light and ventilation. A 60-foot separation of the RAC Garage and the Idle Storage Garage (which would still be connected via bridges) was shown as a way to introduce these elements to the project. This would help with exiting, fire access, drainage, proper seismic separation (anticipated to be required at every 300 feet), and improved customer wayfinding and experience (if the

slots are located near circulation cores). Idle Storage Garage is currently shown to be approximately 432' x 1,600'. The RACs appeared to understand and accept the need for this separation.

17. Multiple functional diagrams for layout of the QTA areas were presented (see Attachment A3). The following comments were received from the RAC representatives:
    a) Queuing for maintenance would need to be larger in QTA Option C (Avis).
    b) It was noted that approximately one third of the returned vehicles need to be pulled out for periodic maintenance every month (Avis).
    c) Need to consider balance of staging at Maintenance, versus extra costs for sprinkler and storing in adjacent Idle Storage Garage.
    d) There are concerns on allocation and reallocation for QTA options with a break within the fuel/wash areas. However, this would be less of a concern if the entire floor is used by one concessionaire (EHI).
    e) There are concerns with maintenance bay traffic backing into QTA traffic flow, which is a big issue to the RACs (Avis and Advantage).
    f) There are concerns with requiring two managers on QTA decks with split operations.
    g) With the smaller operators having at-grade QTA sites, concerns with security between brands will be alleviated.
    h) Distances between pick-up and drop off of vehicles will need to be reviewed further (Hertz).
    i) Hiker bringing car through the wash would often create backup before the car wash (Avis).
    j) There is generally lack of administrative areas at the QTA. Reduction of number of wash bays and increase in administrative spaces shall be considered (Avis and Hertz).
    k) Options B and E have QTA operations separated by other functions in the middle would be less efficient operationally (EHI).
    l) Design should prevent employees from having to travel long distances across the QTA (Hertz)
18. Split decks within QTA floor will likely be favored by code officials as typical exit travel distance (to a protected stair) will be reduced.
19. It is recommended that QTA Option C be explored further, on grouping of wash and fuel, with spill over into Idle Storage. Option to place QTA to south, maintenance tower at center and smaller operators at north end shall be further developed. This concept will limit travel distances in flow from return to ready stalls, where most vehicles will travel.
20. ACTION: Andrew Jaksich of Avis will provide some diagrams illustrating typical operational flows to the Design Team.
21. On the phone, RB Laurence of Stantec provided an overview of the proposed fuel tank sizing. Estimated aggregate daily demand is 30,000 gallons. A total capacity of 240,000 gallons will provide 8 days of supply. Scott Goldstein of EHI commented that an increase in the storage capacity (10 to 11 days of supply) should be considered, and configuration was discussed. Mr. Jaksich concurred that having availability for storage would have cost benefits.
22. Site layout shall consider having two separate fuel delivery locations. Duration of each delivery would take approximately 45 minutes, or 20 deliveries in a day. Terminals will likely be from Long Beach. The ability to pump fuel between the two tank fields is possible, but it will have site planning implications.
23. Another important site consideration is how car carriers are accommodated. Offloading of up to 200 cars can occur at any given time, which RACs have limited control on timing. A secured holding area is required

for plating and preparation (removal of plastic overwrap, fueling, filling of windshield wiper fluid) before distributing to their final location. Carriers also arrive empty to remove vehicles from the fleet. The RACs stated that it is important not to undersize this operation.

24. Brand families who are likely to control all or most of a single level in the garage were asked if they want to group all their return lanes together in the south and group the rental areas together in the north, as depicted in the graphics on the left hand side of Slide 29. This will have implications to the design of the CSB on Level 4, as the lobbies can skew toward the center and north cores as there will be more rental traffic through those cores than the one on the south (with recovery booths located near south core on the RAC floor). The general consensus among the RACs is that this will be their desired approach. ACTION: Pat Tomcheck to confirm with individual RAC brand families and LAWA senior staff that this is the direction for design of the CSB.
25. Multiple functional diagrams for layout of CSB were presented (see Attachment A4). Mini mall configuration for CSB lobbies is planned for all options shown. Because of the moderate climate, common areas that are unconditioned and exposed to the elements are proposed. The following comments were received from the RAC representatives:
    a) Mr. Jaksich noted that they are open to having even vertical circulation core areas be unconditioned space, as the RACs would otherwise be paying for the higher operational and utility costs (Avis).
    b) Mr. Van Valkenburg noted that there may be less passenger flow through the CSB in the future because of technology improvements. However, since this is an international airport, transaction times tend to be longer, equating to more space needs.
    c) Brands within a family will tend to remain together, which would be challenging for concepts that contain two-sided lobbies (Options A, B and C).
    d) Option D has an approximately 900-foot long CSB (one-sided). This length seems excessive, as the length for the ConRAC at Phoenix is about 400 feet long.
    e) A two-level concept (Option E) may add to project costs. Cost analysis should be performed to ensure that it is feasible before going further with development of this concept. The additional vertical transitions may impact customer experience as well.
    f) Further development of concepts that skew more to the North and Center Cores shall be provided for review.
    g) It was noted that the overall size of the CSB is not as important as the true allocable space for each RAC agency.
26. Mr. Goldstein noted that accidents occurring at or near helix of other ConRACs have shut down the entire helix and impacted the overall operation. A bypass lane should be considered.
27. Warren Adams of WJA provided a summary of the business issues carried over from the last meeting, including basic business terms, enabling projects, TI allowances, CFC capacity and bussing costs. Mr. Adams will talk with RAC company representatives separately to set time and review documents in detail, as they pertain to each company. Future business and financial discussions will be separated from the planning and design meetings going forward. See Attachment A5 for action items for next meeting.

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Attachments:

A1: Attendance Roster (2 pages)
A2: Meeting Presentation (38 pages)
A3: QTA Design Options A through E (6 pages)
A4: CSB Design Options A through E (7 pages)
A5: Business and Financial Planning Action Items (1 page)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	June 16, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Second Floor, LAneXT Conference Room

Name	Representing	Telephone Number	Email Address	
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Connie Gurich	Hertz/DTAG	310 568-3KSS	cGurich@Hertz.com	
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PETER VANVALKENBURG	ENTERPRISE	310-721-8950	PETER.VANVALKENBURG@EHI.com	
Warren Adams	WJ Advisors LLC	6?0-218-8538	warren.adams@wj-advisors.com	
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David Lee	TranSystems	510-835-9916	dklee@transystems.com	
Norman Lin	TranSystems	312-669-5831	ylin@transystems.com	
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STEVEN LOTT	RAW	213.622.4993	SLOTT@RAWINTERNATIONAL.COM	
JONATHAN CARRILLO	ADVANTAGE	310 912.4476	JONATHAN.CARRILLO@ADVANTAGE.COM	
Fatima Hashim	LAWA - Planning	424-646-5173	fhashim@lawa.org	

Project	ConRAC Programming and Planning	Date:	June 16, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Second Floor, LAneXT Conference Room

Name	Representing	Telephone Number	Email Address	By Phone
Bill Bettison	EHI			✓
Scott Goldstein	EHI			✓
Jeff Heileson	Sixt			✓
Matt Wiegand	EHI			✓
Chuck Rowe	TranSystems			✓
Justin Neel	TranSystems			✓
RB Laurence	Stantec			✓
Joe Olivera	Advantage			✓

Agenda

1. Functional Values
2. Scope of Current Phase
3. Overview of Project Schedule
4. Review of Preferred Alternative 4
5. Quick Turn-Around (QTA) Design
6. Customer Service Building (CSB) Design
7. Next Meeting

Jun 16, 2015 RAC Industry Meeting

Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

Functional Values

Current Design Scope

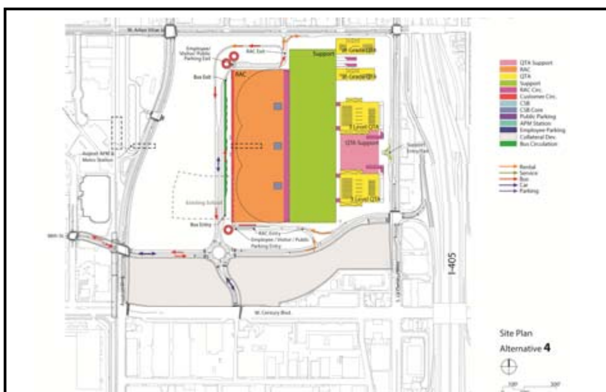
- ConRAC Concept Development to Give to the Design/Build Team
  - CSB
  - Ready/Return Area (RAC)
  - Idle Storage Building
- Develop 30% Schematic Design for QTA
  - All QTA Components Except Building Exterior
  - Agency Review of Multi-Level Fueling
  - Basis of Design for Subsequent Design Phase

Scope of Current Phase

Design Schedule

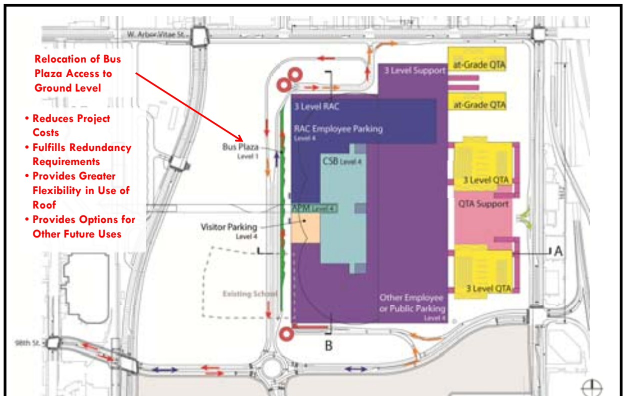
- June 2015 – Multiple QTA and CSB Configurations
- July 2015 – Preferred QTA and CSB Configurations, Preliminary Code Mitigations for QTA
- September 2015 – Single QTA and CSB Concept, Dynamic Models, Preliminary Renderings
- November 2015 – Refined QTA and CSB Concept, Proposed Code Mitigations for QTA
- December 2015 – Complete ConRAC Basis of Design and QTA 15% Concept Submittals
- April 2016 – Complete QTA 30% Concept Submittal

Project Schedule



ConRAC – Site Plan

ConRAC – Overall Plan/Sections



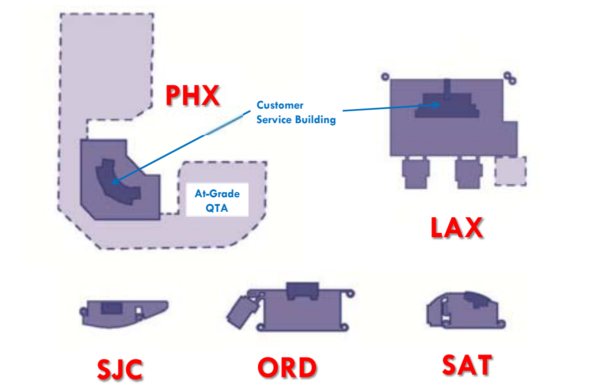
APM, Bus Plaza and Level 4 Parking

SIZE MATTERS

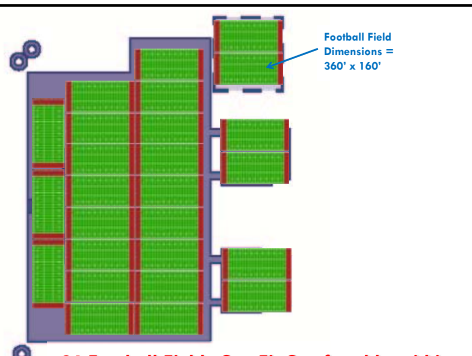
Ultimate Development Program

- 20,000 Daily Transactions Reduced by 30 Seconds Each Means 21 Fewer Full-Time Employees
- Fleet of 70,000 Vehicles
- You Have Not Done It to This Scale Before

ConRAC Project Size



Size Comparison with Other ConRACs

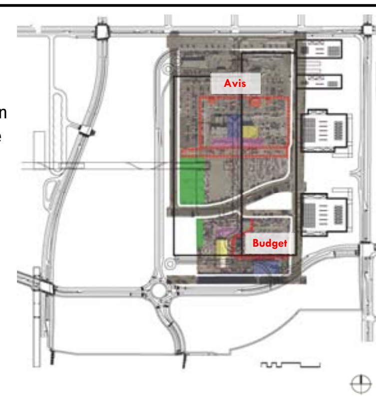


26 Football Fields Can Fit Comfortably within the Footprint of the Proposed LAX ConRAC

Size Comparison with Football Fields

Size Considerations

- Flatter Future Peak
- Brand Family Operation Reduction in Fleet Size
- Greater Flexibility Between Brands
- Greater Flexibility Between Rental and Return

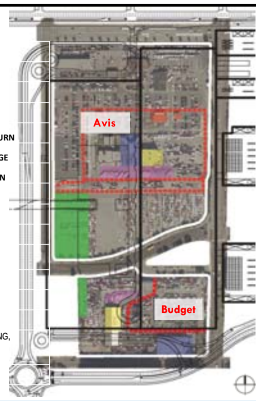


ConRAC Size Considerations

ConRAC Size Considerations

	TOTAL	NET*	
CURRENT AVIS	1,077,887	833,468	
CURRENT BUDGET	368,723	289,651	
CURRENT TOTAL		1,123,119	
10% FLATTER PEAK	-0.025	-28,078	REDUCED NEED FOR READY/RETURN
15% FLEET SHARING	-0.067	-75,249	REDUCED NEED FOR IDLE STORAGE
5% EFFICIENT LAYOUT	-0.050	-56,156	REDUCED NEED FOR CIRCULATION
15% FLEX SPACE	-0.150	-168,468	DOUBLE USE OF FLEX SPACE
CONRAC OPERATION		795,168	
ALT 4 CONCEPT DESIGN		4,919,875	
MARKET SHARE	0.230	1,131,571	
GROWTH OVER TODAY		42.3%	

NET* MINUS BUS OPERATIONS AND STORAGE, EMPLOYEE PARKING, CSB, HEAVY MAINTENANCE, CAR TRANSPORTS, REGIONAL OFFICE AND SERVICE YARD



ConRAC Design Considerations

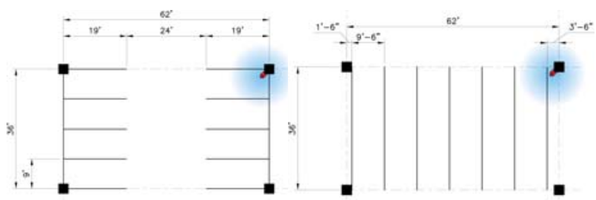
Design Considerations

- Fire Separation and Exiting – Initial Fire Department Meeting
- Drainage and Structural Bay Size – More Bays or More Space per Bay?

ConRAC Design Considerations

Design Considerations

- Typical 62-Foot Bays
  - Ready Stalls
  - Return Stalls



ConRAC Design Considerations

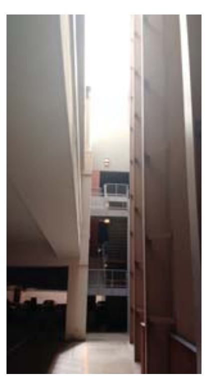
Design Considerations

- Build as Much as Space and Dollars will Allow
- 62' Bays with One Less Bay or
- 60' Bays with a Drain Pipe Every Third Column

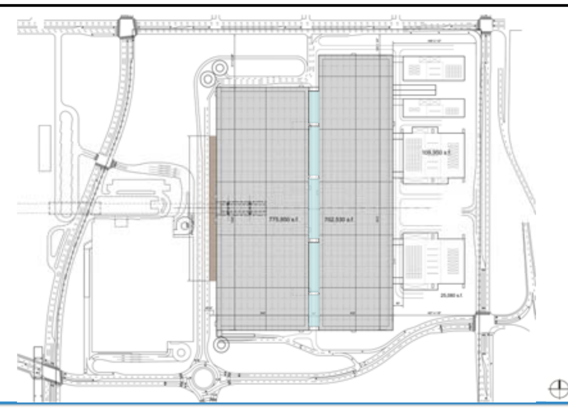
ConRAC Design Considerations

Design Considerations

- Natural Light and Ventilation
- Seismic and Expansion Joint
- Customer Experience



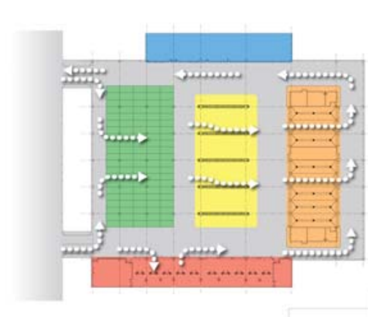
RAC Option – Slots for Light & Ventilation



QTA Design Considerations

- Locations of Administration Areas
- Locations of Maintenance Areas
- Shuttler Routes
- Egress Travel Distance
- Fuel Storage Quantities and Locations

QTA Design Considerations



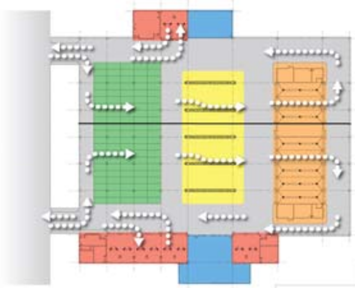
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

Pros:
- Easy to Sub-Divide
- Easy to Reallocate
- More Flexibility

Cons:
- Requires Two-Way Circulation
- Increased Travel Distance to Exits
- 200' from Admin to Most Remote Fuel Island

Program Summary (Per QTA Level, excluding At-Grade):
- 233,000 SF, 210 Queuing Spaces , 60 Fuel Nozzles, 16 Wash Bays and 20 Maintenance Bays

QTA Option A – Single Company



color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

Pros:
- Easy to Sub-Divide
- Easy to Reallocate
- More Flexibility
- 130' from Admin to Most Remote Fuel Island

Cons:
- Requires Two-Way Circulation
- Mix of Counter-Clockwise and Clockwise Circulation
- Increased Travel Distance to Exits

Program Summary (Per QTA Level, excluding At-Grade):
- 233,000 SF, 210 Queuing Spaces , 60 Fuel Nozzles, 16 Wash Bays and 20 Maintenance Bays

QTA Option A – Multiple Companies

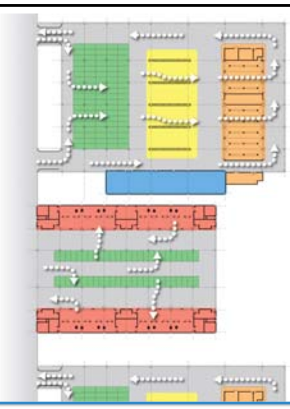
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

Pros:
- Short Travel Distance to Exits
- 130' from Admin to Most Remote Fuel Island
- Ability to Close Off Half of QTA During Slow Periods
- 50 Additional Queuing Spaces
- 12 Additional Fuel Nozzles

Cons:
- More Difficult to Reallocate
- More Traffic Intersections
- 54,000 SF Additional Floor Areas

Program Summary (Per QTA Level, excluding At-Grade):
- 287,000 SF, 260 Queuing Spaces , 72 Fuel Nozzles, 16 Wash Bays and 20 Maintenance Bays

QTA Option B



color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

Pros:
- Less Congestion Resulting from Maintenance Traffic
- 32 Additional Queuing Spaces

Cons:
- 25,000 SF Additional Floor Areas - More Costly to Build
- 180' from Admin to Most Remote Fuel Island

Program Summary (Per QTA Level, excluding At-Grade):
- 259,000 SF, 242 Queuing Spaces, 60 Fuel Nozzles, 16 Wash Bays and 20 Maintenance Bays

QTA Option C

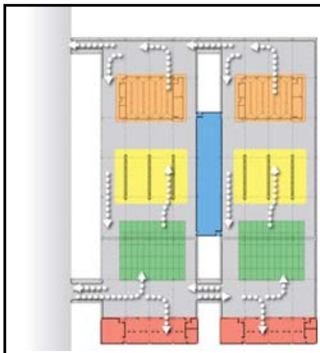
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

Pros:
- Less Congestion Resulting from Maintenance Traffic
- 24 Additional Queuing Spaces
- Flexible Queuing Spaces for Maintenance or Fueling

Cons:
- Increased Distance to Exits
- 180' from Admin to Most Remote Fuel Island
- More Difficult to Allocate

Program Summary (Per QTA Level, excluding At-Grade):
- 234,000 SF, 234 Queuing Spaces , 60 Fuel Nozzles, 16 Wash Bays and 20 Maintenance Bays

QTA Option D



Pros:
- Short Travel Distance to Exits
- 108' from Admin to Most Remote Fuel Island
- Ability to Close Off Half of QTA During Slow Periods
- 12 Additional Fuel Nozzles
- 10 Additional Queuing Spaces

Cons:
- More Difficult to Reallocate
- More Traffic Intersections/ Potential Congestions
- 61,000 SF Additional Floor Areas

Program Summary (Per QTA Level, excluding At-Grade):
- 295,000 SF, 220 Queuing Spaces , 72 Fuel Nozzles, 16 Wash Bays and 20 Maintenance Bays

QTA Option E

Fuel Tank Sizing

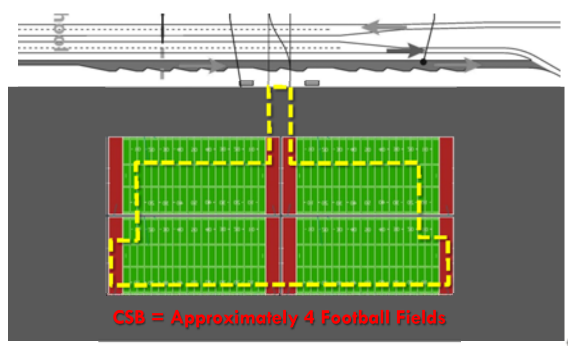
- Estimated Aggregate Daily Demands is 30K Gallons (3-4 Deliveries per Day)
- Estimated 8-Day Supply is 240K± Gallons
- Understanding the Value of That Inventory ($500K to $750K), Industry's Desire to Have the Capability to Maintain 8 Days of Supply On-site?

Fuel Tank Sizing and Configuration

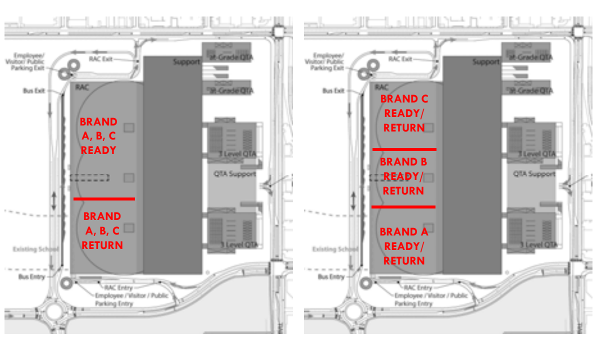
Fuel Tank Configuration

- Typically, the Industry Prefers that All Tanks are Siphoned (Connected), such that Tank Levels Fall Equally
- With a 240K Gallon Tank Farm (Assumed to be Six (6) 40K Gallon Tanks), There are Numerous Benefits to Separating the Farm into Two Areas (1 Area per QTA Building), which the Team is Exploring
- Tanks within Each Area Would be Siphoned, but There Would Not be Connection Between Areas. Can We Assume That This Configuration is Consistent with RAC Goals?

Fuel Tank Sizing and Configuration



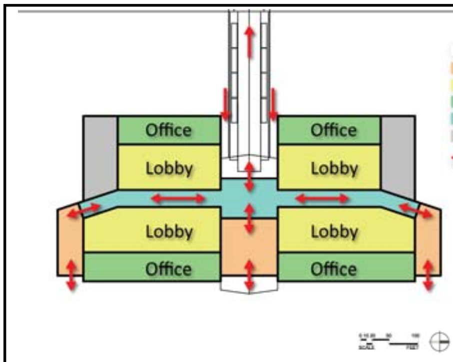
Size Comparison with Football Fields



CSB Design Considerations

- CSB Design Considerations
  - Brand Adjacencies within Family
    - Keep Brands within Family Together?
    - Or, Separate Brands within Family to Get Customers Closer to Their Cars?
  - Lobby to be Unconditioned Space?
  - Reduce the Number Because of Spread Peak?
  - Move Business Counters (and Associated Budget) to Garage?
  - Does Design Enhance Safety and Security?

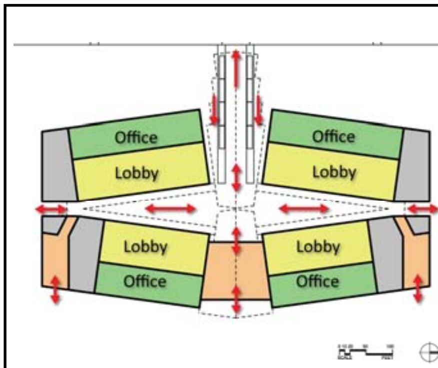
CSB Design Considerations



Pros:
- Tight Arrangement of Spaces/Less Costly

Cons:
- Limited Visibility of Lobbies at Two Ends
- Difficult to Allocate to Current Market Share
- 350' from Platform to Ends of Lobby

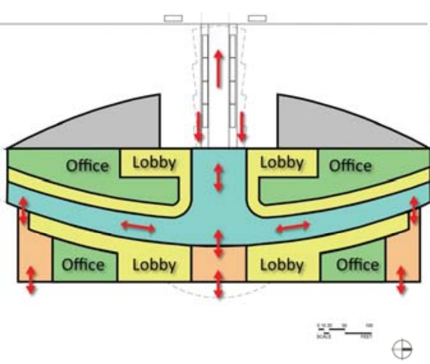
CSB Option A



Pros:
- Good Visibility of All Lobby Areas
- Access to Natural Ventilation and Light
- 300' from Platform to Ends of Lobby

Cons:
- Difficult to Allocate to Current Market Share

CSB Option B



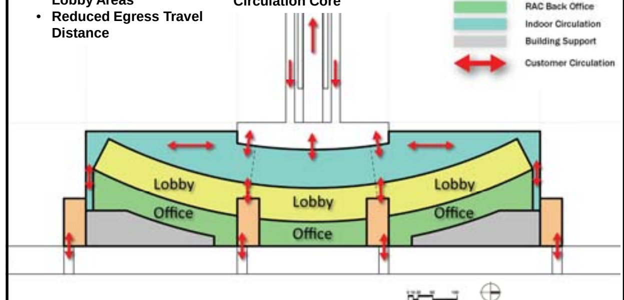
Pros:
- Good Visibility of All Lobby Areas

Cons:
- Difficult to Allocate to Current Market Share
- 400' from Platform to Ends of Lobby

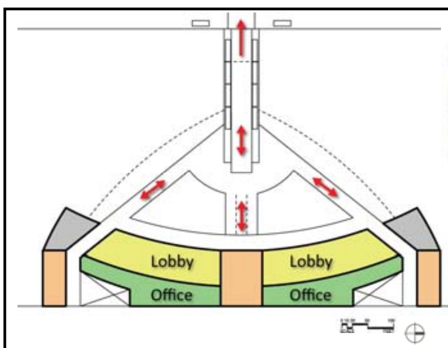
CSB Option C

Pros:
- Allocation Close to Current Market Share
- Good Visibility of All Lobby Areas
- Reduced Egress Travel Distance

Cons:
- 400' from Platform to Ends of Lobby
- Extra Costs for Additional Circulation Core



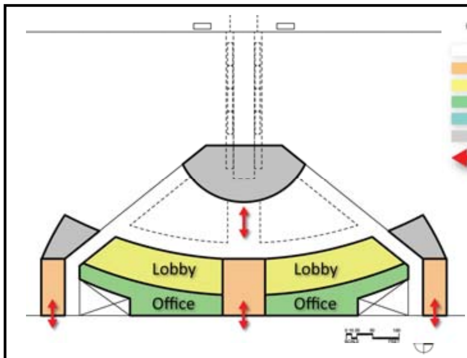
CSB Option D



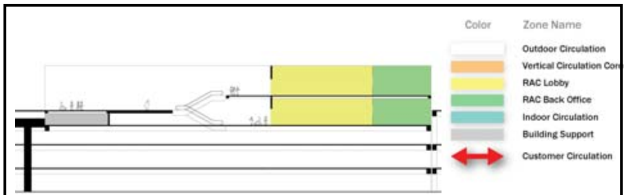
Pros:
- Good Visibility of All Lobby Areas
- 300' from Platform to Ends of Lobby
- Access to Natural Ventilation and Light

Cons:
- Additional Vertical Transition
- Reduced Height Clearance at RAC

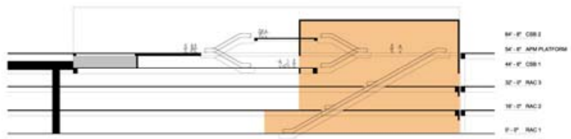
CSB Option E – Upper Level



CSB Option E – Lower Level



Section Through Lobby/Office



Section Through Vertical Circulation Core

CSB Option E – Sections

LAX
Los Angeles World Airports
TranSystems

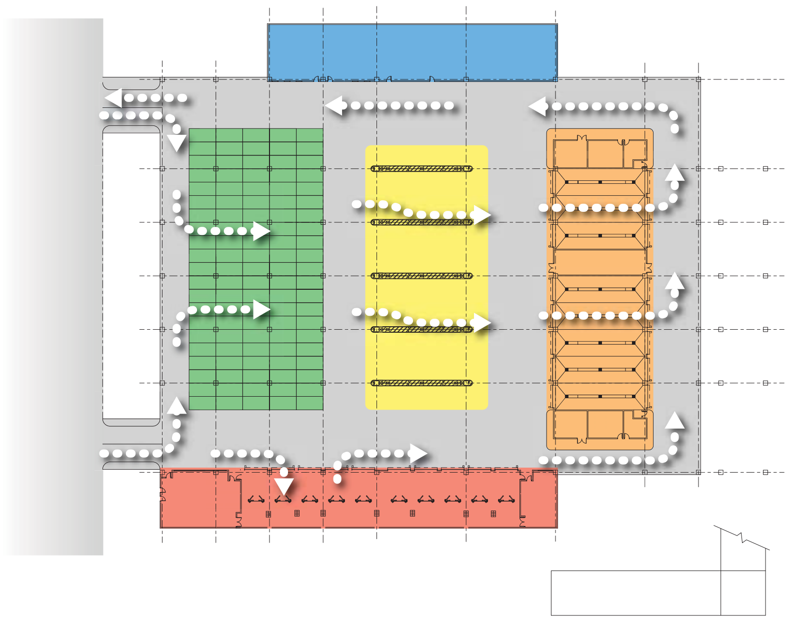
Next Steps

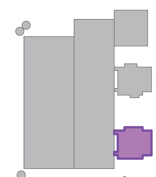
- Refinement of Preferred Options for July 21, 2015 RAC Industry Meeting
- After July RAC Meeting, Dynamic Model for Each Brand Family of Their Anticipated Configuration within the Garage

Review of Next Meeting

LAX
Los Angeles World Airports
TranSystems

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation



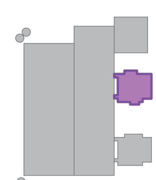


Key Plan

QTA Option A
Single Company on QTA Floor

0 10 20 50 100
SCALE FEET

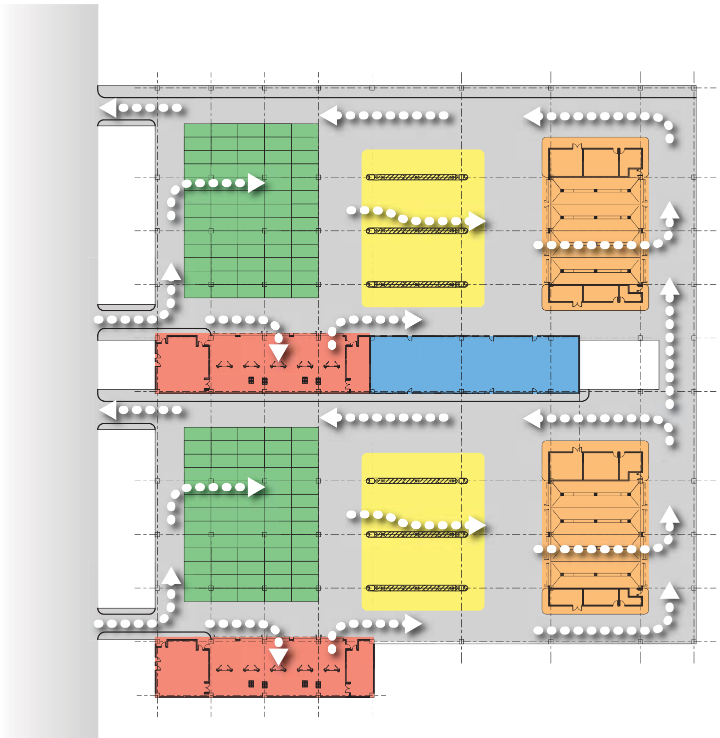
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation



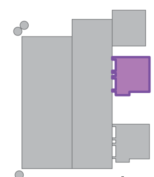
Key Plan

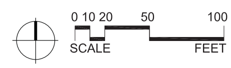
QTA Option A
Multiple Companies on QTA Floor

0 10 20 50 100
SCALE FEET

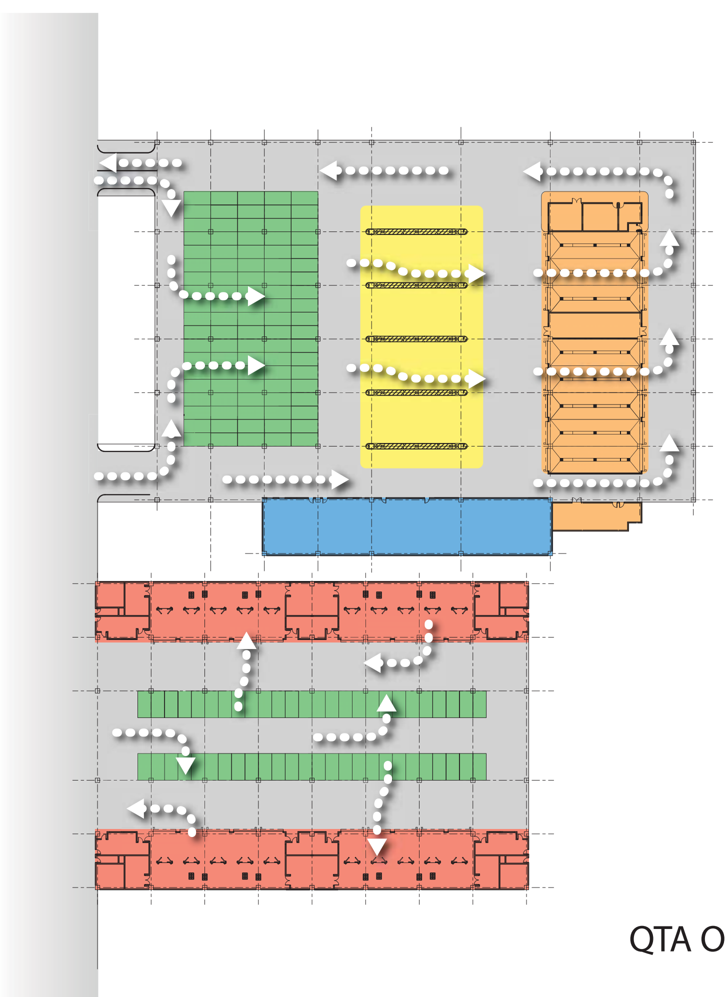


color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

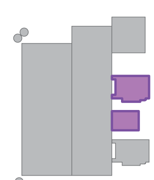

Key Plan

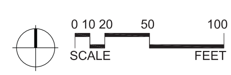


QTA Option **B**



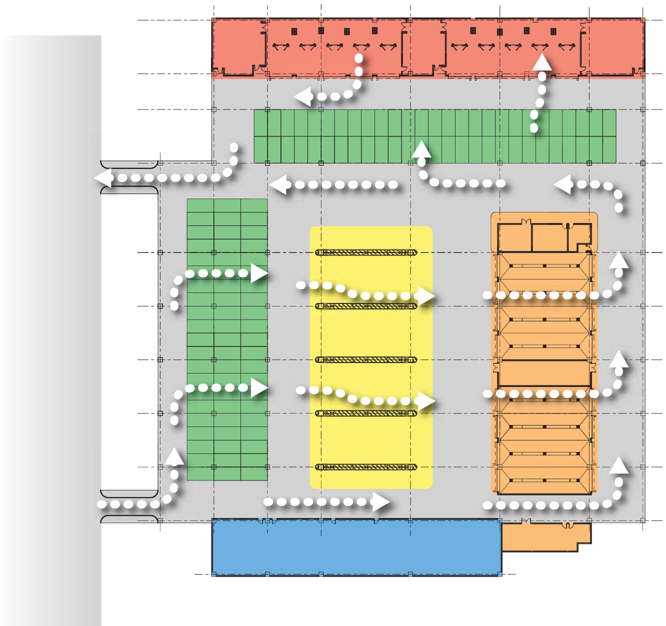
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

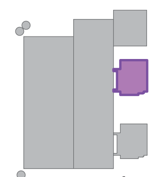

Key Plan



QTA Option **C**

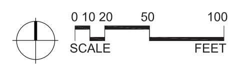
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation



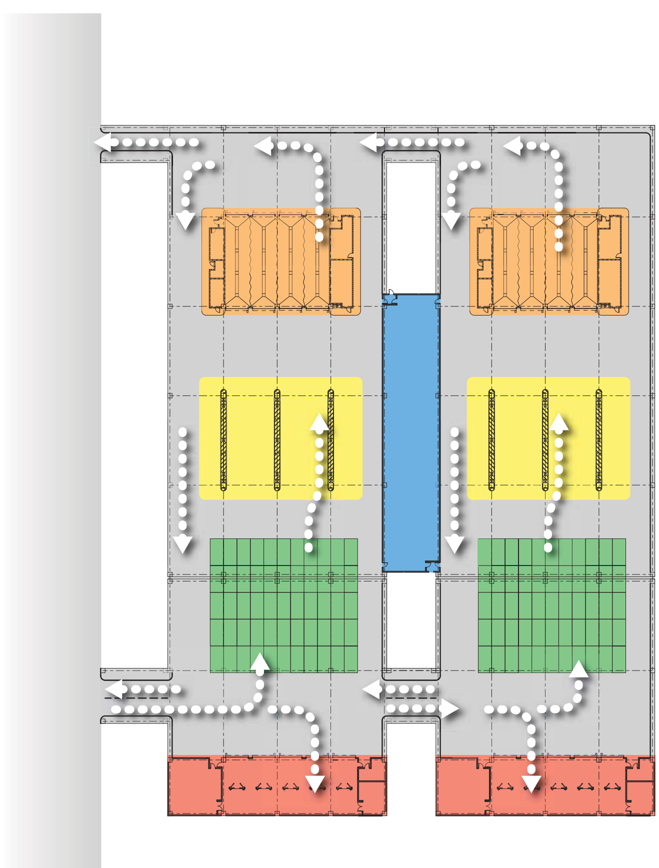


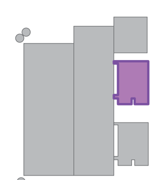
Key Plan

QTA Option **D**



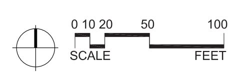
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

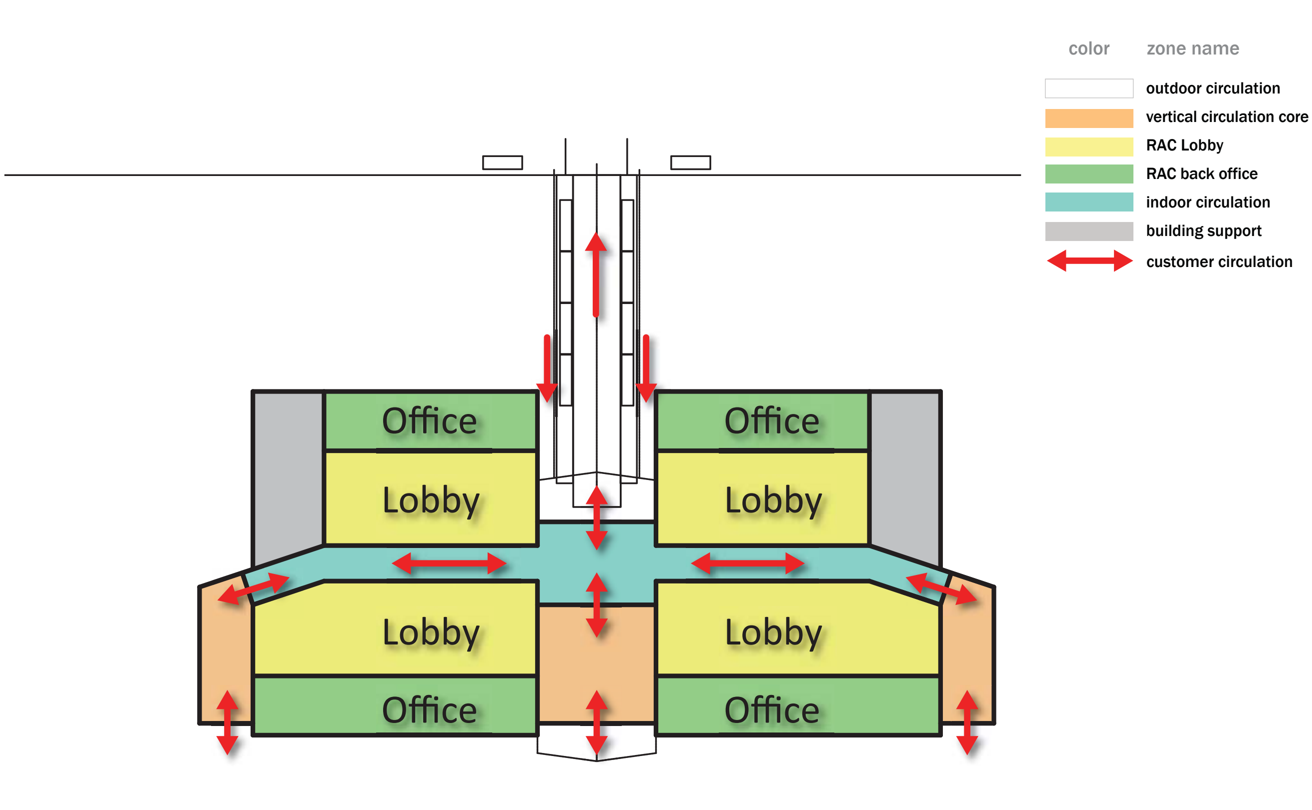




Key Plan

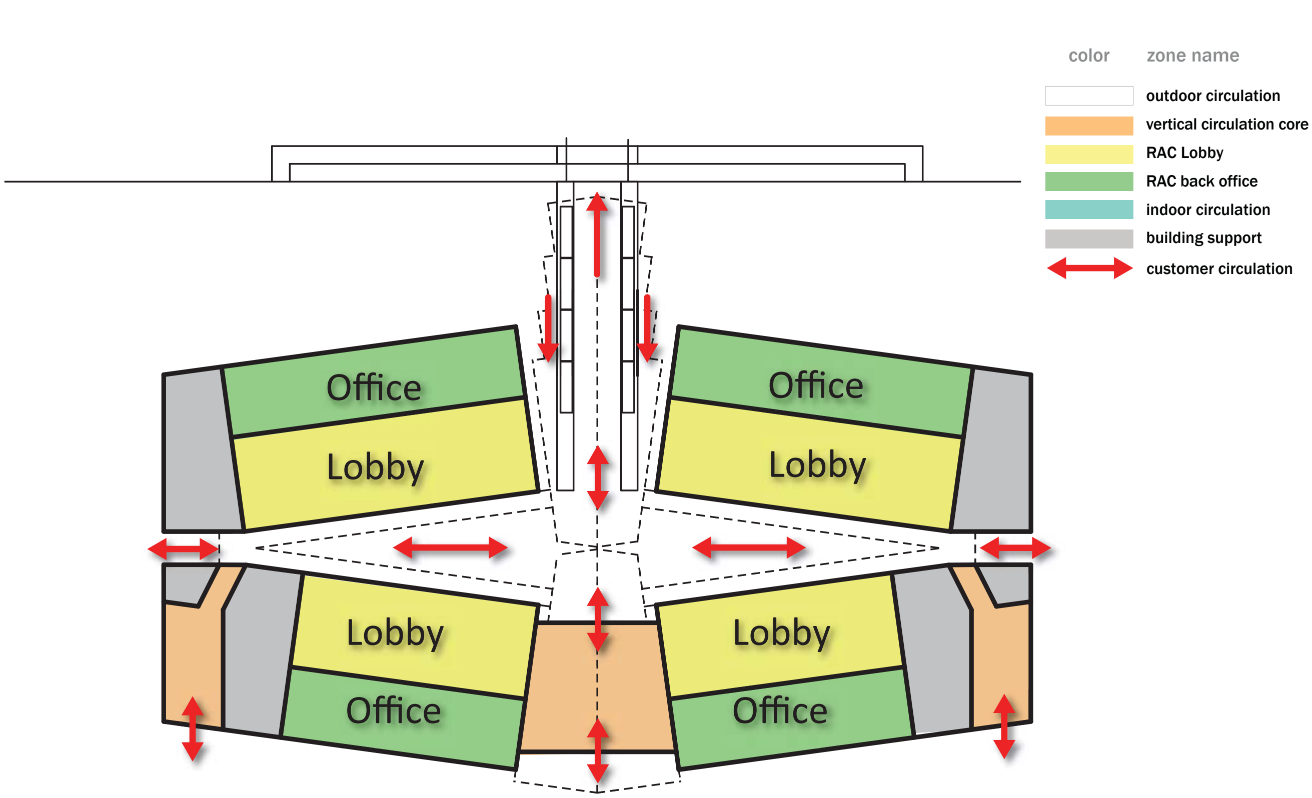
QTA Option **E**





CSB Option **A**

0 10 20 50 100
SCALE FEET

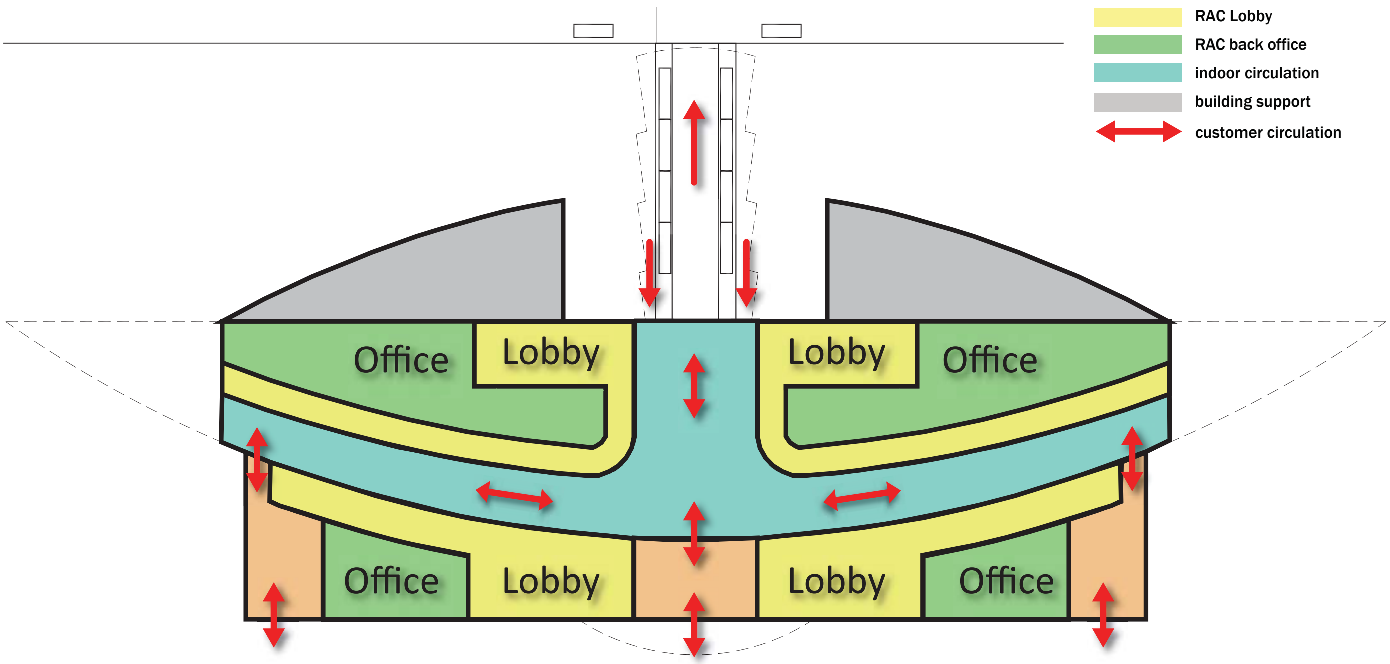


CSB Option **B**

0 10 20 50 100
SCALE FEET

LAX Los Angeles World Airports

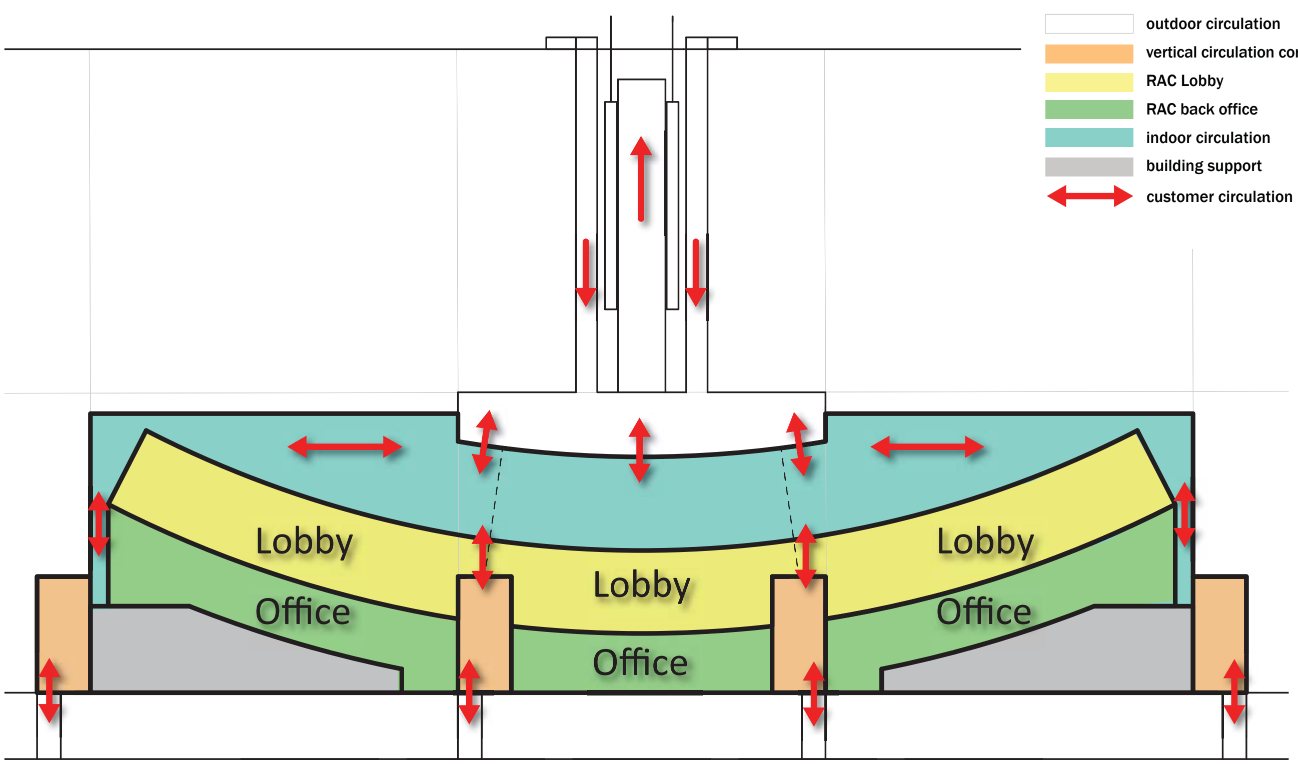
color	zone name
	outdoor circulation
	vertical circulation core
	RAC Lobby
	RAC back office
	indoor circulation
	building support
	customer circulation



CSB Option C

0 10 20 50 100
SCALE FEET

color	zone name
	outdoor circulation
	vertical circulation core
	RAC Lobby
	RAC back office
	indoor circulation
	building support
	customer circulation

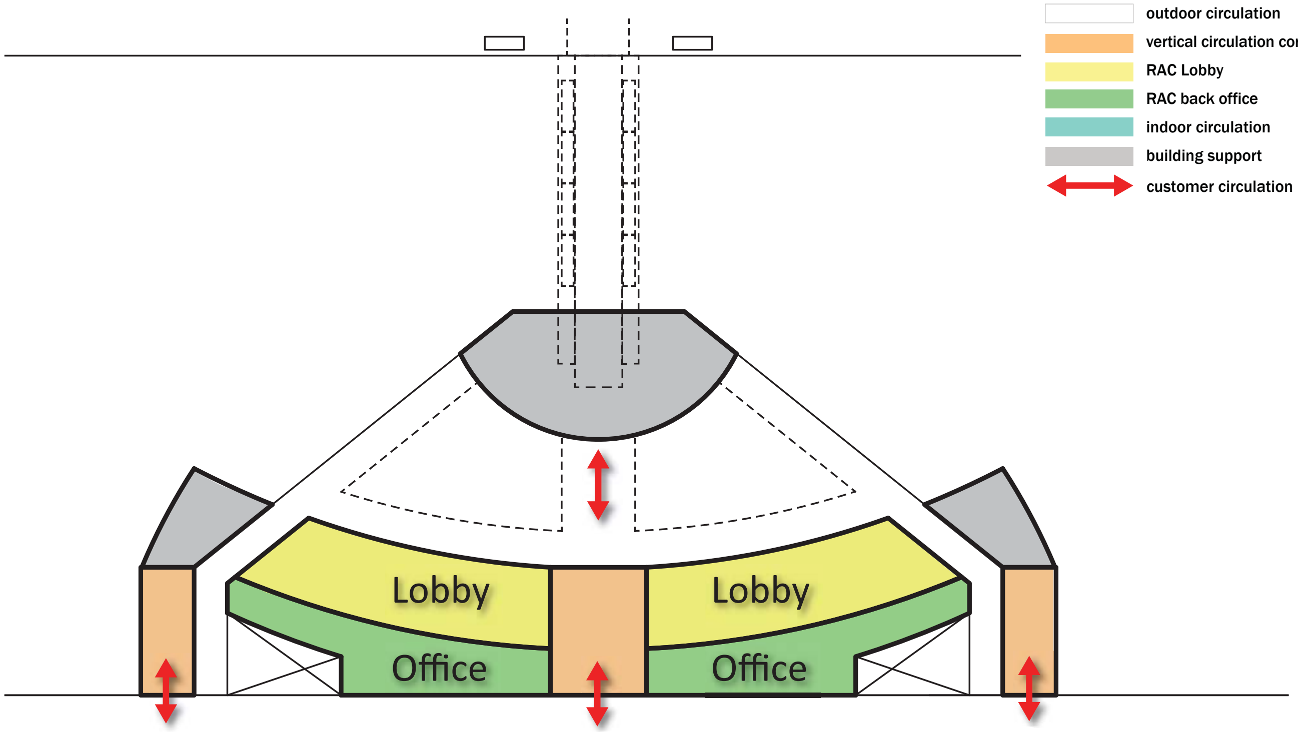


CSB Option D

0 10 20 50 100
SCALE FEET

color | zone name

- outdoor circulation
- vertical circulation core
- RAC Lobby
- RAC back office
- indoor circulation
- building support
- customer circulation

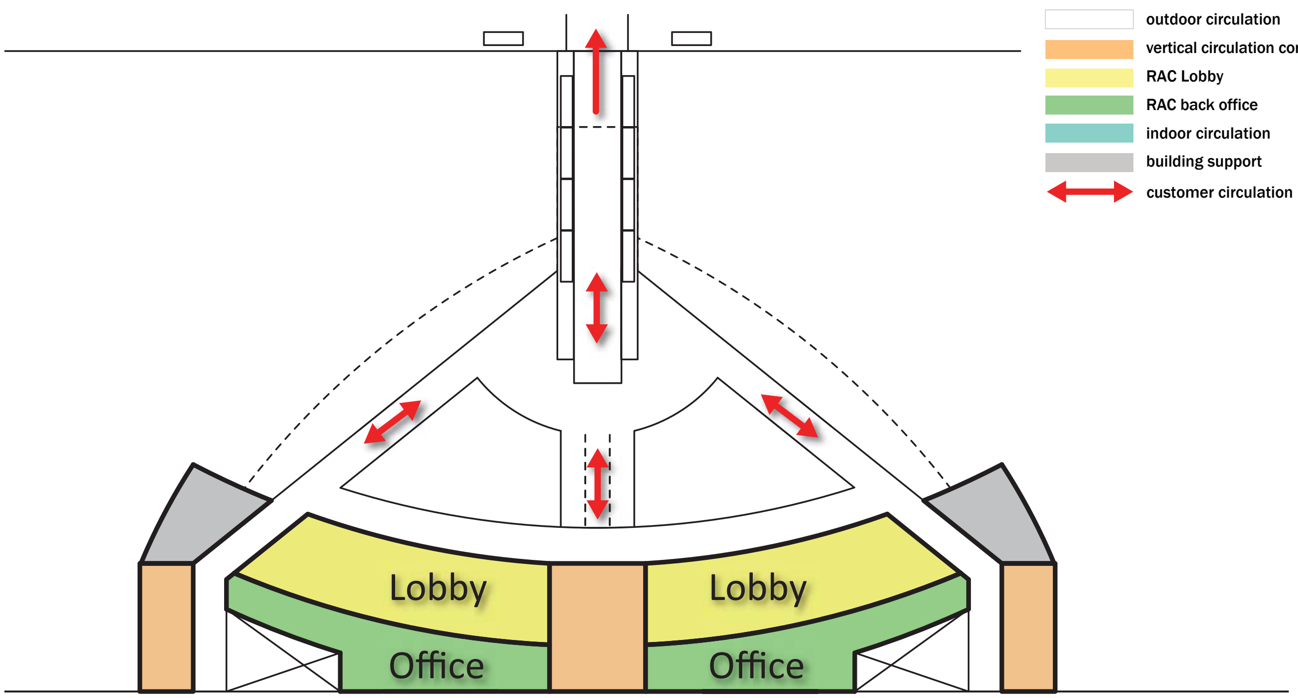


CSB Option **E**
Lower Level

0 10 20 50 100
SCALE FEET

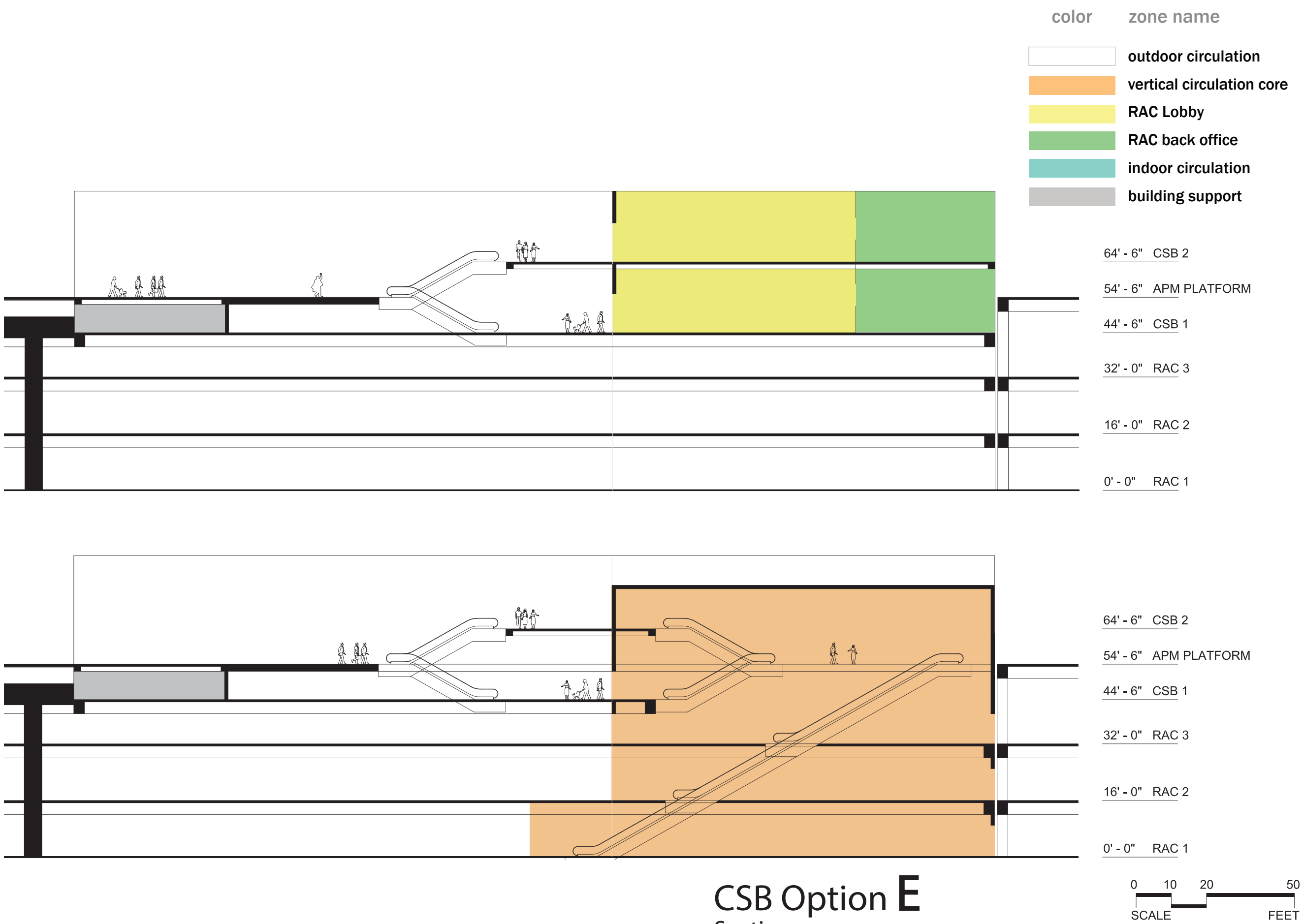
color | zone name

- outdoor circulation
- vertical circulation core
- RAC Lobby
- RAC back office
- indoor circulation
- building support
- customer circulation



CSB Option **E**
Upper Level

0 10 20 50 100
SCALE FEET



CSB Option E
Sections

LAX
Los Angeles World Airports

FOCUS TOPICS PRIOR TO NEXT MEETING
CONRAC BUSINESS AND FINANCIAL PLANNING
Los Angeles World Airports

Provided below are topics of focus prior to the next rental car industry meeting:

1. Consider industry request for 30-year agreement term.

2. Identify option to mitigate concerns regarding potential ConRAC facility conversion to alternative use after agreement term.

3. Confirm estimated ConRAC project costs have appropriately accounted for cost of enabling projects.

4. Evaluate use of CFCs to pay acquisition/capital leasing costs for common shuttle bus system.

5. Explore options to mitigate potential increased costs arising from possessory interest tax during transition period to ConRAC.

6. Define scope of tenant improvements within ConRAC that are eligible for Tenant Improvement Allowance and develop associated cost estimates.

7. Evaluate potential to rebate contingent idle storage area charge, if paid by rental cars, from subsequent CFCs during term of agreement, if surplus CFCs become available.

8. Develop mechanism to ensure that small operators in ConRAC are not unduly charged under consortium structures (e.g., cost allocation other than the 80/20 rule typical in airline agreements).

FOR DISTRIBUTION - JULY 28, 2015

LAX ConRAC – RAC Industry Meeting

Meeting Date: Tuesday, July 21, 2015, 10:00am – 12:00pm PDT
Location: LA NEXT Conference Room, LAWA Administration Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the ConRAC site, QTA and CSB design developments. Copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis of TranSystems provided a reminder of the top functional values to be used as facility design criteria. John Vermeersch of Hertz expressed that the baseline conditions for each functional value should be identified, which will then allow the industry to evaluate the proposed design concept by quantifying determined metrics such as pedestrian walking distances and time, customer service, and operational efficiencies.
2. Andrew Jaksich of Avis Budget noted that because this facility is so large, it would be difficult to compare travel distances and time to other facilities. It is good practice to perform comparison to current operations.
3. Joe Olivera of Advantage noted that there are four major areas of customer service to be considered: APM to CSB, CSB to Ready/Return, Ready/Return to CSB, and CSB to APM.
4. Mr. Jaksich commented that returning customers are often more stressed as time is more critical to catch their flight.
5. Diego Alvarez of LAWA noted that the project is required by statue to meet Cal Green Tier 1 of the California Building Code (similar to LEED Silver). The Project Team will decide if targeting Cal Green Tier 2 can be justified.
6. Mr. Jarvis provided an overview of the design, highlighting elements that have been updated since the last industry meeting. The overall sizes of the RAC Ready/Return and RAC Idle Storage Garages were revised to accommodate car carriers on site and location of building egress stairs to fall within maximum travel distances. Because of the reduced footprint of the RAC Idle Storage Garage, it is anticipated that additional overflow storage will be accommodated on the fourth (roof) level of this garage. 42% growth is anticipated in the programming. The use of an overflow storage floor is similar to facilities in Boston and Atlanta, and it allows flexibility in market share allocation.
7. It was noted that the roof level storage will be outside of secured boundary and will be accessed via common travel. The team will review possibility of providing dedicated ramp access to the roof but this would likely only be possible for access from Level 3 and would require significant cost increases.
8. [*Post Meeting Note*: The Design Team and LAWA discussed the timing of when anticipated growth to the market would require use of the Level 4 for RAC overflow storage. Since the 1,996,000 SF provided on three Idle Storage levels is only about 10% short of the original program demand that equates to 2,206,000 SF, it suggests that the demand would not require use of overflow storage until well into the life of the facility, which represents an opportunity to utilize this floor as parking for RAC employees airport employees, visitors or the public.]
9. Two deck drainage proposals were presented: Option 1 requires the two outer bays to drain to perimeter leaders and inner bays to be drained to interior leaders; Option 2 requires drainage from center ridge to

larger perimeter leaders but no interior drains. Option 2 is preferred by the RAC industry. The industry stressed the importance of the lower floor decks being level in order to avoid ADA ramps to their individual customer service buildings on those levels (this is a problem at the Burbank ConRAC).

10. The anticipated traffic circulation within different floors of the ConRAC facility was reviewed. The circulation will be different for the floors. Small RAC operators are expected to be located on Levels 1 and 2, while Level 3 will most likely be occupied by one entire brand family. It is anticipated that the larger brand families will have their return lanes located closer to the south and ready stalls located closer to the north. Business customers will be directed to the center core as it will be closest to the APM platform. Business transactions also have the biggest swing during a week and this space can flex depending on the level of activity.
11. The QTA towers are proposed as two separate structures to reduce exit distances at the QTA and avoid the need to provide extreme code mitigations. Mr. Jaksich noted that a concept to include a single QTA should not be abandoned because of potential benefits this could bring; however, it is recognized that building code requirements may limit the sizing of these facilities.
12. Separate maintenance areas are anticipated. These are staffed by different work groups and there are no advantages to these being located adjacent to the fueling island and car wash.
13. TranSystems will develop quantifiable design metrics for evaluating the various QTA concepts.
14. Two main QTA concepts were presented. The first concept has a travel path in a primarily west to east orientation for fueling and east to west orientation for car wash. The second concept has a travel path in a primarily south to north orientation for both fueling and car wash.
15. The support site was reviewed. A landscape buffer along La Cienega Blvd will be required and is shown on the site diagram. Space for staging and circulation for up to 30 car carriers is shown, along with three separate car corrals with each accommodating at least 100 cars on site. Two helices to access the upper levels of the Idle Storage Garage are planned. Loading docks will be provided at grade level support spaces. ACTION: **RACs to provide input on details for processing of car drop-off/pick-up, timing, peaks and valleys, points of origination (and percentage), and maximum number of car carriers for each brand family.**
16. The car carrier staging area will not be allocated. A third party operator could manage allocation between companies for vehicle delivery.
17. QTA Concept F has fuel and wash areas separated. This concept appears to work for some brands, but for some, this separation appears to create additional turns to the operation and may also create a labor issue with varying union classifications. Design Team will consider suggestion to locate the queuing in front of the car wash rather than immediately after the wash bay.
18. Within this QTA Concept, there are two options for design of the Maintenance Bays. The alternative with the floor of the maintenance bays connected to the QTA area is preferred as this provides more flexibility.
19. RACs suggested considering having at least a number of maintenance bays as drive-through to increase efficiency. RB Laurence of Stantec noted that wider bays are typically required to allow equipment to be stored on the side walls, due to elimination of the back wall where the equipment would otherwise be stored. ACTION: **Design Team will provide additional information for next meeting.**
20. Mr. Jaksich indicated that all maintenance functions should be moved toward the north end to facilitate processing of dirty cars, which will most likely be stored toward the south end of the Idle Storage Garage.

21. QTA Concept G was reviewed. The location of the administration area in relation to the fuel islands was discussed. An opening within the floor is provided adjacent to the proposed administration area, which provides ventilation and opportunities for egress stair. This concept also allows a portion of the QTA areas to be shut down during slow periods to conserve energy and manpower. RACs would like to see additional queuing spaces after coming out from the car wash.
22. There is concern that the size of the QTA footprint may become an issue with Code Officials. Each QTA block is approximately 100,000 SF per floor. The footprint floor areas of stacked QTAs at other locations are smaller: Chicago O'Hare QTA footprint is 90,000 SF and San Antonio QTA footprint is 56,000 SF. Further reviews with Code Officials should be conducted to confirm limitations to floor areas for this jurisdiction.
23. Mr. Vermeersch indicated that it is important to continue to explore multiple design options, to make sure that final proposed concept would be most appropriate for this market. Pat Tomcheck from LAWA noted that there is no particular reason for requiring a single concept before mid-September.
24. A number of CSB design options were presented at this meeting. The first four options reviewed (CSB Concepts F1 through F4) are variations of concept with CSB lobbies, back offices and support spaces on the Roof Level 4. Of the four concepts, the RAC industry prefers F4, which shows CSB spaces within the northern half of the building, as this provides most convenient access for customers coming off the APM north platform and that rental customers will be closest to the ready stalls located north of the center cores. The south core will be ideal location for taking returning customers back to the CSB to access the APM platform. Moving sidewalks on the Level 4 outdoor circulation areas will be provided in all of the options.
25. For rental customers, having a vertical circulation core located along the west edge should be explored. For wayfinding, it is better for the cores to be located near any edge and not in the center of the garage, as the customers will only have one way to travel if they arrive at the edge of the RAC floor.
26. Mr. Jaksich indicated that administration space remains to be a concern in many locations and made a suggestion for some back office areas to be provided on the RAC levels as part of base building budget, with the RACs providing only tenant improvement at interior and branding, rather than ground up construction of a premium booth. Typical administration functions that need to be close to the CSB are: break areas for customer service representatives, cash-out rooms and limited offices.
27. CSB Concept G involves having CSB lobbies and offices distributed equally among all RAC levels, with direct escalators/elevators provided at the Center Core. Openings in the floor will be provided to allow visual access to all RAC lobbies. Some images of an existing retail mall in Downtown Los Angeles (Fig at 7th Shopping Center) were shown to illustrate possibilities of this type of arrangement to allow visibility of the companies on the lower levels.
28. Mr. Olivera noted that he does not like arrangement to have split on multiple levels as it does not provide good customer service, when a customer wishes to choose a different RAC company located on a different floor. There were also concerns with additional costs associated with the openings in the floor.
29. Mr. Jarvis noted that we have had review meetings with responders and operators at the Fire Department personnel/operators and with code review and plan check approval personnel at Department of Building and Safety. This is expected to be a long process of education with these agencies. Mr. Tomcheck commented that a high-level review with department heads will be scheduled in the next few weeks to review ConRAC

and other associated components, to receive advanced buy-off of overall program before reviewing specifics of project with plan check reviewers.

30. The Design Team meets regularly with the APM team to review structural integration, vertical clearances and coordination. APM stations are anticipated at the following locations: three stations at the Central Terminal Area, two stations at the intermodal transportation facilities, a station to connect to the Metro line, and the ConRAC station. For a period of up to two years before the APM construction is completed, rental car customers will arrive on common shuttle buses that will arrive at grade. 9 to 10 bays are anticipated to be required and vertical circulation access will be provided from the grade level up onto Level 4.
31. Each RAC level is expected to have 17 feet floor-to-floor height to align with the QTA levels.
32. Next steps for the Design Team involve being engaged with each RAC brand family, including operations people to review deck layout and prepare dynamic model specific for each family, using actual transactions data unique to that company. Models will only be shared individually as these contain proprietary information. ACTION: TranSystems to contact each brand family to initiate the dynamic modeling process and setup one-on-one meetings in September.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (2 pages)

A2: Meeting Presentation (21 pages)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	July 21, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Second Floor, LA NeXt Conference Room

Name	Representing	Telephone Number	Email Address	
Pat Tomcheck	LAWA	424-646-5192	ptomcheck@lawa.org	Pat
Bill Bettison	ERAC	310-901-5172	William.L.Bettison@EHI.com	
David Lee	TranSystems	510-835-9916	dklee@transystems.com	
Jeff Jarvis	TranSystems	602 576 1733	JWJarvis@TranSystems.com	
Joe Olivera	Advantage/EZ	918-605-0139	Joe.Olivera@AdvantageCo	
Jock Knight	Fox	310 505 7705	joe@foxrentacar.com	
Fatima Hashim	LAWA	424-646-5173	fhashim@lawa.org	
Clemens Schoenberger	Sixt Rent a Car	786-246-0375	clemens.schoenberger@sixt.com	
Andrew Jaksich	Avis Budget	650-616-0145	Andrew.Jaksich@AvisBudget.com	AJ
Michael Luedtke	Avis Budget	619-727-3541	Michael.Luedtke@AvisBudget.com	ML
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Doug Steen	TranSystems	201-681-1300	dsteen@transystems.com	
Steven Lott	RAW International	213-622-4993	slott@rawinternational.com	
Rosa Doran	RAW International	213 622 4993	rdoran@rawinternational.com	
Norman Lin	TranSystems	312-669-5831	ylin@transystems.com	
Diego Alvarez	LAWA	424-646-5179	dalvarez@lawa.org	✓

Project	ConRAC Programming and Planning	Date:	July 21, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Second Floor, LA NeXt Conference Room

Name	**Representing**	**Telephone Number**	**Email Address**	
Jasmin Welker	Sixt			By Phone
Chris Roberts	Enterprise			By Phone
RB Laurence	Stantec			By Phone
Neil MacAloney	Stantec			By Phone
Justin Neel	TranSystems			By Phone

Los Angeles International Airport
Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING
JULY 21, 2015

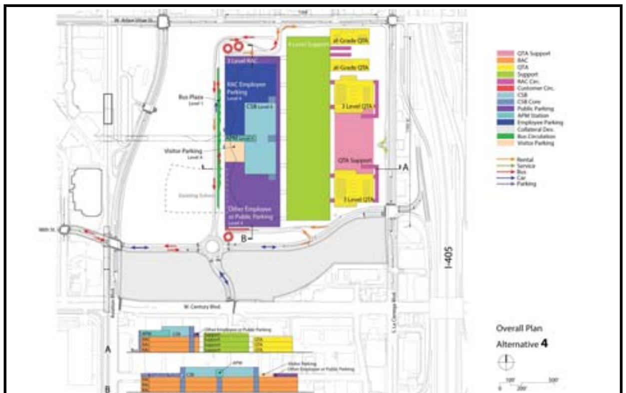
LAX Los Angeles World Airports
TranSystems

Agenda
1. Functional Values
2. Site Development
3. Deck Drainage
4. Development of QTA Configurations
5. Development of CSB Configurations
6. Fire Department Review Status
7. Next Steps

July 21, 2015 RAC Industry Meeting

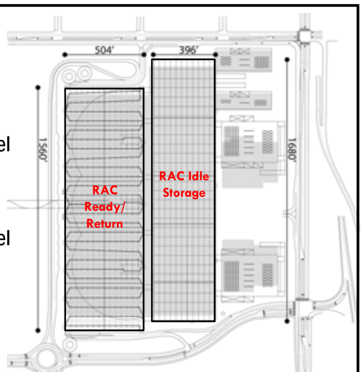
Top Functional Values (Facility Design Criteria)
1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

Functional Values



ConRAC – Overall Plan

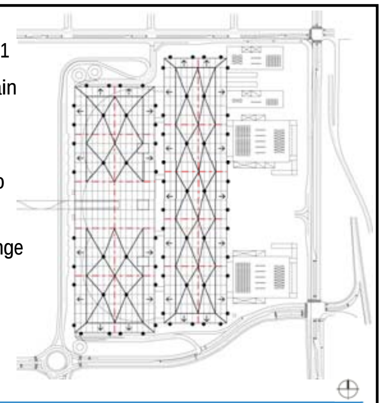
- Latest Site Development
  - RAC Ready/Return Garage: 1,560' x 504' = 786,240 SF per Level
  - RAC Idle Storage Garage: 1,680' x 396' = 665,280 SF per Level
  - 36' x 60' Bays
  - Buildings Shifted to Accommodate Exits and Car Carriers



Shading Represents Building Locations from Previous Concept

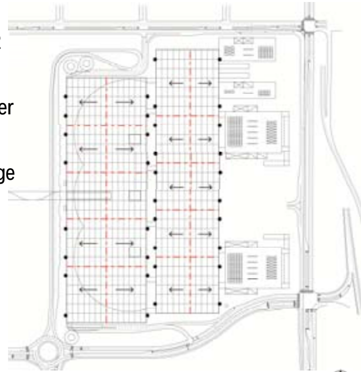
ConRAC Site Development

- Deck Drainage Option 1
  - Outer 1-2 Bays Drain to 5" Perimeter Leaders
  - Inner Bays Drain to 8" Interior Leaders
  - 20" Elevation Change at 1% Slope

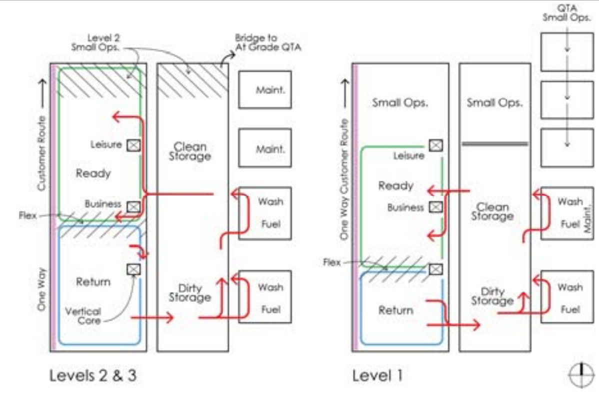


ConRAC Deck Drainage

➢ Deck Drainage Option 2
  - Drain from Center Ridge to 8" Perimeter Leaders
  - 30" Elevation Change at 1% Slope



ConRAC Deck Drainage

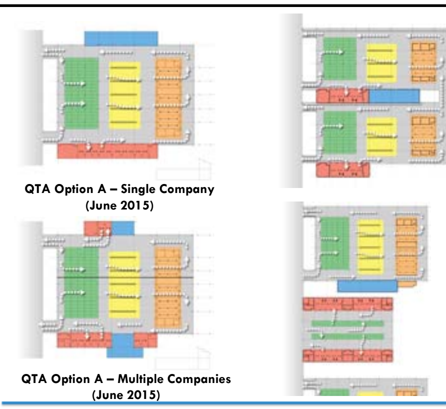


Typical Traffic Circulation

QTA Design Considerations

➢ Administration Areas – Supervisor Close to Fuel Islands
➢ Maintenance Areas – Convenient Access
➢ Shuttler Routes – Convenient Access with Few Cross Intersections
➢ Egress Travel Distance – Short and Direct Access
➢ Fuel Tank Locations – Convenient Fuel Truck Access
➢ Car Carrier Locations – Convenient Truck Access and Secured Access to RAC Floors

QTA Design Considerations



QTA Option A – Single Company (June 2015)

QTA Option B (June 2015)

QTA Option A – Multiple Companies (June 2015)

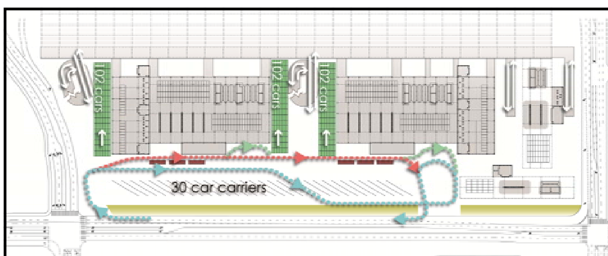
QTA Option C (June 2015)

Recap of QTA Options from June 2015

QTA Option D (June 2015)

QTA Option E (June 2015)

Recap of QTA Options from June 2015

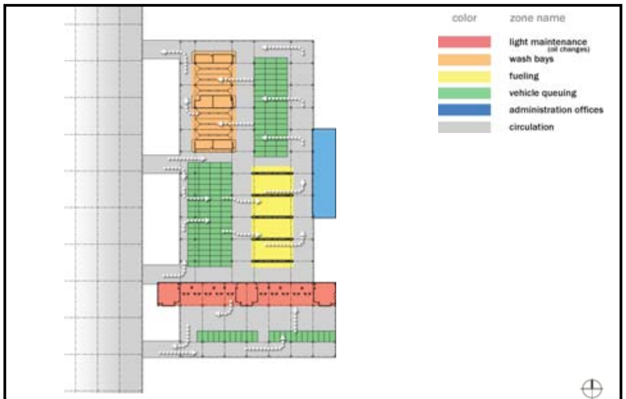


Overall Area (3 Levels)	748,716 SF
Area per Level	249,572 SF
Fuel Positions	60
Wash Bays	12
Maintenance Bays	20
Queuing in QTA	306
Office Area	11,466 SF
Car Carriers	30
Car Corral Spaces	306

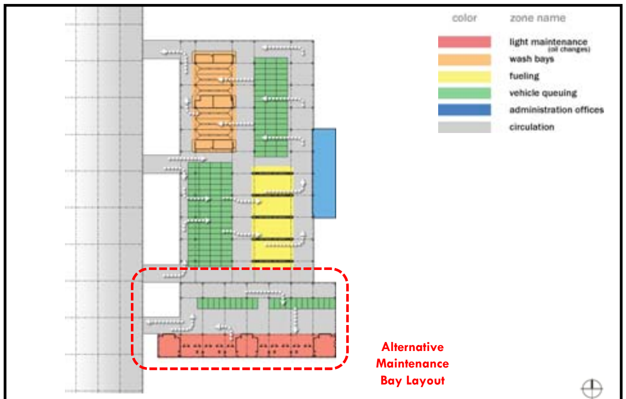
Delivery Route
Fuel Delivery Route
Car Carrier Route
Car Carrier Stacking

* Area does not include bridges
* Area calc. does not include alternative options

QTA Option F – Support Site



QTA Option F - Enlarged Plan



QTA Option F Alt - Enlarged Plan

Benefits

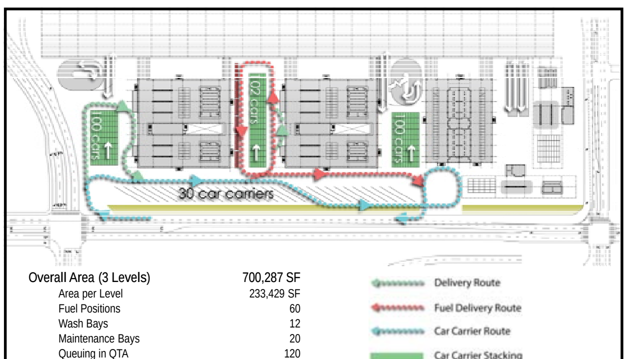
- Queueing Provided Before and After Fueling
- Larger Open Area = Better Sight Distances
- Split Maintenance Bays = Allocation Flexibility
- Split Maintenance Bays = Less Congestion at Intersections
- More Entry and Exit Ramps = Increased Flexibility and Less Busy Intersections

QTA Option F Benefits

Constraints

- Pedestrian Path from Offices to Fueling Area Crosses Main Travel Way (Where All Cars Pass)
- Less Visibility of Work Areas for Supervisor
- North Wash Area Less Accessible for Service Vehicles and Vacuum Truck
- Split Maintenance Bays = More Intersections
- More Entry and Exit Ramps = More Intersections

QTA Option F Constraints

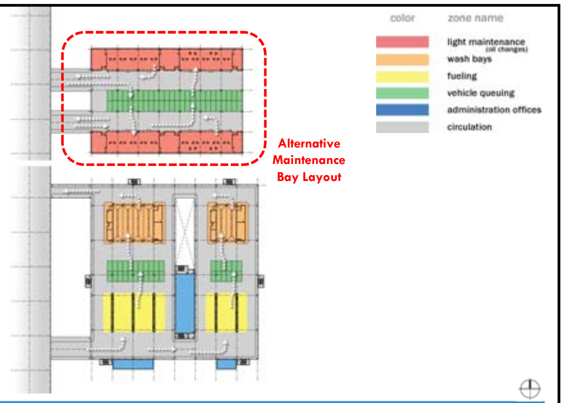


Overall Area (3 Levels)	700,287 SF
Area per Level	233,429 SF
Fuel Positions	60
Wash Bays	12
Maintenance Bays	20
Queuing in QTA	120
Office Area	10,776 SF
Car Carriers	30
Car Corral Spaces	302

* Area does not include bridges
* Area calc. does not include alternative options
* Area calc. does not include open air wells or stairs

QTA Option G – Support Site

QTA Option G - Enlarged Plan



QTA Option G Alt - Enlarged Plan

Benefits

- Short Travel Distance from Office to Fuel Island with Safer Pedestrian Paths
- Segregated Operating Areas = More Options for Allocation, Opportunities to Secure Area and Close Section of Area
- Car Wash Service Areas More Accessible for Service Vehicles and Vacuum Trucks
- Single Tank Field
- Open Slot in QTA = More Egress Opportunities, Shorter Travel Distances and Increased Air Circulation
- Centralized Maintenance = Better Supervision

QTA Option G Benefits

Constraints

- Center Office May Reduce Sight Distance and Traffic Circulation Visibility
- Limited Proximate Queueing Area (Provided in Idle Storage)
- Single Maintenance Bay Tower = Busier Intersection

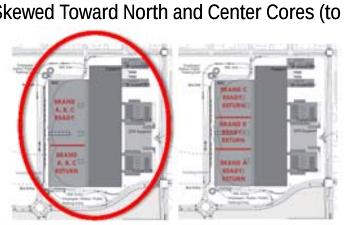
QTA Option G Constraints

Discussion of QTA Options

- Option F
- Option F Alt
- Option G
- Option G Alt

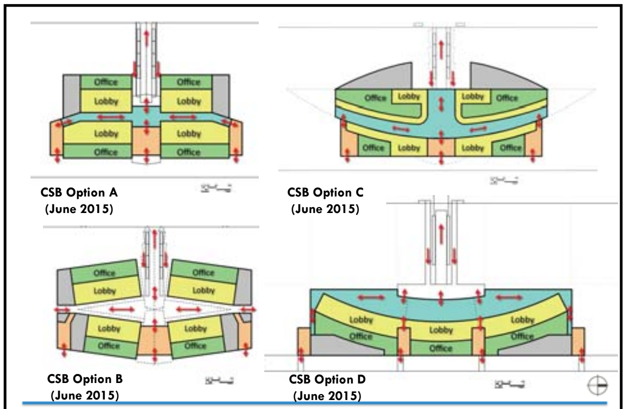
Preferred QTA Option

- CSB Design Considerations
  - CSB Skewed Toward North and Center Cores (to be Confirmed)

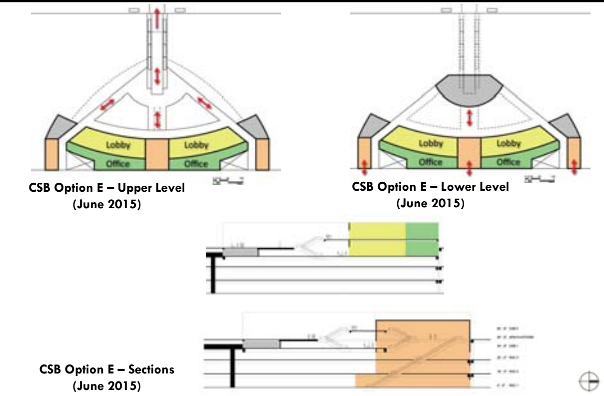


  - Keep Brands within Brand Family Together
  - Unconditioned Lobby Space
  - Designed to Enhance Safety and Security

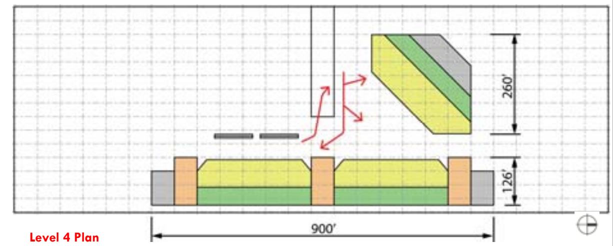
CSB Design Considerations



Recap of CSB Options from June 2015



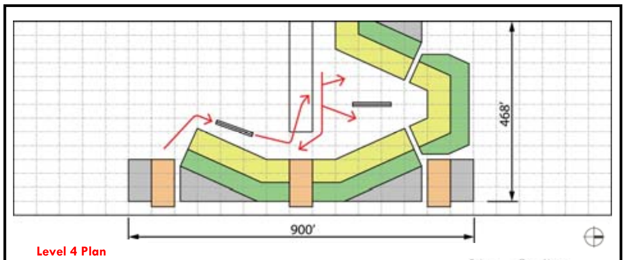
Recap of CSB Options from June 2015



Overall Area		199,280 SF
	RAC Lobby	110,000 SF
	RAC Back Office	45,000 SF
	Building Support	21,600 SF
	Vertical Circulation Core	22,680 SF

Color / Zone Name: Outdoor Circulation; Vertical Circulation Core; RAC Lobby; RAC Back Office; Indoor Circulation; Building Support; Customer Circulation

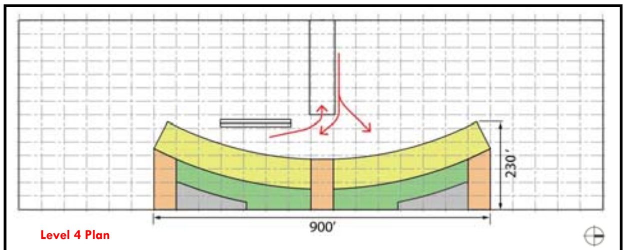
CSB Option F1



Overall Area		199,280 SF
	RAC Lobby	110,000 SF
	RAC Back Office	45,000 SF
	Building Support	21,600 SF
	Vertical Circulation Core	22,680 SF

Color / Zone Name: Outdoor Circulation; Vertical Circulation Core; RAC Lobby; RAC Back Office; Indoor Circulation; Building Support; Customer Circulation

CSB Option F2



Overall Area		199,280 SF
	RAC Lobby	110,000 SF
	RAC Back Office	45,000 SF
	Building Support	21,600 SF
	Vertical Circulation Core	22,680 SF

Color / Zone Name: Outdoor Circulation; Vertical Circulation Core; RAC Lobby; RAC Back Office; Indoor Circulation; Building Support; Customer Circulation

CSB Option F3

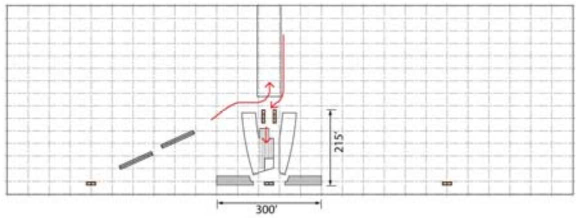
Overall Area		199,280 SF
	RAC Lobby	110,000 SF
	RAC Back Office	45,000 SF
	Building Support	21,600 SF
	Vertical Circulation Core	22,680 SF

Color / Zone Name: Outdoor Circulation; Vertical Circulation Core; RAC Lobby; RAC Back Office; Indoor Circulation; Building Support; Customer Circulation

CSB Option F4

Benefits	F1	F2	F3	F4
➢ Bring Rental Customers Closer to North and Center Cores to Suit Expected RAC Operations	✓	✓		✓
➢ More Counters Closer to Arriving Customers from APM North Platform	✓	✓		✓
➢ Good Visibility of All Lobby Areas	✓		✓	✓
Constraints				
➢ Less Flexibility if RAC Operations Change	✓	✓		✓
➢ Long Walking Distance to Lobby Ends			✓	
➢ Difficult to Allocate to Current Market Share			✓	

CSB Option F Benefits and Constraints

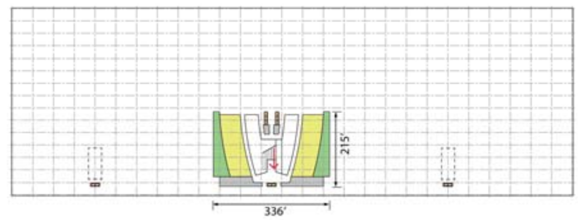


Level 4 Plan

Overall Area **(Excluding Cores)**	177,680 SF
RAC Lobby (Levels 1 thru 3)	110,000 SF
RAC Back Office (Levels 1 thru 3)	45,000 SF
Building Support (All Levels)	22,680 SF
Vertical Circulation Core	N/A

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

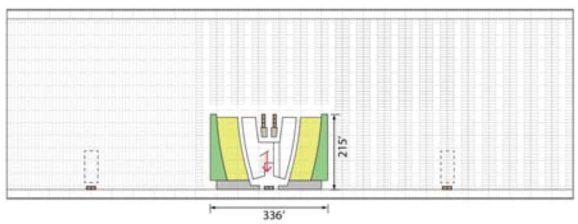
CSB Option G



Level 3 Plan

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

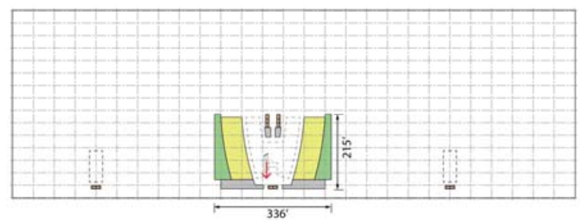
CSB Option G



Level 2 Plan

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

CSB Option G

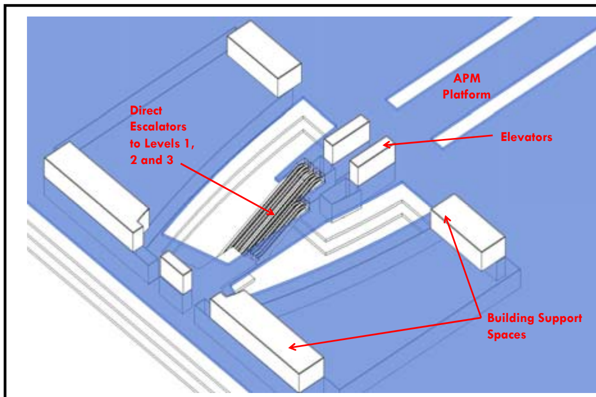


Level 1 Plan

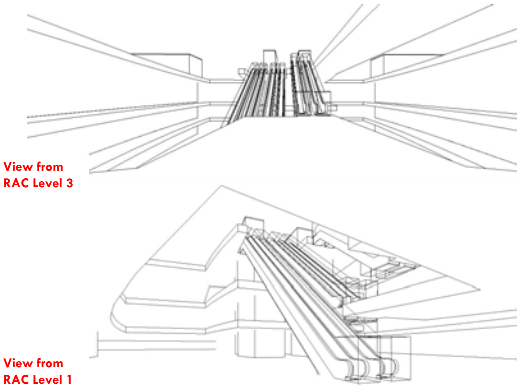
Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

CSB Option G

Images of Retail Mall in Downtown L.A.



CSB Option G – Aerial View



CSB Option G – Views from RAC Levels

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Benefits

- Good Visibility of All Lobby Areas
- Shorter Travel Distances to Lobby Areas
- Lobbies and Offices on Same Level of RAC Operations
- Access to Natural Ventilation and Light to All RAC Floors
- Eliminated Costs for Multiple Sets of Escalators

Constraints

- More Costly to Incorporate Large Openings in Floors
- Long Walking Distances on Floor Decks
- More Difficult to Go From One Floor to Another
- Reduced Ready/Return Areas on Each RAC Floor

CSB Option G Benefits and Constraints

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Discussion of CSB Options

- Option F1
- Option F2
- Option F3
- Option F4
- Option G

Preferred CSB Option

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Agency Review Status

- Met with LA Fire Department and LA Department of Building and Safety
- Presented Performance-Based Approach for Design of the QTA with Code Mitigations
- Reviewed Occupancy Group Classifications and Fire Protection Systems
- Additional Review Meetings Planned Between Now and November
- Objective is to Receive Conceptual Approval of QTA Mitigation Plan by 30% Design

Fire Department Review Status

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Next Steps

- Prepare Dynamic Model for Each Brand Family of Their Anticipated Configuration within the Garage
- Single Concept by September 15, 2015 RAC Industry Meeting

Next Steps

Consolidated Rental Car Facility at Los Angeles International Airport

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FOR DISTRIBUTION - AUGUST 26, 2015

LAX ConRAC – RAC Industry Teleconference

Meeting Date: Tuesday, August 18, 2015, 10:00am – 12:00pm PDT
Location: On-Line GoToMeeting

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the proposed overall ConRAC site layout as well as the Quick Turn-Around (QTA) and Customer Service Building (CSB) design developments. A copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis (TranSystems) provided a reminder of the top functional values to be used as facility design criteria.
2. A consolidated busing operation may be in effect for a year or so prior to the opening of the Automated People Mover (APM), with the buses traveling along the west edge of the ConRAC to load and unload passengers in a series of bus bays. Elevators and escalators will carry customers from the Level 1 bus plaza directly to the CSB on Level 4.
3. Jeff Jarvis provided an overview of the typical traffic circulation pattern between the Ready/Return, Support (vehicle storage), and QTA (fuel/wash/maintenance) areas.
4. TranSystems has received surveys back from the major brand families which indicate that 20 car carrier slots, with space for a few more for growth, will be adequate to meet the RAC industry needs. This is fewer than the 30 car carrier spaces initially anticipated to meet the future requirements of the ConRAC.
5. The PowerPoint presentation shows 30 car carrier spaces on the site layout plan. **Future drawings will show the reduction in the number of spaces required for that function.**
6. For the proposed QTA, queuing areas are provided both before and after fuel and wash, with close proximity to each other, as was suggested by the RACs.
7. Jeff Jarvis presented four updated QTA options incorporating responses to prior RAC comments. The options are as follows:
    a. Option F has two approximately equal-sized QTA blocks, each with fuel and wash functions, and, on Levels 2 and 3, a separate maintenance block
    b. Option G has two equal-sized blocks of fuel and wash, each split into two smaller, adjacent blocks, and a separate maintenance block on Levels 2 and 3
    c. Option H has a single large block of fuel and wash, with a separate maintenance tower on Levels 2 and 3
    d. Option J has two larger blocks, one with fuel only and the other with wash bays only, with a separate maintenance tower on Levels 2 and 3
8. Avis Budget suggested that the maintenance bays on Level 1 of Options H and J be relocated along the west edge of the QTA facing into the storage area, rather than the east edge, as currently proposed.
9. Jeff Jarvis shared several options for the smaller independent operators at the QTA, including at grade and stacked versions.
10. **TranSystems will complete a preliminary QTA Functions Comparison Matrix for the September 15 meeting which will include travel distances, types and number of turns, timing, etc. to assist in**

evaluating options. The RACs were asked to provide any suggestions on what criteria should be included in the Matrix. These are to be submitted no later than September 4th.

11. At the September 15, 2015 meeting, TranSystems will provide an analysis of drive-through versus pull in/back out maintenance bays.
12. It was noted that the areas and program vary slightly between QTA options, due to different shapes, configuration and the structural grid. Option H, for example, has slightly more fuel positions due to the array of fuel islands.
13. TranSystems will provide more detail on the independent QTA options in September.
14. Pat Tomcheck (LAWA) noted that requirements or direction from the City of LA Fire Department and Building and Safety Departments may determine which QTA options will be approved. TranSystems will take the RAC preference into account when presenting the QTA design to City officials, but code requirements may dictate the final decision.
15. The discussion then turned to the CSB.
16. Based on industry input, administration space has been added near the vertical cores in the Ready/Return areas of Levels 1 – 3. TranSystems will provide further detail at the September meeting.
17. Each CSB option will have some flexibility for allocation, based on reasonable assumptions, understanding that it would be up for negotiation as part of the business deal between LAWA and the RACs.
18. In September, TranSystems will provide further detail on the vertical cores on the west side of the ConRAC, with an updated bus curb configuration, shifted north to be closer to the west vertical cores. These bus bays and vertical cores will be used during the time when a consolidated bussing operation is in effect. These areas will also be used by car rental companies that do not operate from the ConRAC.
19. At the September meeting, TranSystems will present walking distances and implications of the west vertical cores for each CSB option and distribute key evaluation factors for industry feedback.
20. The west cores will have at least one direct escalator from Level 1 to the CSB on Level 4.
21. A mezzanine level below the APM will connect it to the Intermodal Transportation Center East as well as to Metro's Crenshaw Light Rail station, on the west side of Aviation Boulevard.
22. The customer drive lane at the west edge of the garage and RAC customer exit plazas, likely to be located along the perimeter within the building structure, will not be impeded by the west vertical cores.
23. Customers are only expected to walk between a west vertical core and an east vertical core on Level 4.
24. Indoor circulation, currently shown on the legends of the CSB options, will be shown as buildings with roofs in the next iteration. TranSystems will provide further detail at the September 15th meeting regarding which areas are proposed as open air and which are covered areas, with the consideration that customers can be protected from inclement weather all the way to their rental vehicle.
25. TranSystems will provide an evaluations matrix on the key functional values of the CSB options at the September meeting.
26. Pat Tomcheck stated when comparing the CSB options, not all criteria should be evaluated equally. Jeff Jarvis pointed out that the evaluation criteria is intended more for comparison and evaluation than for selection. LAWA will provide TranSystems with those CSB design characteristics that the airport finds most critical.

27. Joe Olivera (Advantage) is hesitant on the CSB Circle design option. The RACs will be in the facility for many years and it is incumbent for the team to ensure that the facility can efficiently be reallocated in future years.
28. The ability to reallocate space will be one of the characteristics included in CSB evaluation criteria.
29. John Vermeersch (Hertz) noted that the back office area seems small relative to the overall design space. TranSystems pointed out that the RACs previously requested provisions for administration space on Levels 1 through 3 in the Ready/Return area, where much of the operation occurs. Therefore, some of that programmed space which would typically be the located in the CSB is proposed to be shifted to the lower levels.
30. The CSB mini-mall configuration would allow for some flexibility for companies to use the space as they need, with respect to customer service and administration areas.
31. Back office space supporting counter functions would be located on Level 4, with much at the operation at Ready/Return areas supported by the space provided on Levels 1 – 3.
32. Chris Roberts (Enterprise) noted that the distance from the center core to true north is long, at the two large main cores to the east. Perhaps the cores do not need to be spaced symmetrically equidistant.
33. TranSystems will provide the anticipated layouts of the Ready/Return and Storage Areas. TranSystems will arrange to have individual ace-to-face meetings with the RACs to review modelling assumptions. Each meeting, which will be scheduled around the middle of September, is expected to last a few hours. Subsequent follow- up meetings will be scheduled as needed, but may be held on-line.
34. In September, we will discuss the preferred direction, which may be a combination of several concepts. At that time we will need basic direction for QTA and CSB, as agreed with LAWA.
35. Joe Olivera noted that there are four brand families today, although one is smaller (Advantage and E-Z).
36. Scott Goldstein (Enterprise) and Chris Roberts presented a slight shift in cores as a way of balancing the asymmetrical CSB concepts. TranSystems will present this variation to the rest of the RACs at the September meeting.
37. For car carrier loading and unloading, it is unlikely that all three brand families will experience their peaks at the same time.
38. LAWA requested to see the data that led to this conclusion and that TranSystems add their recommendation regarding the number of car carrier spaces to the Project Definition Document.
39. RAC industry to provide comments to TranSystems by September 4th on the CSB Decision Matrix for evaluation of the concepts.
40. The next meeting is at LAWA's Administration Building on September 15th, from 10:00 AM to 12:00 PM. TranSystems will also provide a call-in number for a GoToMeeting for those who cannot attend the meeting in person.

These minutes have been prepared by Doug Steen of TranSystems (dssteen@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

A2: Meeting Presentation (22 pages)

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MEETING ATTENDEE SHEET

Project	ConRAC Programming and Planning	Date:	August 18, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	GoToMeeting

Name	Representing	Telephone Number	Email Address	
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Scott Goldstein	Enterprise	314 512 5307	scott.d.goldstein@ehi.com	
Chris Roberts	Enterprise		Christopher.P.Roberts@ehi.com	
John Vermeersch	Hertz	201 307 5203	JVermeersch@hertz.com	
Clemens Schoenberger	Sixt	786 246 0375	clemens.schoenberger@sixt.com	
Jasmin Welker	Sixt	888 942 7498 x442	jasmin.welker@sixt.com	
Anthony Skidmore				
RB Laurence	Stantec	603 206 7559	ronald.laurence@stantec.com	
Neil MacAloney	Stantec		Neil.MacAloney@stantec.com	
Rosa Doran	RAW International	213 622 4993	rdoran@rawinternational.com	
Jeff Jarvis	TranSystems	602 576 1733	JQJarvis@transystems.com	
Doug Steen	TranSystems	201 681 1300	dssteen@transystems.com	
Justin Neel	TranSystems	602 681 0415	jmneel@transystems.com	
Pat Tomcheck	LAWA	424 646 5192	PTomcheck@lawa.org	

Los Angeles International Airport
Consolidated Rental Car Facility

RENTAL CAR INDUSTRY TELECONFERENCE
AUGUST 18, 2015

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Agenda

1. Functional Values
2. Site Development
3. QTA Concept
4. CSB Concept
5. Next Steps

August 18, 2015 RAC Industry Meeting

Consolidated Rental Car Facility at Los Angeles International Airport

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Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

Functional Values

Consolidated Rental Car Facility at Los Angeles International Airport

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ConRAC – Overall Plan

Consolidated Rental Car Facility at Los Angeles International Airport

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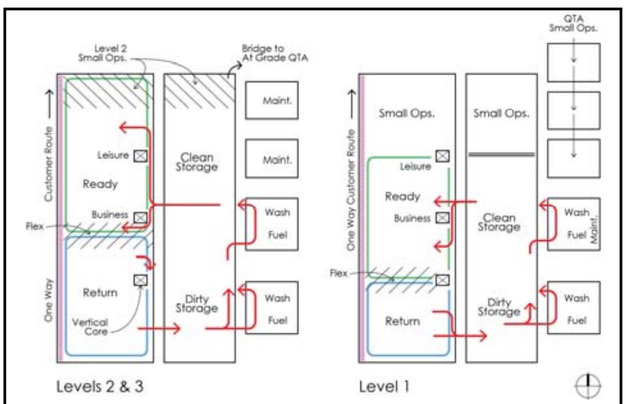

Typical Traffic Circulation

Consolidated Rental Car Facility at Los Angeles International Airport

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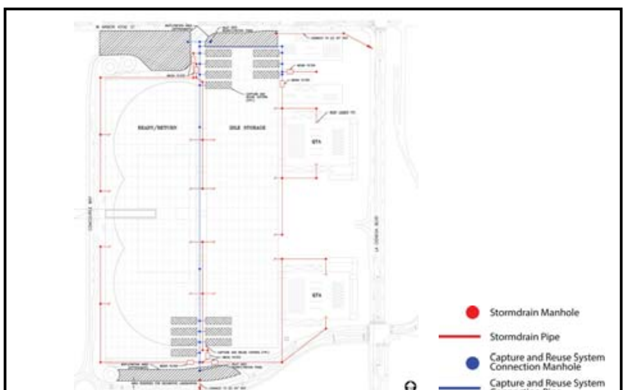
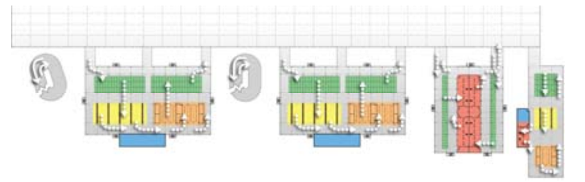


Storm Water Management – Preliminary Concept

Consolidated Rental Car Facility at Los Angeles International Airport

color	zone name		
	light maintenance (oil changes)		Delivery Route
	wash bays		Fuel Delivery Route
	fueling		Car Carrier Route
	vehicle queuing		Car Carrier Stacking
	administration offices		
	circulation		

QTA Option F – Level 1



Overall Area (3 Levels)	704,961 SF
Area per Level	234,987 SF
Fuel Positions	60
Wash Bays	12
Maintenance Bays	20
Queuing in QTA	268
Office Area	11,480 SF

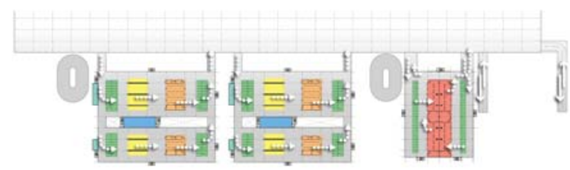
* Area does not include bridges or independent ops QTA

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

QTA Option F – Level 2/3

color	zone name		
	light maintenance (oil changes)		Delivery Route
	wash bays		Fuel Delivery Route
	fueling		Car Carrier Route
	vehicle queuing		Car Carrier Stacking
	administration offices		
	circulation		

QTA Option G – Level 1



Overall Area (3 Levels)	700,287 SF
Area per Level	233,429 SF
Fuel Positions	60
Wash Bays	12
Maintenance Bays	20
Queuing in QTA	120
Office Area	10,776 SF

* Area does not include bridges or independent ops QTA

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

QTA Option G – Level 2/3

color	zone name		
	light maintenance (oil changes)		Delivery Route
	wash bays		Fuel Delivery Route
	fueling		Car Carrier Route
	vehicle queuing		Car Carrier Stacking
	administration offices		
	circulation		

QTA Option H – Level 1

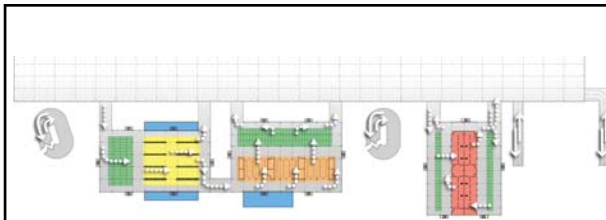
Overall Area (3 Levels)	670,194 SF
Area per Level	223,398 SF
Fuel Positions	64
Wash Bays	12
Maintenance Bays	20
Queuing in QTA	247
Office Area	13,609 SF

* Area does not include bridges or independent ops QTA

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

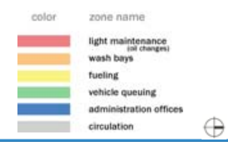
QTA Option H – Level 2/3

QTA Option J – Level 1

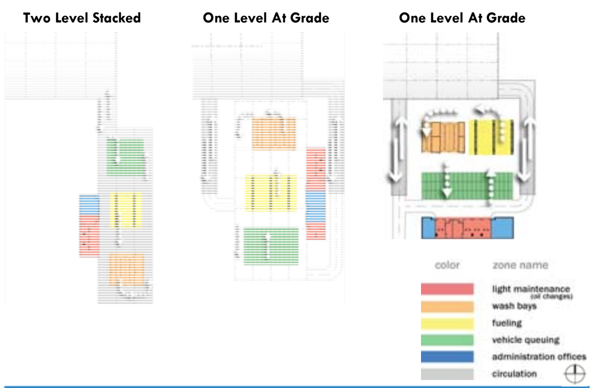


Overall Area (3 Levels)		563,265 SF
	Area per Level	187,755 SF
	Fuel Positions	60
	Wash Bays	12
	Maintenance Bays	20
	Queuing in QTA	215
	Office Area	15,583 SF

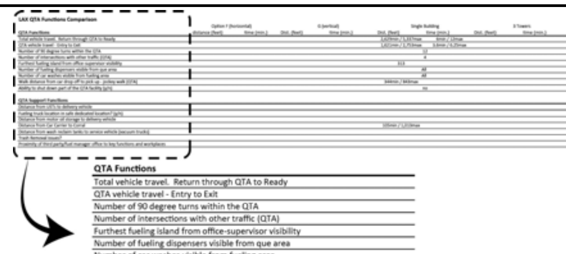
* Area does not include bridges or independent ops QTA



QTA Option J – Level 2/3



QTA Design Concept – Independent Options



QTA Functions
Total vehicle travel. Return through QTA to Ready
QTA vehicle travel - Entry to Exit
Number of 90 degree turns within the QTA
Number of intersections with other traffic (QTA)
Furthest fueling island from office-supervisor visibility
Number of fueling dispensers visible from que area
Number of car washes visible from fueling area
Walk distance from car drop off to pick up - jockey walk (QTA)
Ability to shut down part of the QTA facility (y/n)

QTA Support Functions
Distance from USTs to delivery vehicle
Fueling truck location in safe dedicated location? (y/n)
Distance from motor oil storage to delivery vehicle
Distance from Car Carrier to Corral
Distance from wash reclaim tanks to service vehicle (vacuum trucks)
Trash Removal issues?
Proximity of third party/fuel manager office to key functions and workplaces

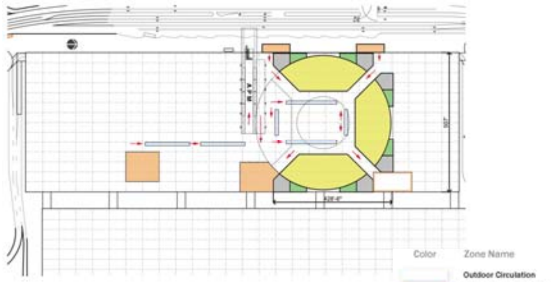
QTA Functions Comparison

- CSB Design Metrics
  - CSB North of APM Platform
  - Distributed Back-of-House Offices on RAC Floors
  - Keep Brands within Brand Family Together
  - Unconditioned Lobby Space
  - Designed to Enhance Safety and Security

CSB Design Considerations

Overall Area		163,400 SF
	RAC Lobby	86,700 SF
	RAC Back Office on Level 4	11,700 SF
	Building Support on Level 4	23,000 SF
	Vertical Circulation Core	42,000 SF

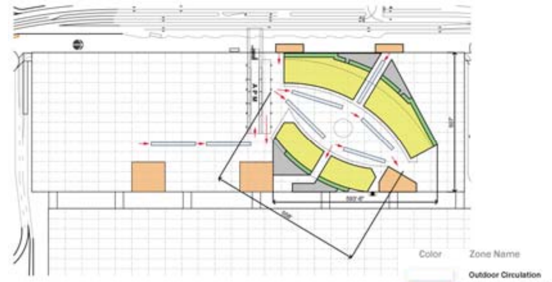
CSB Design Option - Arc



Color | Zone Name
- Outdoor Circulation
- Vertical Circulation Core
- RAC Lobby
- RAC Back Office
- Indoor Circulation
- Building Support
- Customer Circulation

Overall Area	160,000 SF
RAC Lobby	89,700 SF
RAC Back Office on Level 4	9,300 SF
Building Support on Level 4	19,000 SF
Vertical Circulation Core	42,000 SF

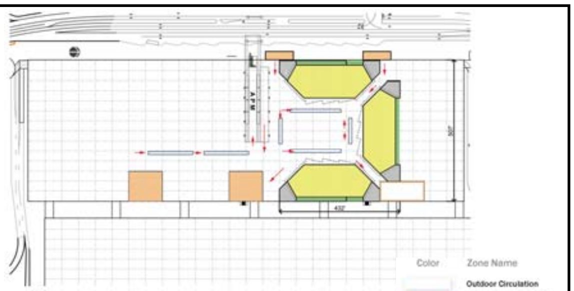
CSB Design Option - Circle



Color | Zone Name
- Outdoor Circulation
- Vertical Circulation Core
- RAC Lobby
- RAC Back Office
- Indoor Circulation
- Building Support
- Customer Circulation

Overall Area	169,800 SF
RAC Lobby	92,300 SF
RAC Back Office on Level 4	12,500 SF
Building Support on Level 4	23,000 SF
Vertical Circulation Core	42,000 SF

CSB Design Option - Elliptical



Color | Zone Name
- Outdoor Circulation
- Vertical Circulation Core
- RAC Lobby
- RAC Back Office
- Indoor Circulation
- Building Support
- Customer Circulation

Overall Area	161,200 SF
RAC Lobby	89,500 SF
RAC Back Office on Level 4	11,500 SF
Building Support on Level 4	18,200 SF
Vertical Circulation Core	42,000 SF

CSB Design Option - U

Next Steps

- Prepare Dynamic Model for Each Brand Family of Their Anticipated Configuration within the Garage
- September 15, 2015 RAC Industry Meeting

Next Steps

ISSUED FOR DISTRIBUTION – SEPTEMBER 22, 2015

LAX ConRAC – RAC Industry Meeting

Meeting Date: Tuesday, September 15, 2015, 10:00am – 12:00pm PDT
Location: LA NEXT Conference Room, LAWA Administration Building

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the ConRAC site, QTA and CSB design developments. Copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis (TranSystems) reviewed the agenda and provided a reminder of the top functional values to be used as facility design criteria.
2. An updated site plan was presented. Mr. Jarvis noted that the project team has been coordinating with the Landside Access Modernization Program (LAMP) team on the APM station alignment, location of 98th Street toward the southern edge of the site, and traffic impacts by various project elements. Pat Tomcheck (LAWA) indicated that LAWA is reviewing the preliminary traffic modeling results and validating whether the proposed 98th Street has sufficient capacity to accommodate the anticipated traffic volumes.
3. A hypothetical allocation of lobby and back office space based on 2014 market share for RAC agencies was reviewed. Discussions include:
    a. Market shares noted were based on percentage of transactions, adjusted to reflect 5% for independent RAC agencies.
    b. Lobby sizing was based on preliminary program data and project experience from similar facilities.
    c. Additional customer service and back office areas are also allocated on the RAC levels, as requested in prior industry meetings.
    d. Allocations are shown only to provide an example of what each brand family's square footage areas might be if 2014 market share transactions were used, knowing the actual allocations will evolve with negotiations of a future business agreement.
    e. Connie Gurich (Hertz DTAG) expressed concerns with basing market share calculation on transactions, and not on revenues represented by fees generated by each RAC agency. It was noted that transactions provide better indication of actual need. **ACTION: TranSystems will provide allocation based on revenue market share, for discussion directly with each of the participating companies.**
    f. Peter Van Valkenburg (Enterprise Holdings) asked if the airport would use a competitively bid scenario. He is concerned whether the timeline of first quarter of 2016 can be met for memorandum of understanding.
    g. John Vermeersch (Hertz DTAG) asked if transaction data were used for the space allocation at the Phoenix ConRAC CSB, what would the allocations have been and how would they have been different than what they are now. **ACTION: TranSystems will provide additional size comparison information (with other ConRACs) at the next meeting.**
4. Mr. Jarvis reminded the group that the proposed ConRAC design is based on the anticipated traffic circulation pattern between the Ready/Return, Idle Garage/Support and QTA areas, as noted on Slide 6.

Small operators are expected to be located on Levels 1 and 2 of the facility, which can be connected more easily to the at-grade QTA functions. QTAs will be separate and secure for large brand families.

5. RB Laurence (Stantec) presented results of the analysis between drive-through and pull-in/back out maintenance bays. Since pull-in/back out type maintenance bays utilize the back wall for large equipment (such as work bench, computer workstation, tool box and parts), drive through type maintenance bays would require the same equipment to be moved to the side, thus increasing the required width of each maintenance bay. Two types of drive through maintenance bays are possible – the first type with two bays arranged in a row, and the second type with an added drive aisle to allow vehicles from each maintenance bays to enter. The following comments were received:
    a. A tradeoff of the drive through concept would be the potential inefficiency where one of the two drive-through bays would not be available in a similar time frame and resulting in the need for backing a vehicle to exit the maintenance bay.
    b. In the drive through concept, safety aisle would need to be located in the long direction of bays.
    c. Doug Steen (TranSystems) suggested earmarking certain bays to dedicated functions, such as preventative maintenance, tire, balance, allowing for adjacent administration and storage spaces to be in closest proximity.
    d. Chris Roberts (Enterprise Holdings) noted that drive through Type 1 appears to be a good hybrid that provides convenience of a drive through and flexibility for space usage.
    e. Mr. Vermeersch indicated that he would like to see further studies to explore sizing and possible layout of maintenance administration and parts storage areas. ACTION: TranSystems will provide further development of the maintenance areas, including definition of the administration and support spaces, at the next meeting.
    f. Ms. Gurich asked if the team has considered including heavy maintenance in the program. Mr. Laurence indicated that the code has specific classifications for what are considered as light maintenance versus heavy maintenance. Light maintenance includes preventative measures including windshield wiper work, tire rotation/replacement, and oil changes. Heavy maintenance includes work involving engine, fuel system and body work that requires welding and painting, which has more stringent code requirements. For example, certain heavy maintenance activities might trigger additional building ventilation. ACTION: TranSystems will review the possibility of including heavy maintenance in the program, and the anticipated ramifications, with LAWA.
    g. Bill Bettison (Enterprise Holdings) stated that experience has shown that there is never sufficient storage in the maintenance bays.
6. Anticipated routing pattern for both arriving and departing trucks were reviewed. This information is important in that the traffic pattern will impact site entrance/exit locations and placement of car carrier staging and fuel tanks.
7. Four updated QTA concepts were presented. The following common features will be provided for each of the proposed concepts:
    a. The QTA support site accommodates up to 20 car carriers and three distinct secured car corral areas, with smaller car corral areas provided for independent RAC operators. Car carrier lanes are not assigned but will be managed by the third party operator.
    b. QTA is sized based on brand family that commands a full floor, on the third floor.

   c. The ground level of the QTA will be laid out differently from the two upper levels, because of the QTA support spaces and flexibility of vehicle access at grade.
   d. QTA areas for independent RAC operators are located on the ground level toward the north.
   e. Maintenance functions on Levels 2 and 3 are located as a separate structure with fueling and wash functions on Level 1.
   f. Maintenance functions on Level 1 are located at the area between Idle Storage and QTA, for the larger share brand family occupying that level.

8. Key differences among these concepts were noted:
   a. Concept F has two approximately equal-sized QTA blocks, each with fuel and wash functions, as well as a separate maintenance block on Levels 2 and 3.
   b. Concept G has two similarly sized blocks of fuel and wash functions, each split into two smaller, adjacent blocks, as well as a separate maintenance block on Levels 2 and 3.
   c. Concept H has a single large block of fuel and wash functions, as well as a separate maintenance block on Levels 2 and 3.
   d. Concept J has two larger blocks, one for fuel functions and the other for wash functions, and a separate block for maintenance functions on Levels 2 and 3.
9. Comments received include:
   a. Mr. Bettison suggested locating car carriers into the car corral areas. Mr. Jarvis noted that it would not be possible to maneuver trucks through that tight space.
   b. Mr. Roberts noted that QTA administration areas should be located closer to the fuel islands, with less need to be located as close to the wash bays.
   c. Joe Olivera (Advantage) noted that fuel islands may be less of a concern with code officials if visibility is provided to supervise the areas with the higher concerns.
10. Dynamic modeling tools were used in the project team's analysis of vehicle and pedestrian performance under different design variations, for conditions from Return to QTA, at QTA, and from QTA to Ready. Beth Kulick (TranSystems) described the methodology used, which is based on 2013 transaction data increased by 42% growth, on a Thursday in April and run for a 24-hour period, for a typical RAC brand family. The following results were found:
    a. It was determined that differences in total vehicular time and travel distances among the four concepts are not significant.
    b. Results for pedestrian movements indicate that there are significant differences among the concepts, with Concept F having the shortest distance traveled and in the shortest time duration.
11. The general consensus among the RAC agencies represented is to proceed with design development of Concept F, with the following adjustments:
    a. Combine the two approximately equal-sized QTA blocks into a single block, with all fuel islands located in the southern half of the building and all wash bays located in the northern half of the building.
    b. Locate all of the administration areas immediately east of the fuel islands, to maximize visibility from the offices and supervision of the fueling area (via large windows).
    c. Locate secured car corral areas as close to the car carrier staging lanes as possible, to reduce travel distances between the two areas.

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12. Four CSB design concepts were developed and presented for review:
    a. Each concept includes an overview of the layout with approximate floor areas, a hypothetical allocation based on market share, size comparison with the Phoenix Sky Harbor Rental Car CSB, circulation flows for both temporary shuttle bus and long term APM conditions, and how the vertical circulation cores react to the RAC ready/return decks. ACTION: Each of the rental car companies needs to review the projected amount of space indicated that they would receive for lobby, counter and back offices. Any concern the rental car companies have about the amount of individual office space needs to be communicated to the design team by the time of the October industry teleconference to be scheduled for October 20, 2015.
    b. It was noted that the some of the RAC back office spaces will be pushed to the lower RAC levels, for increased functionality and better customer service.
    c. Mini-mall spaces are more visible, when walking from the APM, with core placement at CSB considered.
    d. Minimal dwell is expected at the CSB, especially compared to typical retail mall.
    e. On APM arrival, the doors will open on the north side for egress, then the south side for ingress from the center platform. The south track will only be used when the north track needs to be serviced. Mr. Tomcheck noted that APM is designed to arrive/depart every 90 seconds but this needs to be confirmed [post meeting confirmation: Mr. Tomcheck consulted with LAMP Team and confirmed that APM is designed to arrive/depart every 1.5 to 2 minutes].
    f. There are limitations on where vertical circulation cores could be placed, in order to work with anticipated locations of expansion joints.
    g. Connecting bridges between RAC Ready/Return and Idle Storage Garages are shown as placeholders. Quantity and location for each bridge will be further reviewed.
13. All of the CSB concepts include unconditioned common circulation area, with moving sidewalks for access between APM platform, lobbies and vertical circulation cores. Comments received include:
    a. Because of the size of the outdoor courtyard (similar size as a football field), special attention shall be paid to how the customer will experience this space.
    b. Consider the rental car ready/return operations on each RAC deck to determine the optimal location of the vertical circulation cores, particularly the north and south cores.
    c. Explore having two "north cores" to serve the CSB.
    d. Consider how the layout can encourage customers to shop among multiple RAC agencies by providing visibility of all RAC lobbies.
    e. Compare the walking distance from the APM platform to the RAC ready area at this facility with other similar facilities, such as Burbank, Rhode Island and Nashville.
    f. Consider having arriving customers go from east to west on the escalators at the Center Core (closest to the APM), from the CSB level to the RAC level.
    g. Regarding question on whether views of mountains and downtown could be captured on the CSB Level, Mr. Jarvis indicated that these were considered but wanted to focus more on getting visibility of the rental car brands. Due to the height of the building, view to 405 Freeway is not possible.
    h. Chris Roberts stated his belief that the south core will be very underutilized, since their company would not expect a customer returning a vehicle to walk more than 300 feet.

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14. TranSystems has had one-on-one dynamic model review of their operation for some of the brand families and will soon be able to complete this review for all major brand families.
15. Mr. Van Valkenburg emphasized that the RACs need an understanding of plan for finance and builders' terms and that the process should be expedited. It would be helpful to have more detail on considerations for tenant improvements versus base building.
16. A teleconference will be scheduled on Tuesday, October 20, 2015 to review design progress. The next in-person meeting with the entire RAC industry will be scheduled on Tuesday, November 17, 2015.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (2 pages)

A2: Meeting Presentation (46 pages)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	September 15, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Second Floor, LA NeXt Conference Room

Name	Representing	Telephone Number	Email Address	
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Project	ConRAC Programming and Planning		Date:	September 15, 2015
	Los Angeles International Airport		Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting		Location:	LAWA Admin Building East, Second Floor, LA NeXt Conference Room

Name	Representing	Telephone Number	Email Address	
Robert Hunsinger	EHI			By Phone
Jasmin Welker	Sixt			By Phone
Maja Barcelo Cazorla	Sixt			By Phone
Matt Wiegand	EHI			By Phone
Scott Goldstein	EHI			By Phone
Peter Van Valkenburg	EHI			By Phone
Joe Olivera	Advantage			By Phone
Chuck Rowe	TranSystems			By Phone
Justin Neel	TranSystems			By Phone

Los Angeles International Airport
Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING

SEPT 15, 2015

Agenda – September 15, 2015

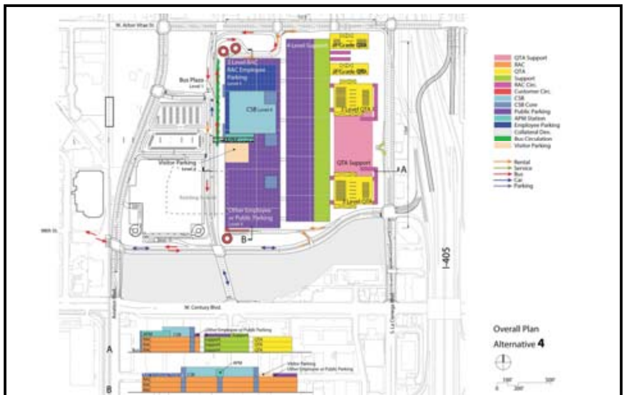
1. Functional Values
2. Site Development
3. Hypothetical Allocation of Lobby and Back Offices
4. Maintenance Bay Design Considerations
5. QTA Concepts
6. QTA Dynamic Model
7. CSB Concepts
8. Next Steps

RAC Industry Meeting

Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

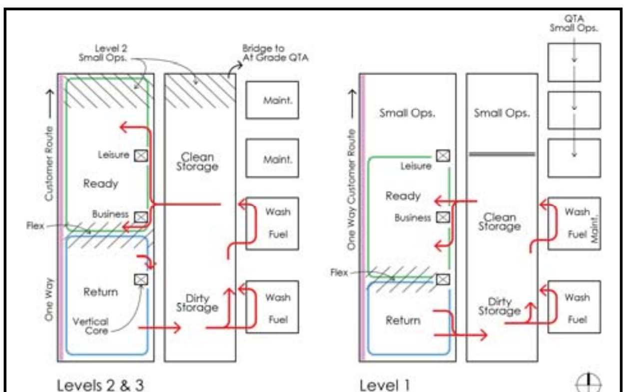
Functional Values



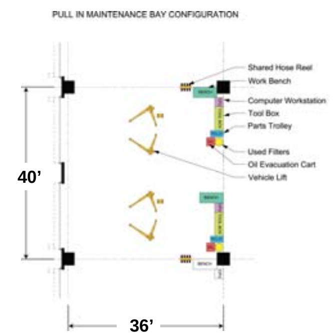
ConRAC – Overall Plan

	Total Area (SF)	Advantage	Enterprise/ Alamo/ National	Avis/ Budget	Hertz/ Dollar/ Thrifty	Fox	Independent
	Allocation to Tenants (based on 2014 Market Share)						
Market Share		1.7%	30.2%	23.0%	33.9%	6.2%	5.0%
CSB Areas - Level 4							
Lobby and Back Office Space	107,000	1,820	32,320	24,610	36,280	6,640	5,350
Ready Return - Level 1, 2 or 3							
Back Office Space	26,007	430	7,610	6,290	8,667	1,700	1,310

Allocation – Lobby and Back Offices

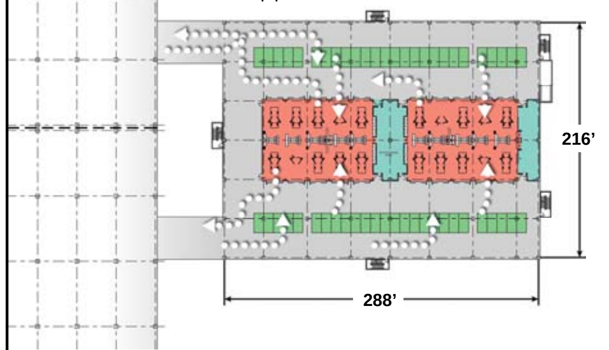


Typical Traffic Circulation

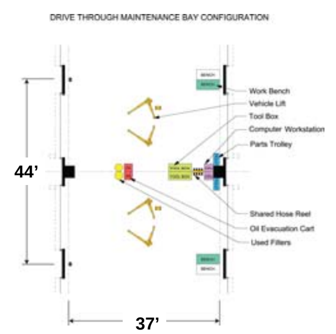


Maintenance Bay – Pull In Type

- Wall Behind Maintenance Bays Used for Large Equipment

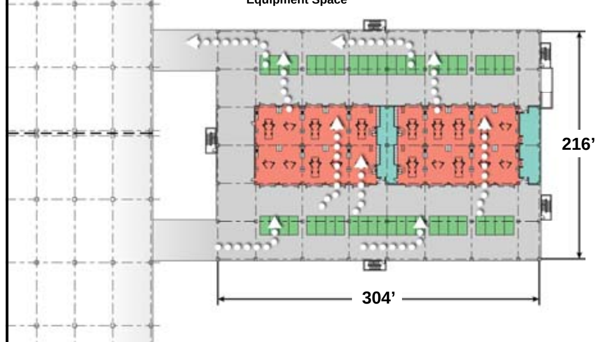


Maintenance Bay – Pull In Type



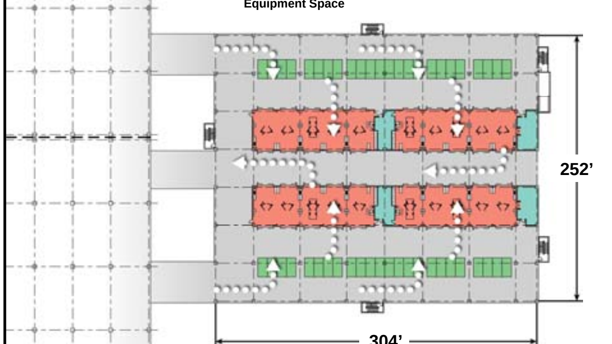
Maintenance Bay – Drive Through Type

- Drive Through Requires Additional Centralized Equipment Space

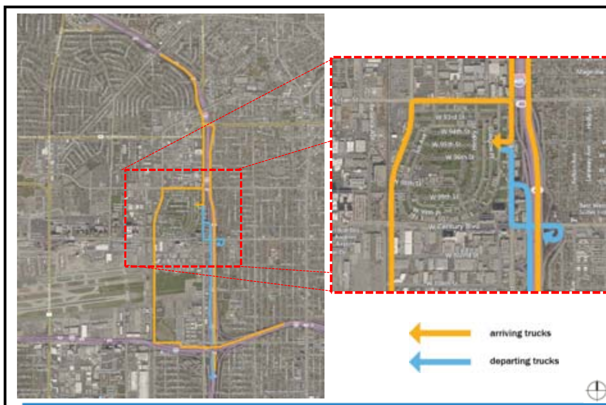


Maintenance Bay – Drive Through Type

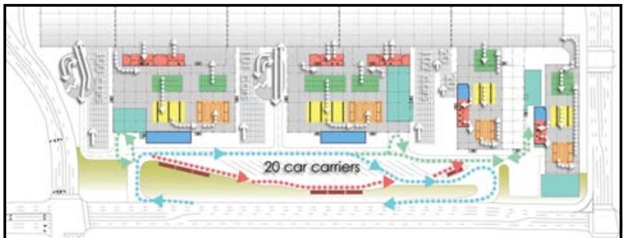
- Drive Through Requires Additional Centralized Equipment Space



Maintenance Bay – Drive Through Type 2



Arriving and Departing Truck Route



Level 1 Floor Area: 228,726 SF

QTA Floor Area (L1)	195,169 SF
Office Floor Area (L1)	13,945 SF
Maintenance Floor Area (L1)	19,612 SF
Fuel Positions (L1)	54
Wash Bays (L1)	10
Maintenance Bays (L1)	19
QTA Queuing Spaces (L1)	170

Overall Areas (Three Levels): 721,636 SF

color / zone name: light maintenance (oil changes); wash bays; fueling; vehicle queuing; administration offices; support/third party offices; circulation

Delivery Route; Fuel Delivery Route; Car Carrier Route; Car Carrier Stacking

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept F – Level 1

LAX Los Angeles World Airports

Independent Operator's QTA on Level 2 Only

Level 2/3 Floor Area: 246,455 SF

QTA Floor Area (L2, L3)	174,764 SF
Office Floor Area (L2, L3)	11,466 SF
Maintenance Floor Area (L2, L3)	60,225 SF
Fuel Positions (L2, L3)	60
Wash Bays (L2, L3)	12
Maintenance Bays (L2, L3)	20
QTA Queuing Spaces (L2, L3)	152

Overall Areas (Three Levels): 721,636 SF

color / zone name: light maintenance (oil changes); wash bays; fueling; vehicle queuing; administration offices; support/third party offices; circulation

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept F – Level 2/3

LAX Los Angeles World Airports

Level 1 Floor Area: 274,261 SF

QTA Floor Area (L1)	240,678 SF
Office Floor Area (L1)	8,939 SF
Maintenance Floor Area (L1)	24,644 SF
Fuel Positions (L1)	60
Wash Bays (L1)	10
Maintenance Bays (L1)	20
QTA Queuing Spaces (L1)	160

Overall Areas (Three Levels): 801,231 SF

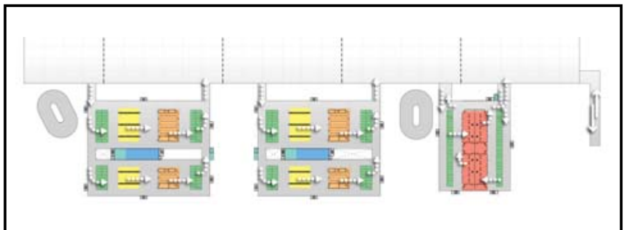
color / zone name: light maintenance (oil changes); wash bays; fueling; vehicle queuing; administration offices; support/third party offices; circulation

Delivery Route; Fuel Delivery Route; Car Carrier Route; Car Carrier Stacking

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept G – Level 1

LAX Los Angeles World Airports



Level 2/3 Floor Area: 263,485 SF

QTA Floor Area (L2, L3)	196,800 SF
Office Floor Area (L2, L3)	6,460 SF
Maintenance Floor Area (L2, L3)	60,225 SF
Fuel Positions (L2, L3)	60
Wash Bays (L2, L3)	12
Maintenance Bays (L2, L3)	20
QTA Queuing Spaces (L2, L3)	152

Overall Areas (Three Levels): 801,231 SF

color / zone name: light maintenance (oil changes); wash bays; fueling; vehicle queuing; administration offices; support/third party offices; circulation

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept G – Level 2/3

LAX Los Angeles World Airports

Level 1 Floor Area: 227,327 SF

QTA Floor Area (L1)	190,336 SF
Office Floor Area (L1)	18,304 SF
Maintenance Floor Area (L1)	18,687 SF
Fuel Positions (L1)	52
Wash Bays (L1)	10
Maintenance Bays (L1)	19
QTA Queuing Spaces (L1)	164

Overall Areas (Three Levels): 701,341 SF

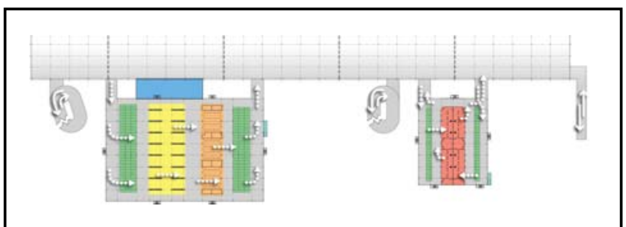
color / zone name: light maintenance (oil changes); wash bays; fueling; vehicle queuing; administration offices; support/third party offices; circulation

Delivery Route; Fuel Delivery Route; Car Carrier Route; Car Carrier Stacking

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept H – Level 1

LAX Los Angeles World Airports



Level 2/3 Floor Area: 237,007 SF

QTA Floor Area (L2, L3)	163,173 SF
Office Floor Area (L2, L3)	13,609 SF
Maintenance Floor Area (L2, L3)	60,225 SF
Fuel Positions (L2, L3)	64
Wash Bays (L2, L3)	12
Maintenance Bays (L2, L3)	20
QTA Queuing Spaces (L2, L3)	183

Overall Areas (Three Levels): 701,341 SF

color / zone name: light maintenance (oil changes); wash bays; fueling; vehicle queuing; administration offices; support/third party offices; circulation

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept H – Level 2/3

LAX Los Angeles World Airports

Level 1 Floor Area: 204,879 SF

QTA Floor Area (L1)	169,496 SF
Office Floor Area (L1)	17,824 SF
Maintenance Floor Area (L1)	17,559 SF
Fuel Positions (L1)	42
Wash Bays (L1)	8
Maintenance Bays (L1)	15
QTA Queuing Spaces (L1)	105

Overall Areas (Three Levels): 615,759 SF

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	support/third party offices
	circulation

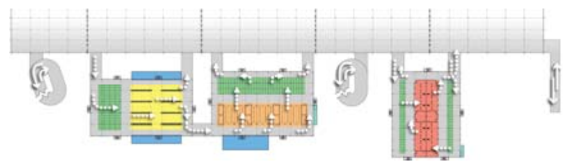
Delivery Route
Fuel Delivery Route
Car Carrier Route
Car Carrier Stacking

* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept J – Level 1

LAX Los Angeles World Airports

TranSystems



Level 2/3 Floor Area: 205,440 SF

QTA Floor Area (L2, L3)	129,870 SF
Office Floor Area (L2, L3)	15,345 SF
Maintenance Floor Area (L2, L3)	60,225 SF
Fuel Positions (L2, L3)	48
Wash Bays (L2, L3)	12
Maintenance Bays (L2, L3)	20
QTA Queuing Spaces (L2, L3)	157

Overall Areas (Three Levels): 615,759 SF

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	support/third party offices
	circulation

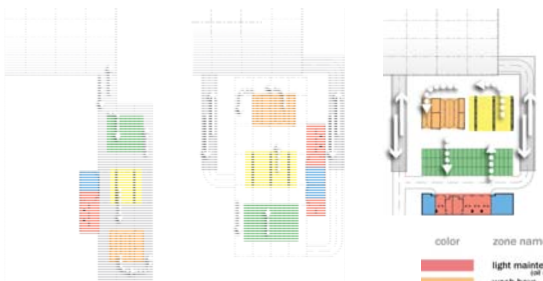
* Area does not include independent operators' QTA, support spaces, bridges or stairs

QTA Design Concept J – Level 2/3

LAX Los Angeles World Airports

TranSystems

Two Level Stacked | One Level At Grade | One Level At Grade



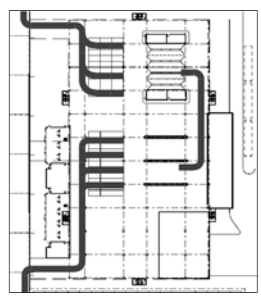
color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	circulation

QTA Design Concepts (Independent Operators)

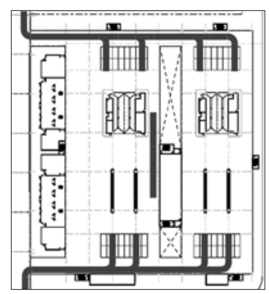
LAX Los Angeles World Airports

TranSystems

Concept F



Concept G

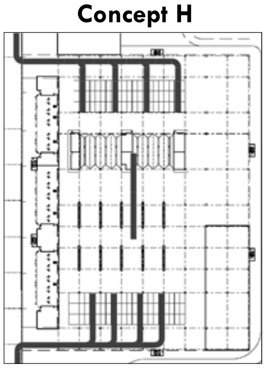


QTA Dynamic Model

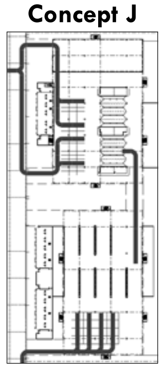
LAX Los Angeles World Airports

TranSystems

Concept H



Concept J



QTA Dynamic Model

LAX Los Angeles World Airports

TranSystems

- **Assumptions:**
  - Typical Agency Used for Comparison
  - Run for 24 Hours
  - Speeds
    - Straight = 10 MPH
    - Turns (Left or Right) = **5** MPH
  - **Fuel Consumption**
    - **0 MPH (Idle) = 0.20 Gal/hr**
    - **5 MPH = 0.41 Gal/hr**
    - **10 MPH = 0.47 Gal/hr**
  - Typical Volumes for Thursday in April
    - Volumes Increased by 42%
  - QTA is a Black Box for Timings
    - Internal Turns and Length to Move are Included

QTA Dynamic Model

LAX Los Angeles World Airports

TranSystems

To QTA		Concept F	Concept G	Concept H	Concept J	
	Cars To QTA	3,879	3,879	3,880	3,881	cars
	Total Distance	1,061.25	993.12	1,023.17	1,024.08	miles
	Total Time	116:41	108:31	111:33	111:40	HH:MM
	Total Right Turns	15,516	11,637	11,640	11,643	turns
	Total Left Turns	15,516	11,637	11,640	11,643	turns
	Total Gallons Used	54	50	52	52	gallons
At QTA						
	Cars Through QTA	3,835	3,837	3,836	3,837	cars
	Total Distance	147.93	95.87	105.42	204.58	miles
	Total Time	16:11	8:23	9:20	20:42	HH:MM
	Total Right Turns	0	0	0	0	turns
	Total Left Turns	7,758	0	0	3,881	turns
	Total Gallons Used	8	5	5	10	gallons
From QTA						
	Cars From QTA	3,833	3,836	3,833	3,835	cars
	Total Distance	1,004.27	1,088.88	982.55	932.94	miles
	Total Time	111:01	116:58	106:18	102:37	HH:MM
	Total Right Turns	15,332	11,508	11,499	15,340	turns
	Total Left Turns	15,332	15,344	15,332	15,340	turns
	Total Gallons Used	51	54	49	47	gallons
Total Vehicle Movements						
	Total Distance	2,213.45	2,177.86	2,111.15	2,161.60	miles
	Total Time	243:54	233:53	227:12	235:01	HH:MM
	Total Right Turns	30,848	23,145	23,139	26,983	turns
	Total Left Turns	30,848	23,145	23,139	26,983	turns
	Total Gallons Used	113	109	106	109	gallons
VSA & Shuttle Operator Movements in QTA @ 3.5 mph						
	Walking Distance in QTA	144	290	378	636	feet
	Total Distance	209.18	421.49	549.25	924.37	miles
	Total Hours	59.77	120.43	156.93	264.11	HH:MM

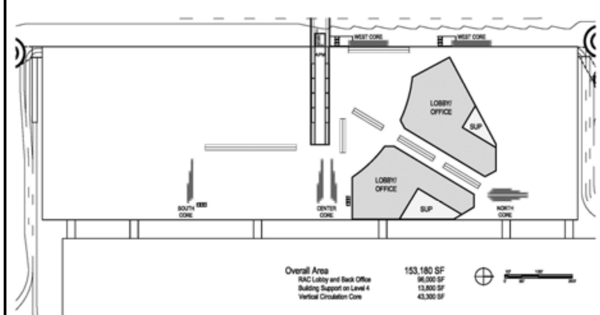
QTA Dynamic Model

	Design Concept			
	F	G	H	J
QTA Functions				
Total Vehicular Travel (Return Through QTA to Ready)				
QTA Vehicular Travel (QTA Entry to QTA Exit)				
Number of 90 Degree Turns within the QTA				
Number of Intersections with Other Traffic within the QTA				
Most Remote Fueling Island from Supervisor's Office (for Visibility)				
Walk Distance from Car Dropoff to Pick-up in QTA (Jockey Walk)				
Total Length of QTA Edge (Perimeter)				
Fueling Dispensers Visible from Queuing Area? (Yes/No)				
Car Washes Visible from Fueling Area? (Yes/No)				
Ability to Shut Down Part of the QTA Facility? (Yes/No)				
Level of Mitigations to Obtain Fire Department Approval (High/Medium/Low)				
Comparative Costs to Build (High/Medium/Low)				

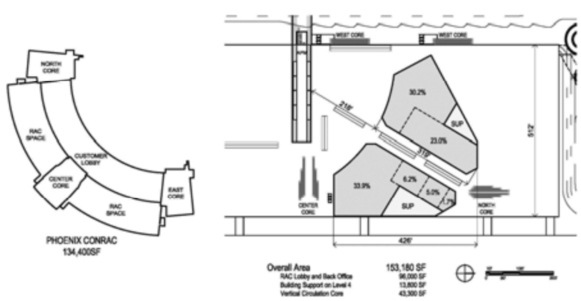
QTA Concept Decision Matrix

	Design Concept			
	F	G	H	J
QTA Support Functions				
Distance from USTs to Delivery Vehicle				
Fueling Truck Location in Safe, Dedicated Location? (Yes/No)				
Distance from Motor Oil Storage to Delivery Vehicle				
Distance from Car Carrier to Corral				
Distance from Wash Reclaim Tanks to Service Vehicle (Vacuum Trucks)				
Trash Removal Issues? (Yes/No)				
Proximity of Third Party/Fuel Manager Office to Key Functions/Workplaces				

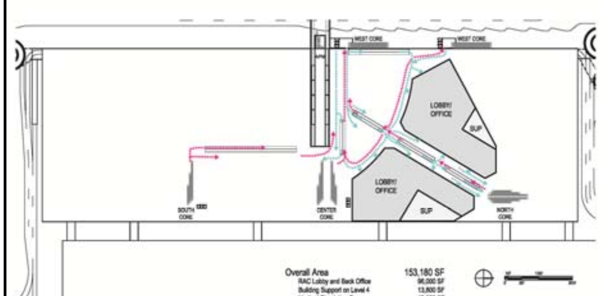
QTA Concept Decision Matrix



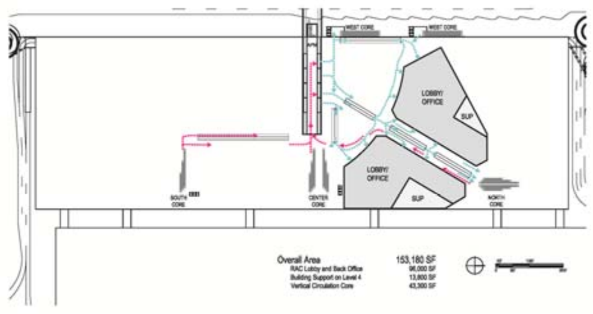
CSB Design Concept 1 Overview



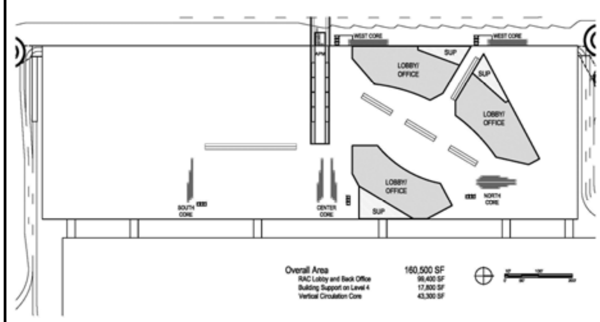
CSB Design Concept 1 Size Comparison



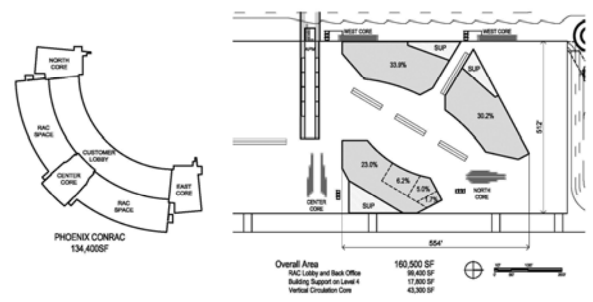
CSB Design Concept 1 Circulation (Bus)



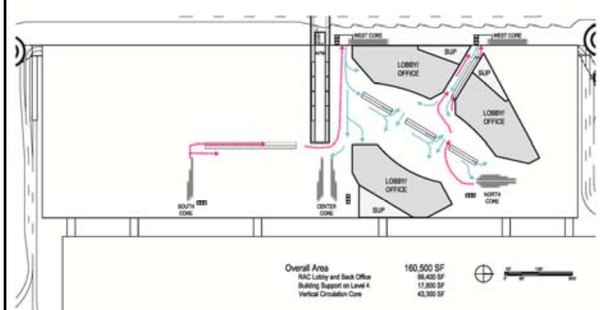
CSB Design Concept 1 Circulation (APM)



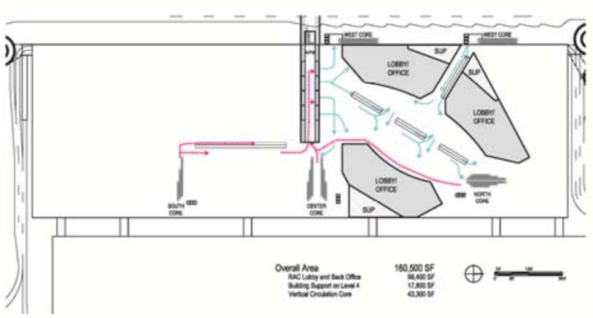
CSB Design Concept 2 Overview



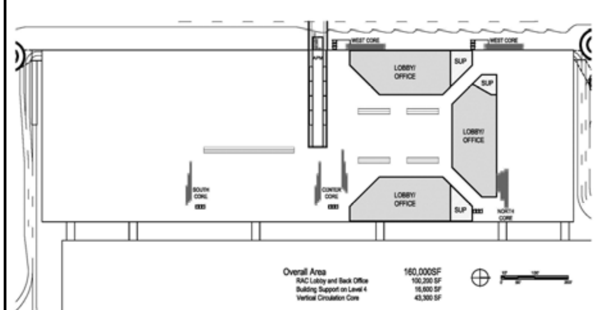
CSB Design Concept 2 Size Comparison



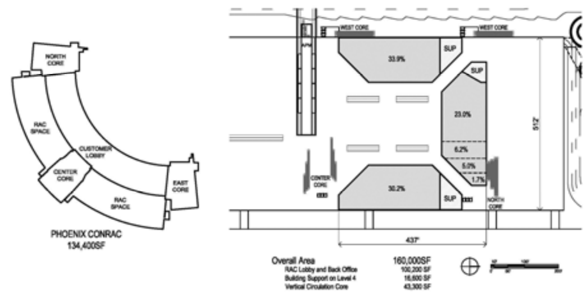
CSB Design Concept 2 Circulation (Bus)



CSB Design Concept 2 Circulation (APM)

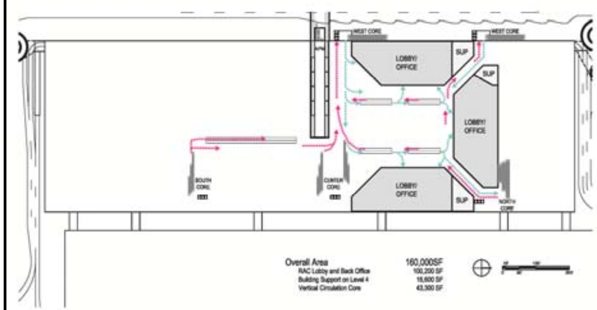


CSB Design Concept 3 Overview



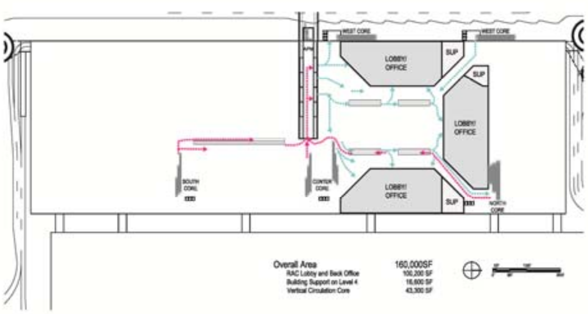
CSB Design Concept 3 Size Comparison

LAX
Los Angeles World Airports



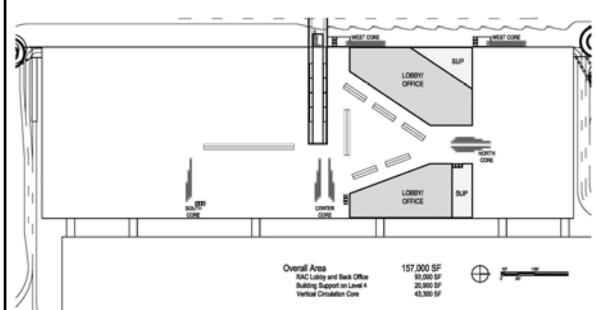
CSB Design Concept 3 Circulation (Bus)

LAX
Los Angeles World Airports



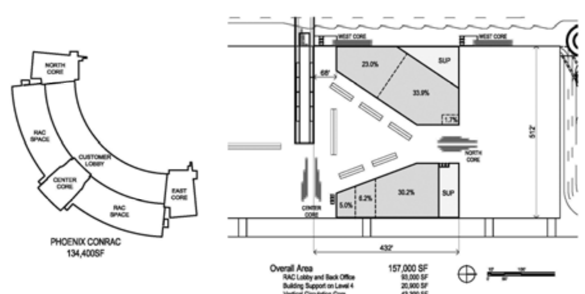
CSB Design Concept 3 Circulation (APM)

LAX
Los Angeles World Airports



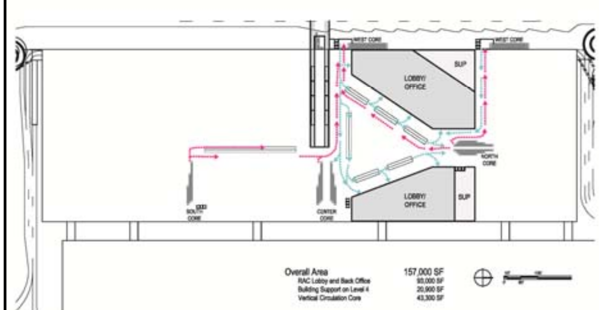
CSB Design Concept 4 Overview

LAX
Los Angeles World Airports



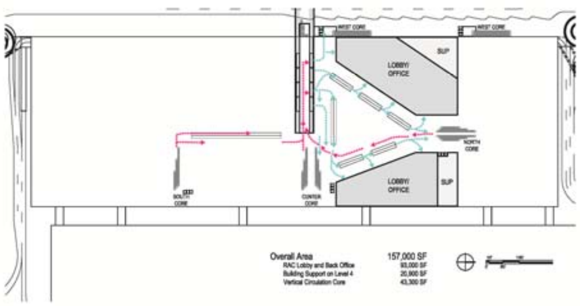
CSB Design Concept 4 Size Comparison

LAX
Los Angeles World Airports



CSB Design Concept 4 Circulation (Bus)

LAX
Los Angeles World Airports



CSB Design Concept 4 Circulation (APM)

	Design Concept			
	1	2	3	4
1. Customer Service				
Convenient Access from APM Station				
Convenient Access for Returning Customers				
Convenient Access from Temporary Bus Curb				
Convenient Pedestrian Access to Employee and Public Parking				
Convenient Pedestrian Access to ITF				
Short Walking Distance to Vertical Circulation Cores				
Customer Always Moving Toward Destination (No Backtracking)				
Direct Access for Business Travelers to the Rental Cars				
Ease of Wayfinding within Facility				
2. Operational Efficiency				
Support Brand Family Consolidated Operation				
Depth to Width Ratio of Allocated Spaces				

CSB Concept Decision Matrix

	Design Concept			
	1	2	3	4
3. Efficient Use of Money				
Skin to Volume Ratio				
Simplicity of Roof Forms				
Orthagonal Shapes vs Curvilinear				
Number and Length of Moving Sidewalks				
Amount of Common Courtyard and Quality of Space				
Amount of Covered Walkway				
Usablity of Remaining 4th Level Deck				
4. Flexibility				
Accommodation for Future Expansion				
Ease of Reallocating due to Shift in Market Share				
5. Level Playing Field				
Equal Visibility of All RAC Companies from APM				
Equal Access from CSB to Vertical Transition				
6. Safety and Security				
Ability to See Entire Lobby from a Single Point				
Minimal Number of Blind Alleys				
Safe Intersections and Flow				

CSB Concept Decision Matrix

Next Steps

- Complete Dynamic Model Review for Each Brand Family of Their Anticipated Configuration within the Garage
- Refined Concept by November 17, 2015 RAC Industry Meeting

Next Steps

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LAX ConRAC – RAC Industry Meeting (Teleconference)

Meeting Date: Tuesday, October 20, 2015, 10:00am – 12:00pm PDT
Location: GoToMeeting

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the ConRAC site, QTA and CSB design developments. Copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis (TranSystems) opened the meeting by noting that there are no big decisions to be made today. The intent of this meeting is to prepare the industry for the meeting in November, where decisions will need to be made.
2. Topics for this meeting were presented. There were a number of questions that the Design Team has for the RAC industry, to guide design direction.
3. Based on industry feedback to date, ready spaces are pushing farther south, on various levels, which will impact customer service building locations and core functionality. The traffic circulation diagrams were updated to reflect this shift in functions.
4. The overall ConRAC layout plan was presented. The bus curb is located toward the center of the building, rather than toward the northern half. New circulation core locations are also shown. The design includes a flyover return lane, with more details to be presented in November.
5. The QTA site development and conceptual floor plans were presented. Current design consists of two distinct QTA Buildings:
    a. North QTA with at-grade fuel, wash and maintenance areas for independent RAC companies and two elevated maintenance levels for the two largest brand families.
    b. South QTA with three fuel and wash levels, with building support spaces and maintenance areas located at-grade.
6. The Design Team has updated the design of the car carrier loading/unloading area, consisting of straight, pull-through lanes (similar to layout at the port). Andrew Jaksich (Avis/Budget) commented that unloading of cars from the carriers will require adequate clearance to maneuver cars from the lanes to the car corrals. [Post Meeting Note: Mike Luedtke (Avis/Budget) provided contact information from several of their car carriers.] **ACTION: Design Team will contact these car carrier companies and ask questions about the design.** The car carrier loading area needs to be clearly striped, as car carrier companies use new and different drivers frequently.
7. An allocation of fuel positions, wash bays and maintenance bays based on a blended market share approach (50% revenue and 50% transaction) was presented. Mr. Jarvis noted that this allocation is based on a slice in time, with the understanding that they will evolve as we move forward. Although only 180 fuel positions are required by program, the actual proposed number of fuel positions currently shown in the design is 186.

8. 60-foot separations are provided between the QTA Buildings and helix ramps or other buildings. This decision was driven by discussions with fire/code officials. A north-south utility corridor will be provided below the open space between the QTA and Support Buildings, which will also serve as the fire department access lane (20' width assumed).
9. The following comments regarding QTA design were noted:
    a. Clemens Schoenberger (Sixt) asked if the layout includes flexibility in case market share of independent operators changes in the future. Mr. Jarvis noted that there is space for future installation of fuel dispensers within the center aisle of the North QTA.
    b. Lorraine Tallarico (Avis/Budget) expressed that she would need to understand expansion area and possibilities.
    c. There are physical limitations for growth for any operator, within the confines of the ConRAC, but it was noted that on Levels 2 and 3 of the South QTA, each level is designed to support a third of the total market (60 fuel positions each floor out of total of 186 fuel positions).
    d. Mr. Jaksich noted that it would be desirable to stage one to two cars in front of the South QTA maintenance bays, assuming that these staging stalls would not infringe upon the required fire department access lane. ACTION: Design Team will review with Code Officials.
10. Updated maintenance bay layouts at the North QTA were reviewed. These bays can be designed to accommodate either drive through or head in bays. The third level is shown with one additional maintenance bay compared to the second level, but occupying the same floor area. From discussion of an earlier meeting, the industry would like the Design Team to explore having heavy maintenance at the QTA and what the impacts will be. A summary highlighting the differences between heavy and light maintenance was presented. Heavy maintenance activities would likely push the areas to a high hazard occupancy, separation with fire rated construction, a more restrictive Class 1, Div. 2 electrical rating required at the 18" zone above the floor, more stringent ventilation requirements, additional code mitigations for permit, and considerably more parts storage space. Pat Tomcheck (LAWA) indicated that LAWA will need to find out more on impact to the program costs before deciding on whether to consider including heavy maintenance functions. ACTION: Design Team's Cost Estimator will provide order-of-magnitude cost information.
11. The Design Team will need very specific information to be provided by the RACs, such as parts and equipment storage needs, maximum number of tires stored, staffing requirements, support spaces, etc. [Post Meeting Note: TranSystems sent out a survey to RAC industry on 10/26/15 requesting for specific operational information]. ACTION: Responses from RACs for this survey requested by 11/4/15.
12. In response to the RAC's questions about the walking distance at this facility, an analysis was prepared to review the approximate walking distance between terminal gate and RAC lobby at various U.S. airport locations. Facilities that are known for longer walks were selected for comparison. Some of these facilities use an APM, and some use shuttle buses. Distances traveled on APM or bus were not included as part of the walking distance. Distances traveled on vertical transportation (elevators or escalators) were not included. However, distances traveled on moving sidewalks were included. Results indicate that required walking distance for LAX is certainly not worst but is in the lower end of the pack. It was suggested that the team also study the walking distances at Atlanta and Chicago O'Hare. ACTION: Design Team will provide additional information at the November meeting.

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13. Similar to the allocation of fuel positions, wash bays and maintenance bays, an allocation for ready/return and storage blocks was also prepared, using a blended (50% transactions and 50% revenue) per LAWA's direction. Connie Gurich (Hertz DTAG) disagreed with the blended market share approach and recommended using 100% revenue based market share. Mr. Jarvis noted that this discussion will be a part of the business negotiations.

    For comparison, the differences in the RAC market share based on these two approaches are noted below:

	Advantage	Avis/ Budget	Enterprise/ Alamo/ National	Hertz/ Dollar/ Thrifty	Fox	Independent
Blended Market Share	2.2%	22.4%	31.4%	33.9%	5.3%	5.0%
Revenue Market Share	2.0%	22.3%	31.0%	35.2%	4.7%	5.0%

14. Mr. Jarvis noted that the garage floor layout plans presented for the three RAC floors is only the Design Team's representation of a possible layout, and that these will eventually be refined by individual RAC companies/brand families. The Design Team would like to find out how the RACs plan to use the areas near the circulation cores for office space, where best they should be placed, and ideal configuration. The RAC industry survey will include questions on these topics.
15. The following comments regarding RAC design were noted:
    a. Ms. Tallarico noted that the number of cores proposed take up valuable space and also come with higher initial and ongoing maintenance costs. She suggested considering one of the circulation cores as a value engineering or optional item if overall budget is a concern.
    b. Mr. Jaksich noted that walking distances would be the same on Level 4 or on the Ready/Return level, so having an additional circulation core may not solve the issue of long walking distances.
    c. Mr. Jarvis noted that the intent is to encourage more north-south pedestrian circulation on Level 4, as there would be opportunities to provide moving sidewalks, allow for uninterrupted flow, and it is easier to provide a more positive experience on the open roof level.
16. Rosa Doran (RAW International) provided an overview of elements that can be developed to enhance customer experience on the CSB Level 4. Ms. Doran described the kit of parts, including visual and sound screens, canopies, greenscape strategies and planters, furnishings with lighting, seating and variations in paving patterns. RACs are concerned that some of these proposed enhancements may be very costly, both for upfront material costs and long term operating/maintenance costs. Design Team noted that it is possible to achieve a good level of amenities while keeping costs in mind. ACTION: Design Team will provide additional study to come up with more cost effective solutions.

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17. It was noted that the areas outside of the CSB lobby and circulation areas will be used for RAC employee and visitor's parking. The roof level of the Support Building will be used as a combination of RAC overflow storage and airport employee's or public parking. The roof level of the Support Building will also provide circulation link between the up helix ramp to the south of the building for parking entrance and the down helix ramp to the north of the building for parking exit. Ms. Gurich noted that the roof of the Support Building does not need to be a concrete deck and is concerned about the cost of this proposed deck.
18. A list of evaluation criteria for the customer service building was reviewed. If there are additional criteria from the RACs, this list could be modified for the November meeting. A total of six layouts were presented at this meeting, focusing on massing, possible allocation, size comparison with similar facility (PHX CSB), and circulation patterns during both initial shuttle bus and long term APM scenarios. **ACTION: TranSystems shall provide approximate sizes of the exclusive use areas at PHX, for comparison at the next meeting.**
19. The following comments regarding CSB design were noted:
    a. While visibility of brands and storefronts is important, it should not be the only determining factor. Also, visibility from 250 or 300 feet away is different from visibility at a closer distance.
    b. Design of signage will be critical at such a large facility. Midfield signage should be considered.
    c. Visibility of the circulation core itself may not be necessary, as long as clear wayfinding is provided.
    d. In order to create a more equal playing field, it may require use of larger sized signs for companies located farther away from the APM.
    e. Concept 1 allows lobbies of the major brand families (serving higher percentage of customers) to be closer to the customers getting off the APM, which is ideal.
    f. Having squared off lobby spaces, such as in Concept 5, is more efficient in terms of interior space planning.
    g. Design Team should provide views from the center of the APM, illustrating what it would look like with 180 or 270 degrees from customer perspective. **ACTION: Design Team will provide additional views at the November meeting.**
20. **ACTION: For the November meeting, the Design Team will further develop CSB Concept No. 1, 4 and 5, addressing comments received with more design refinements.**
21. TranSystems is in the process of preparing a list identifying items that are part of tenant improvement budget versus the base building budget. This will be ready for review at the next industry meeting.
22. The next in-person meeting with the entire RAC industry will be scheduled on Tuesday, November 17, 2015, from 1:00 pm to 3:00 pm. There will be a business meeting that same day from 10:00 am to Noon.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

A2: Meeting Presentation (66 pages)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	October 20, 2015
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting (Teleconference)	Location:	GoToMeeting

Name	Representing		Name	Representing
Cynthia Guidry	LAWA		Chuck Rowe	TranSystems
Diego Alvarez	LAWA		David Lee	TranSystems
Fatima Hashim	LAWA		Doug Steen	TranSystems
Pat Tomcheck	LAWA		Jeff Jarvis	TranSystems
Robert Burlingham	LAWA		Justin Neel	TranSystems
Andrew Jaksich	Avis/Budget		Norman Lin	TranSystems
Lorraine Tallarico	Avis/Budget		Rosa Doran	RAW International
Mike Luedtke	Avis/Budget		Steven Lott	RAW International
Bill Bettison	Enterprise Holdings		Neil MacAloney	Stantec
Chris Roberts	Enterprise Holdings		RB Laurence, Jr.	Stantec
Peter van Valkenberg	Enterprise Holdings			
Robert Hunsinger	Enterprise Holdings			
Connie Gurich	Hertz DTAG			
John Vermeersch	Hertz DTAG			
Clemens Schoenberger	Sixt			
Jasmin Welker	Sixt			
Mick Erlandson	Sixt			

Los Angeles International Airport
Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING
(TELECONFERENCE)
OCT 20, 2015

Agenda – October 20, 2015

1. Functional Values
2. QTA Design Developments
3. Comparison of Light vs Heavy Maintenance
4. Airport Walking Distance Comparison
5. RAC Floor Deck Configurations
6. Customer Experience on CSB Level 4
7. CSB and Vertical Circulation Cores Configurations
8. Tenant Improvement Budgets
9. Next Steps

RAC Industry Meeting (Teleconference)

Questions for RAC Industry:

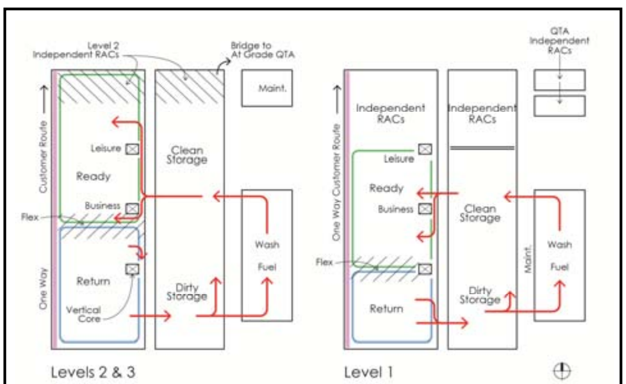
- Who Can Review the Car Carrier Configuration and Speak for the Industry?
- Where Do You Want Your Office Space Located on The Garage Deck and How Will It Be Used?
- Do You Want 4 or 5 Vertical Cores?
- Should the North Cores Be Oriented North-South or East-West?
- What is Most Important When Selecting a CSB Concept?

Questions for RAC Industry

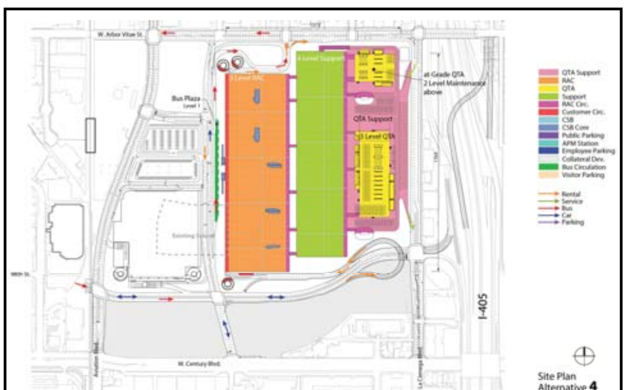
Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

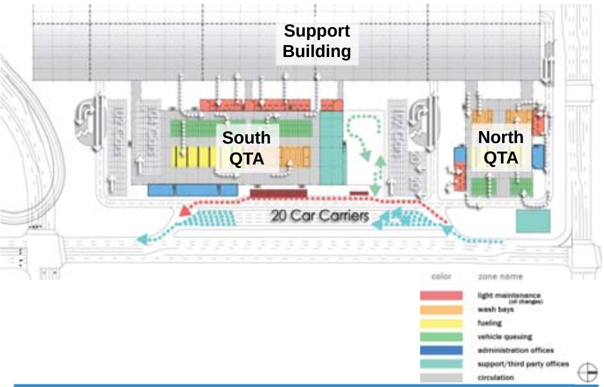
Functional Values



Typical Traffic Circulation



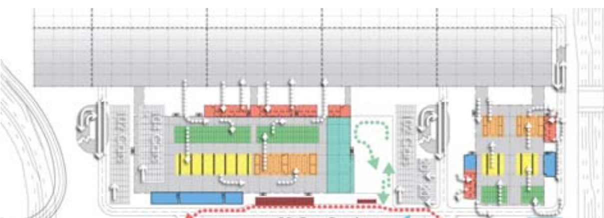
ConRAC – Overall Plan



QTA Site Circulation Plan

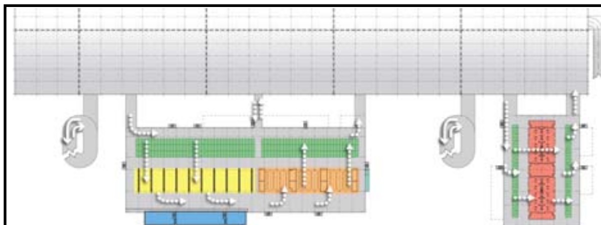
Allocation to Tenants (2015 Blended Market Share)								
		Total	Advantage	Avis/ Budget	Enterprise/ Alamo/ National	Hertz/ Dollar/ Thrifty	Fox	Independent
Market Share			2.2%	22.4%	31.4%	33.9%	5.3%	5.0%
Fuel Positions		180	4.0	40.3	56.5	60.9	9.6	9.0
	Provided:	186	5	42	60	60	10	9
Wash Bays		37	0.8	8.3	11.6	12.5	2.0	1.9
	Provided:	37	1	8	12	12	2	2
Maintenance Bays		64	1.4	14.3	20.1	21.7	3.4	3.2
	Provided:	64	1	15	20	21	3	4

Allocation – Fuel, Wash & Maintenance



	Number of Levels	Number of Fueling Positions	Number of Wash Bays	Number of Light Maintenance Bays
North QTA Approximate Footprint Dimensions of 319' x 292'	3	24 Total 24 on Level 1 None on Level 2 None on Level 3	5 Total 5 on Level 1 None on Level 2 None on Level 3	49 Total 8 on Level 1 20 on Level 2 21 on Level 3
South QTA Approximate Footprint Dimensions of 276' x 684'	3	162 Total 42 on Level 1 60 on Level 2 60 on Level 3	32 Total 8 on Level 1 12 on Level 2 12 on Level 3	15 Total 15 on Level 1 None on Level 2 None on Level 3

QTA Overall Floor Plan – Level 1



	Number of Levels	Number of Fueling Positions	Number of Wash Bays	Number of Light Maintenance Bays
North QTA Approximate Footprint Dimensions of 319' x 292'	3	24 Total 24 on Level 1 None on Level 2 None on Level 3	5 Total 5 on Level 1 None on Level 2 None on Level 3	49 Total 8 on Level 1 20 on Level 2 21 on Level 3
South QTA Approximate Footprint Dimensions of 276' x 684'	3	162 Total 42 on Level 1 60 on Level 2 60 on Level 3	32 Total 8 on Level 1 12 on Level 2 12 on Level 3	15 Total 15 on Level 1 None on Level 2 None on Level 3

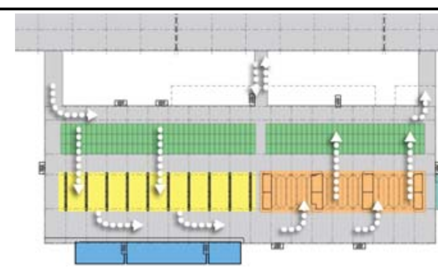
QTA Overall Floor Plan – Level 2 (Level 3 Similar)

South QTA Level 1 Summary:

Approximate Floor Area *	192,317 SF
Administration Floor Area	10,800 SF
Fueling Positions	42
Wash Bays	8
Light Maintenance Bays	15
Queuing Spaces	147

* Floor area does not include stairs, elevators or ramps.

South QTA Building – Level 1



South QTA Level 2 (or Level 3) Summary:

Approximate Floor Area *	177,417 SF
Administration Floor Area	10,800 SF
Fueling Positions	60
Wash Bays	12
Queuing Spaces	207

* Floor area does not include stairs, elevators or ramps.

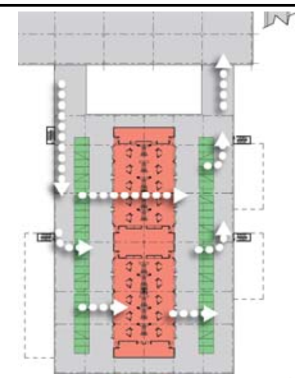
South QTA Building – Levels 2 and 3

North QTA Level 1 Summary:

Approximate Floor Area *	80,500 SF
Administration Floor Area	4,500 SF
Fueling Positions	24
Wash Bays	5
Light Maintenance Bays	8
Queuing Spaces	51

* Floor area does not include stairs, elevators or ramps.

North QTA Building – Level 1

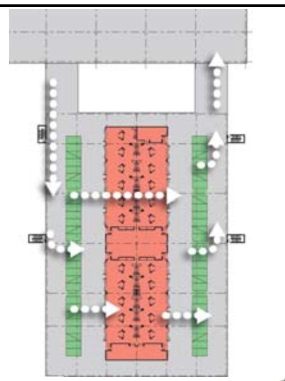


North QTA Level 2 Summary:

Approximate Floor Area *	69,900 SF
Administration/Storage Floor Area	5,200 SF
Light Maintenance Bays	20
Queuing Spaces	46

* Floor area does not include stairs, elevators or ramps.

North QTA Building – Level 2



North QTA Level 3 Summary:

Approximate Floor Area *	69,900 SF
Administration/Storage Floor Area	4,600 SF
Light Maintenance Bays	21
Queuing Spaces	46

* Floor area does not include stairs, elevators or ramps.

North QTA Building – Level 3

	Light Maintenance	Heavy Maintenance
Definitions (Per California Electrical Code)	Lubrication, Inspection, Minor Work to Include Tune Up, Parts Changes, Fluid Changes (Oil, Antifreeze, Transmission, Brake, Refrigeration), Brake Repairs, and Tire Rotations	Major Repairs Such as Engine Overhauls, Painting, Body/Fender Work, and Other Repairs That May Require Fuel Tank Draining
Occupancy	Moderate-Hazard Storage Group S-1 (Motor Vehicle Repair Garages Complying with the Maximum Allowable Quantities of Hazardous Materials)	Likely to be Factory Group F-1 but Could be High-Hazard Group H-2 or H-3 if Maximum Allowable Quantity (MAQ) Exceeded (For Example: > 120 Gallons of Gasoline on the Floor in Storage or > 30 Gallons in Open Use)

Comparison of Light vs Heavy Maintenance

Implications of Providing Heavy Maintenance at the QTAs:

- Potential Higher Hazard Use Group Classification
- Greater Floor Area Demand for Required Equipment and Storage
- Higher Construction Costs and Energy Use for Ventilation or Additional Hazardous Locations
- Additional Risks Associated with Handling Fuel and Fuel System Components
- May Require Additional Mitigations as Part of the Overall QTA Permitting Process
- Need for Considerably More Parts Storage Space

Implications of Heavy Maintenance

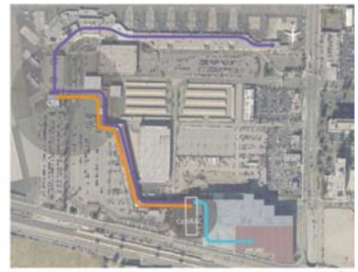
Facility	*2014 FAA Enplanements*	*From Terminal Gate to RAC Lobby (feet) **	*From RAC Lobby to Ready Stall (feet)*	*Average Distance from Terminal Gate to Ready Stall (feet)*
MIA	19.5M	1,000 – 4,050	275 – 840	3,083
BUR	1.9M	1,515 – 3,330	0 – 720	2,783
PDX **	7.9M	1,475 – 3,450	0 – 625	2,775
PVD	1.8M	1,530 – 2,610	0 – 750	2,445
BNA	5.4M	0 – 1,710	720 – 1, 570	2,000
LAX	**34.3M**	**650 – 2,550**	**0 – 800**	**2,000**
FLL	12.0M	305 – 1,045	0 - 800	1,075

* Distance does not include traveling on bus or APM.
** Figures for PDX represent planned future ConRAC.

Airport Walking Distance Comparison

Terminal/Transit Node Farthest to RAC Lobby = 4,050 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,000 feet
RAC Lobby to Ready/Return Closest = 375 feet
RAC Lobby to Ready/Return Farthest = 840 feet
APM Route

Walking Distance Comparison - MIA



Terminal/Transit Node Farthest to RAC Lobby = 3,330 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,515 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 720 feet

Walking Distance Comparison - BUR

Terminal/Transit Node Farthest to RAC Lobby = 3,450 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,475 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 625 feet

Walking Distance Comparison - PDX

Terminal/Transit Node Farthest to RAC Lobby = 2,810 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,530 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 750 feet

Walking Distance Comparison - PVD

Terminal/Transit Node Farthest to RAC Lobby = 1,710 feet
Terminal/Transit Node Nearest to RAC Lobby = 0 feet
RAC Lobby to Ready/Return Closest = 720 feet
RAC Lobby to Ready/Return Farthest = 1,570 feet

Walking Distance Comparison - BNA

Terminal/Transit Node Farthest to RAC Lobby = 1,245 feet
Terminal/Transit Node Nearest to RAC Lobby = 305 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 800 feet
Bus Route

Walking Distance Comparison - FLL

Terminal/Transit Node Farthest to RAC Lobby	=	2,550 feet
Terminal/Transit Node Nearest to RAC Lobby	=	650 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
APM Route		

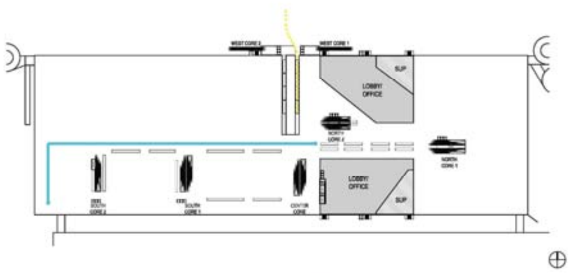
Walking Distance Comparison – LAX (1)

LAX Los Angeles World Airports

Terminal/Transit Node Farthest to RAC Lobby	=	2,550 feet
Terminal/Transit Node Nearest to RAC Lobby	=	650 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
APM Route		

Walking Distance Comparison – LAX (2)

LAX Los Angeles World Airports



Terminal/Transit Node Farthest to RAC Lobby	=	2,550 feet
Terminal/Transit Node Nearest to RAC Lobby	=	650 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
APM Route		

Walking Distance Comparison – LAX (3)

LAX Los Angeles World Airports

Allocation to Tenants (2015 Blended Market Share)

	Total	Advantage	Avis/ Budget	Enterprise/ Alamo/ National	Hertz/ Dollar/ Thrifty	Fox	Independent
Market Share		2.2%	22.3%	31.4%	33.9%	5.3%	5.0%
Ready/Return Blocks	942.8	21.1	210.6	295.3	318.6	50.2	47.1
Storage Blocks	925.8	20.7	206.8	290.0	312.8	49.3	46.2

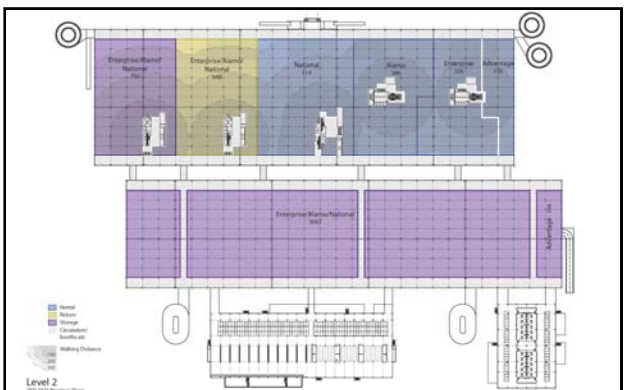
1 Ready Block = 8 Stalls
1 Return Block = 12 Stalls
1 Storage Block = 14 Stalls

Allocation – Ready/Return and Storage

LAX Los Angeles World Airports

RAC Garage/Support Building - Level 1

LAX Los Angeles World Airports



RAC Garage/Support Building - Level 2

LAX Los Angeles World Airports

RAC Garage/Support Building - Level 3

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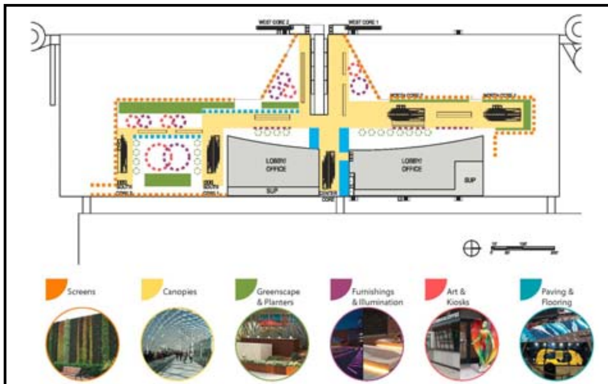
LAX Los Angeles World Airports

TranSystems



Customer Experience on CSB Level 4

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

Decorative metal screen fencing
Vertical landscape screen with drought tolerant planting
Noise reduction barrier with view panels
Vertical landscape screen
Decorative metal screen
Examples of Screens

Customer Experience on CSB Level 4

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems


Tensile steel canopy with ETFE (Ethylene tetrafluoroethylene)
Metal canopy with glazing and LED lighting
Tensile steel canopy with ETFE (Ethylene tetrafluoroethylene)
Photovoltaic canopy
Kalwall canopy with artwork
Examples of Canopies

Customer Experience on CSB Level 4

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems


Raised planters with integrated seating
Raised planters of varying heights with drought tolerant plants
Landscape integrated with Paver
Raised planters with drought tolerant plants
Vertical wall with drought tolerant succulents
Examples of Greenscape & Planters

Customer Experience on CSB Level 4

Consolidated Rental Car Facility at Los Angeles International Airport

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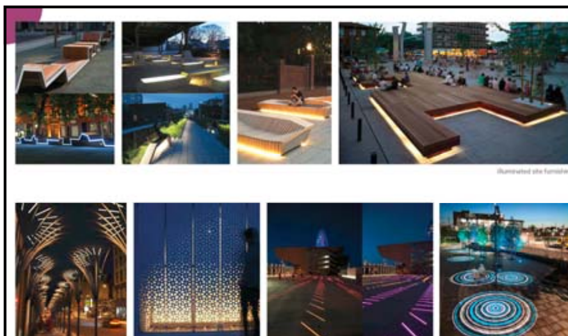
TranSystems


Illuminated site furnishing
Decorative pedestrian lighting
Lit metal mesh screen
Integrated wayfinding lighting
Projected LED light patterns
Examples of Furnishings & Illumination

Customer Experience on CSB Level 4

Consolidated Rental Car Facility at Los Angeles International Airport

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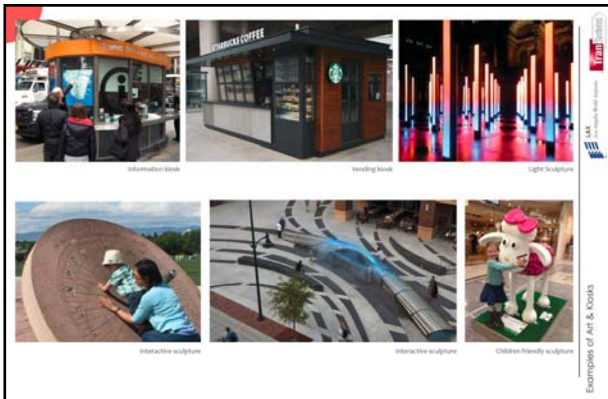
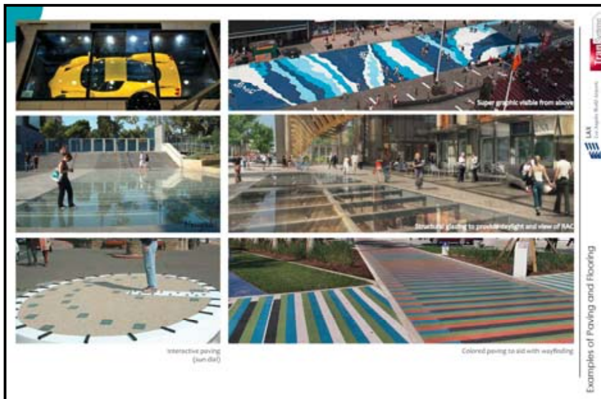
TranSystems



Customer Experience on CSB Level 4



Customer Experience on CSB Level 4

CSB Evaluation Criteria

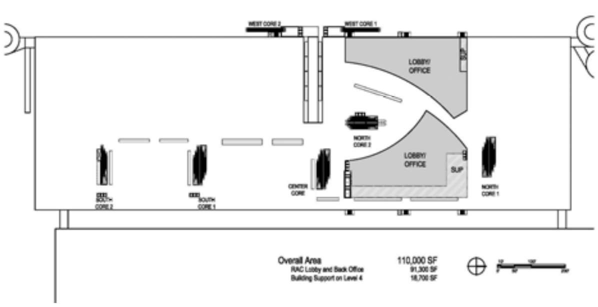
- Cores Touch Decks to Maximize Customer Service
- Most North-South Pedestrian Movement on Level 4
- Bus Curb Access Similar to APM Access
- Allow Pass Through Counter Area Similar to Dallas
- Allocate Space Near the Cores Where the Customers are Headed

CSB Concepts

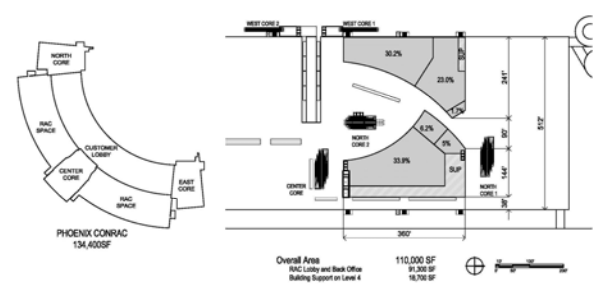
CSB Analysis Matrix

CONCEPT NO.	ALL STOREFRONTS VISIBLE	DISTANCE TO MID STOREFRONT (FT)	EXCLUSIVE USE AREA (SF)	PEDESTRIAN INTERSECTIONS	CORE CONFIGURATION	VISIBLE CORES
1	N	250	88,500	FEW	2NE	N
2A	N	300	88,000	MOD	2NN	Y
2B	N	336	85,500	MOD	NORTH	Y
3	N	253	83,000	MOD	2NN	Y
4	Y	375	74,900	MOD	NORTH	Y
5	Y	360	93,000	MOD	NORTH	Y

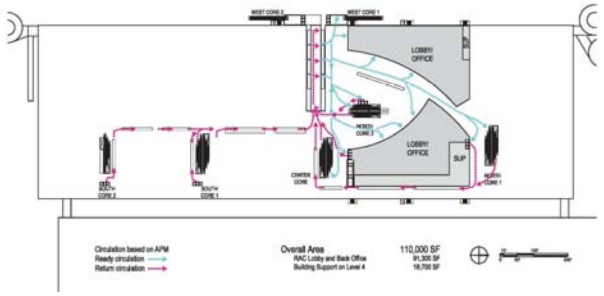
CSB Concepts



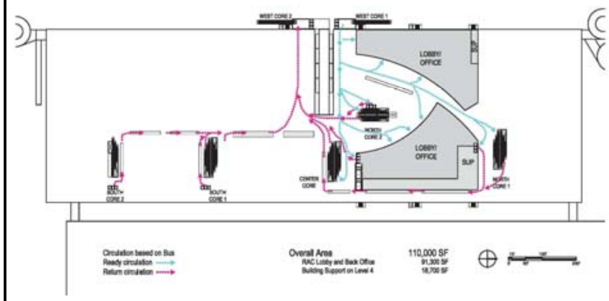
CSB – Concept 1



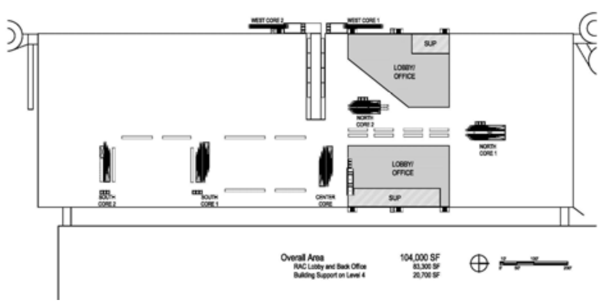
CSB – Concept 1 Floor Area Summary



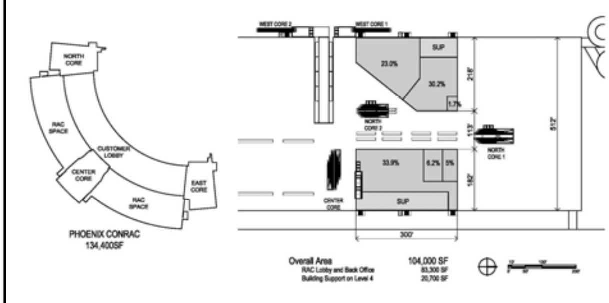
CSB – Concept 1 Circulation APM



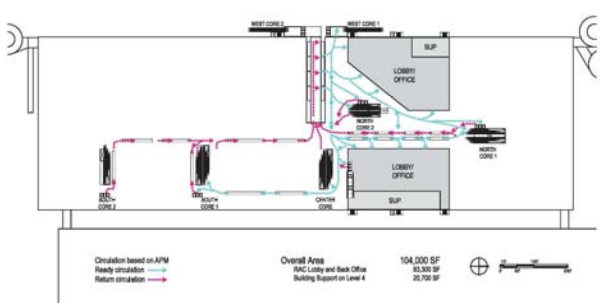
CSB – Concept 1 Circulation Bus



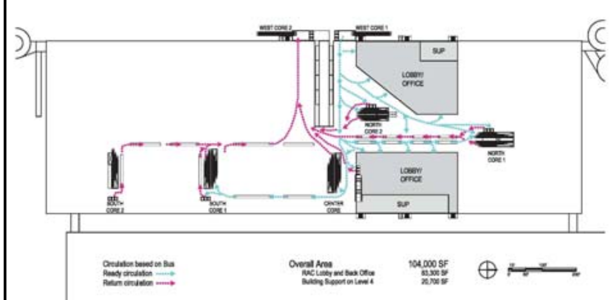
CSB – Concept 2a



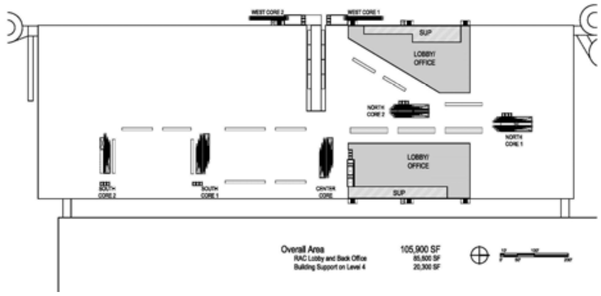
CSB – Concept 2a Floor Area Summary



CSB – Concept 2a Circulation APM



CSB – Concept 2a Circulation Bus



CSB – Concept 2b

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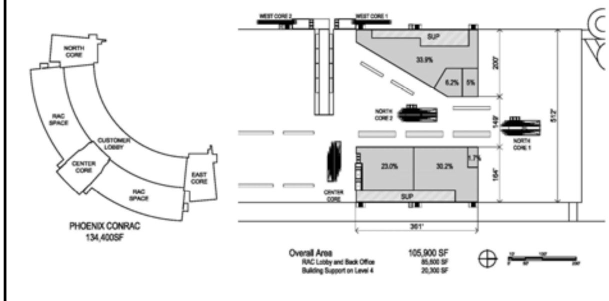
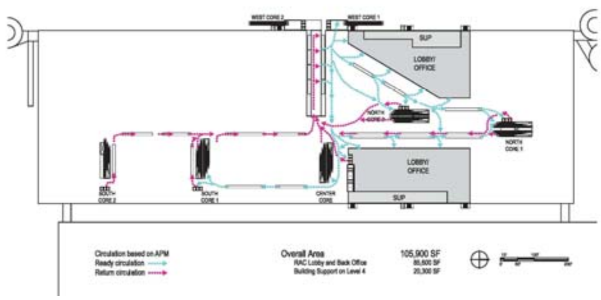


CSB – Concept 2b Floor Area Summary

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

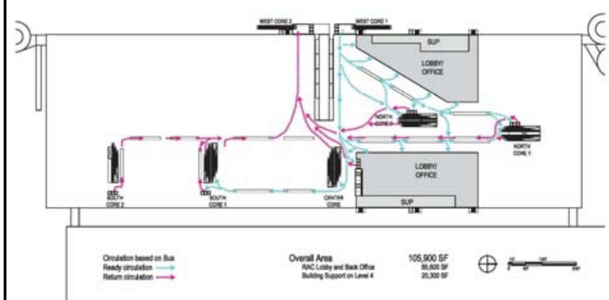


CSB – Concept 2b Circulation APM

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

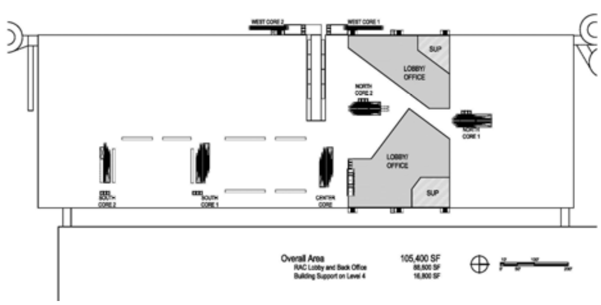


CSB – Concept 2b Circulation Bus

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

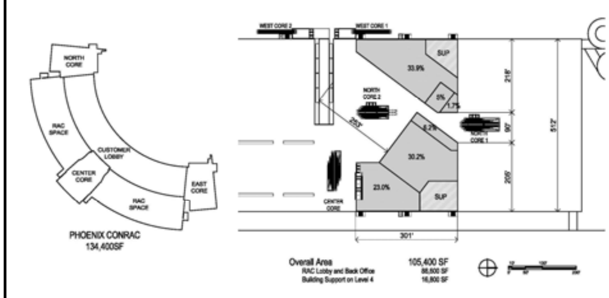


CSB – Concept 3

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

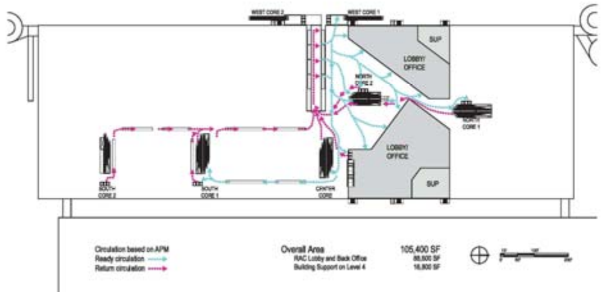


CSB – Concept 3 Floor Area Summary

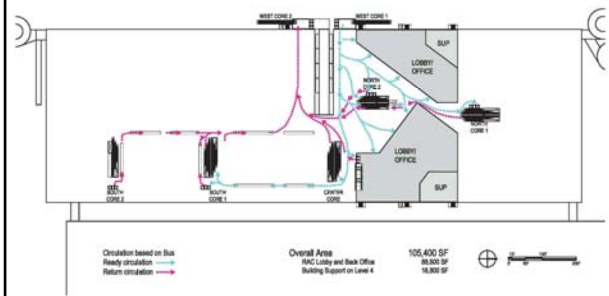
Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

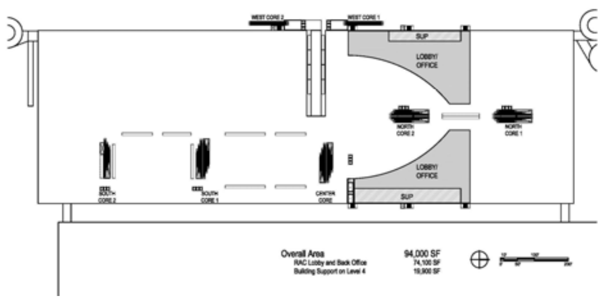
TranSystems



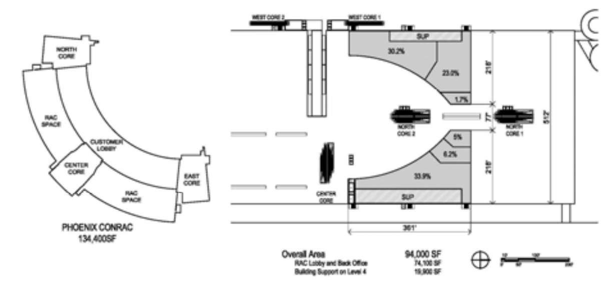
CSB – Concept 3 Circulation APM



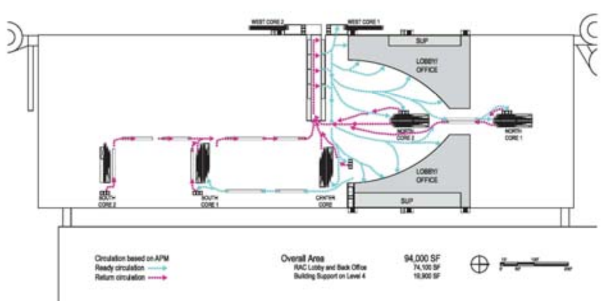
CSB – Concept 3 Circulation Bus



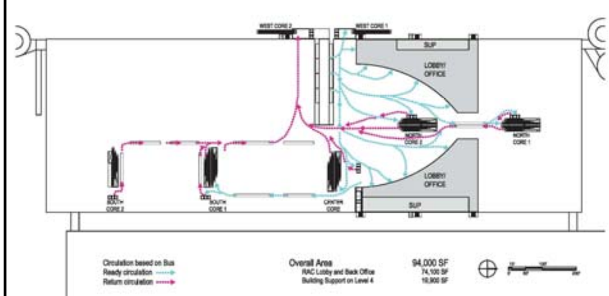
CSB – Concept 4



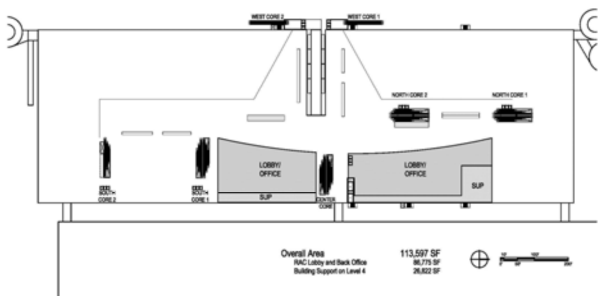
CSB – Concept 4 Floor Area Summary



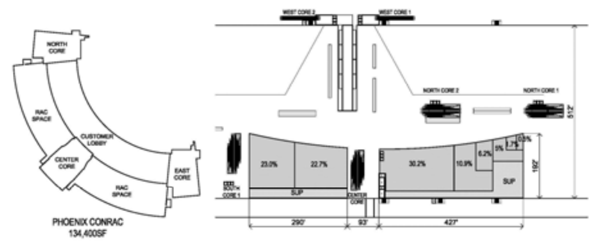
CSB – Concept 4 Circulation APM



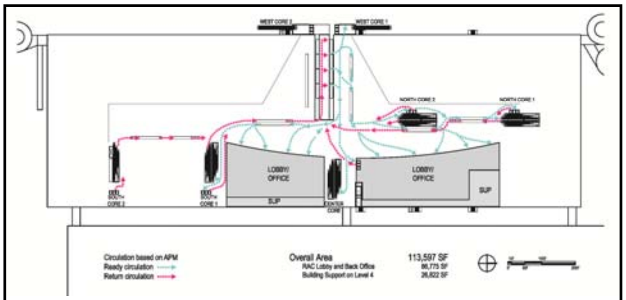
CSB – Concept 4 Circulation Bus



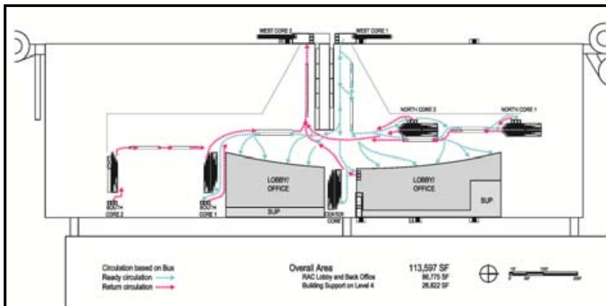
CSB – Concept 5



CSB – Concept 5 Floor Area Summary



CSB – Concept 5 Circulation APM



CSB – Concept 5 Circulation Bus

Tenant Improvements Budget

- Developing List to Identify Items
  - Tenant Improvements
  - Base Building

Tenant Improvements Budget

Next Steps

- November 17, 2015 RAC Industry Meeting:
  - Additional Design Refinements and Final Decisions
  - Possible Remote Baggage Check-in
  - Progress on Fire and Building Code Approval Process
  - Freeway Access Alternatives

Next Steps

ISSUED FOR DISTRIBUTION – DECEMBER 8, 2015

LAX ConRAC – RAC Industry Meeting

Meeting Date: Tuesday, November 17, 2015, 1:00 pm – 3:15 pm PST
Location: LAWA Admin East

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the ConRAC design developments. Copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis (TranSystems) noted that there are a number of key topics for this meeting and that input from the RAC industry would be much appreciated.
2. Pat Tomcheck (LAWA) presented preliminary results from recent passenger survey at LAX. Survey was last completed in 2011 and typically done every five years. With ongoing LAMP work being done, this survey was moved forward to 2015. 2011 survey data is available on LAWA website. By the first quarter of 2016, results of the survey will be released formally.
3. The passenger survey consisted of 40 questions asked of departing passengers waiting in hold rooms (survey for arriving passengers has traditionally been difficult because they are typically less interested in taking a survey when they are in a hurry to get to their destination). Statistics were provided on mode of arrival to LAX, percentage of rental car users who checked in luggage and size of party for rental car users.
4. It was noted that transportation network companies (such as Uber and Lyft) have impacted travel by private vehicles and buses/shuttles, more than with rental cars. Currently, TNCs are not allowed to pick travelers up at LAX. Dropoffs by TNCs at LAX are typically harder to enforce and do occur.
5. Compiled results from TranSystems' recent survey of the RAC companies were shared. Survey consisted of information on staffing breakdown, customer service metrics and maintenance needs. Information gathered would be used to develop design of office spaces and QTA areas.
6. Updated program requirements were presented. The corrected program for idle storage of overflow vehicles is 10,000. Design as shown exceeds the minimum program numbers, at approximately 11,900 stalls shown. Mr. Jarvis noted that TranSystems is available to review results with each RAC company to illustrate how their company's program requirements are being met.
7. John Vermeersch (Hertz) noted that the number of maintenance bays provided in the program appears to be low.
8. John Vermeersch (Hertz) would like the project to consider revenue based market share, not blended market share as shown in the mock allocation chart.
9. The RAC garage floor plans presented were generated by the design team based on typical layouts seen at other ConRACs and input from industry. While some RAC companies believe that having five vertical circulation cores is ideal, others are concerned about amount of space taken up by the cores, as well as the higher associated operation and maintenance costs. **ACTION: TranSystems to investigate possibility of having four vertical circulation cores and will present its impacts to the CSB lobby layout and walking distances at the next meeting.**
10. Mr. Jarvis presented a series of photos from other ConRAC facilities to illustrate industry CSB design principles. The new ConRAC facility at the Austin Bergstrom Airport consists of a 270-foot long linear counters, with one company using pedestal customer service positions and giving up positions to allow for

pass through directly to garage area behind (on the same floor). This approach could be explored for this project to improve customer service.

11. The next series of photos show the Phoenix ConRAC facility during the Friday before NASCAR weekend (typically the busiest time of the year). As expected, the leisure brands were very busy during that time, with customers using the kiosks at the mini-mall lobby areas, and counters with queues of customers. The more business-oriented brands were less busy, with fewer customer service representatives staffed at their counters.
12. A number of evaluation criteria for CSB were reviewed. However, it was noted that no single criteria is the most important factor. Based on the Design Team's review of walking distances at other airport ConRAC facilities, use of moving walkways on the CSB level would not significantly improve customer service and does not appear to be necessary for this project.
13. There were some inquiries regarding how the APM system would work at LAX. Diego Alvarez (LAWA) explained that the APM ride will last approximately 10 minutes between the two ends of the line from Bradley International Terminal to the ConRAC (including dwell times at the four intermediate stations: Central Terminal, Hotels, ITF West and ITF East). When APM arrives to the ConRAC on Level 4, all arriving passengers will exit via the north doors of the APM and arrive on the North Platform. Departing passengers will wait for APM on the Center Platform and enter via the south doors of the APM. The south track will only be used if the north track needs to be serviced.
14. The Design Team presented four design concepts for the CSB:
    a. Concept A utilizes areas north of the APM, with the best visibility and shortest walking distance from the APM platform.
    b. Concepts B1 and B2 take advantage of the linear nature of the garage and place lobbies close to the vertical circulation cores that the customers are headed.
    c. Concept C that maximizes usage of the deck by locating lobbies at both north of the APM platform and along the east edge of the garage.
15. The following comments were received from RAC representatives in attendance:
    a. Robert Hunsinger and Scott Goldstein (EHI): Concept A is the first choice, as it provides good visibility to all companies, access to cores, and clear access for customers to bypass counters. Concept C is a close second place.
    b. John Vermeersch (Hertz/DTAG): Likes either Concept B1 or B2, with good visibility and access to all cores.
    c. Andrew Jaksich (Avis Budget): Believes that Concept A has too much massing on north and requires customers to backtrack. Likes Concept B2 but would like to see a version with four vertical circulation cores. Concept C also has potential, with a flipped QTA layout where the fuel and wash for the major RAC brand families occur toward north end of the site.
16. ACTION: The Design Team will further develop CSB concept for review with LAWA and RACs.
17. The Design Team studied the feasibility of accommodating checked baggage service operation at the ConRAC in the future. It was determined that an area along the returning customers' route on CSB Level 4 can be dedicated to baggage check operation. At PHX ConRAC where this service is provided, baggage needs to be checked in 90 minutes prior to flight departure.
18. The concept of providing heavy maintenance at the QTA was discussed. RB Laurence (Stantec) indicated that electrical code specifically identifies types of activities that would fall under major repairs, as noted on Slide 56. Adopting heavy maintenance operations at the QTA would require additional space, increase

electrical hazards, impact the use occupancy classification, and increase construction costs. The project team has been engaged with the local Fire, Building and Safety Departments. The team is on track to submit a Request for Code Modification for approval of indoor, multi-level fueling. Addition of heavy maintenance functions at the QTA may complicate the code modification approval.

19. Reactions from the RAC industry on providing heavy maintenance functions at the QTA were mixed. The industry could not think of another airport ConRAC location that accommodates heavy maintenance on-site. Some noted that it would only be worthwhile to provide heavy maintenance bays if project can provide total allocation of maintenance lifts to eliminate the need for an offsite maintenance facility altogether. Due to the fairly quick turn-around time of light maintenance, being able to perform light maintenance functions close-by supports demand of the project, whereas heavy maintenance functions would require longer service times. ACTION: Design Team shall keep this request on the table for now and consult with local jurisdiction on potential impacts to code approval.
20. Three QTA service yard layout options were presented:
    a. Option 1 with yard entrance from north end of La Cienega and parallel car carrier staging lanes.
    b. Option 2 with yard entrance from south end of La Cienega and parallel car carrier staging lanes.
    c. Option 3 with yard entrance from Arbor Vitae and angled car carrier stalls with adjacent staging lanes.
21. The Design Team has received contacts for several transport companies and discussed the parallel car carrier arrangements with their representatives, who are in support of the in-line arrangement but cautioned that the U-turn configuration for Option 2 may be a little tight when hauling larger vehicles (potential damage of these carried vehicles hitting each other). The Design Team believes that the truck ingress and egress as shown on Option 2 are best, but share the same concerns of car carrier maneuverability as well. ACTION: Design Team to further develop the QTA service yard plan for review with LAWA and RACs.
22. A copy of the Airport-Tenant delineation list was provided to the group (see Attachment A3). This list was generated based on typical provisions and identifies items that are associated with base building versus tenant improvements. The Project Team would request for feedback from the RAC industry. Due to time constraints at this meeting, this topic was not further discussed.
23. The Project Team is on target to submit a Project Definition Document (PDD) to LAWA by early January, with description of project and updated cost estimate.
24. The next in-person meeting with the RAC industry will be scheduled on Tuesday, January 19, 2016, from 10:00 am to Noon.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)
A2: Meeting Presentation (85 pages)
A3: Airport-Tenant Delineation List (3 pages)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	November 17, 2015
	Los Angeles International Airport	Time:	1:00 pm – 3:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Second Floor, LA NeXt Conference Room

Name	Representing	Telephone Number	Email Address	
Jeff Jarvis	TranSystems	602 277 7800	JDJARVIS@TRANSYSTEMS.COM	
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JOHN VERMEERSCH	HERTZ/DAT	914-329-8700	JVERMEERSCH@HERTZ.COM	
Michael Walker	Hertz/DTG	310-568-3434	mcwalker@hertz.com	
Bill Bettison	EHI	310-921-5172	William.L.Bettison@EHI.com	
JORGE AREVALO	MIDWAY	310-466-0910	JORGEA@MIDWAYCARRENTAL.COM	
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ROSA DORAN	RAW "	"	(PART-TIME)	VIA TELEPHONE
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Norman Lin	"	312 669 5831	ylin@transystems.com	
David Lee	TranSystems	510-835-9916	dklee@transystems.com	
By Phone/Web:				
Andrew Jaksich	Avis Budget			
Robert Hunsinger	Enterprise Holdings			
Scott Goldstein	Enterprise Holdings			
Joe Knight	Fox Rent A Car			

Mick Erlandson — Sixt
Chuck Rowe — TranSystems
RB Laurence — Stantec
Neil MacAloney — Stantec

Agenda – November 17, 2015

1. LAX Passenger and RAC Survey Results
2. Customer Service Building Design
3. Quick Turn-Around Site Circulation Design
4. Maintenance Bay Design
5. Fire and Building Code Approval Progress
6. RAC Garage Entrance
7. Airport and Tenant Delineation List
8. CSB Customer Experience / Walking Distance Comparison
9. Next Steps

Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

Mode of Arrival to LAX

	Year 2011	Year 2015
Private Vehicle	51%	47%
Rental Car	17%	17%
Courtesy Shuttles / Other Buses	13%	11%
Taxi	8%	7%
TNC (Uber / Lyft)	0%	7%
Private Shuttle / Van	7%	7%
FlyAway	2%	2%
Limousine / Town Car	2%	2%

Percent of Rental Car Users who Checked in Luggage: 71%

Pieces of Luggage Checked In:	Percent
1	61%
2	26%
3	6%
4	4%
5 of More	3%

Percent of Rental Car Users Who Traveled with Others: 62%

With Other Adults	Percent	With Children (Ages 10-17)	Percent	With Children (Ages 4-9)	Percent	With Children (Ages 0-3*)	Percent
0	1%	0	59%	0	75%	0	90%
1	55%	1	24%	1	14%	1	10%
2	25%	2	14%	2	9%	2	0%
3	10%	3	2%	3	1%		
4	4%	4	1%	4	1%	* Babies/Toddlers in Strollers	
5 of More	5%	5 of More	1%				

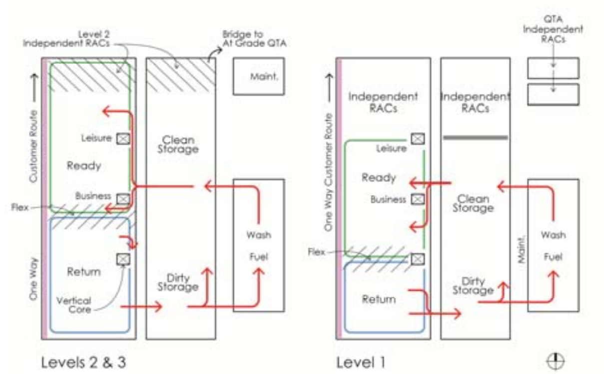
Key Findings from RAC Survey:

- Responses Received from 5 Companies/Brand Families (Representing Approximately 95% of Market)
- Total of 1,200 Peak Shift Employees when ConRAC Opens (Equivalent to Current Employee Count x 1% Annual Growth for 8 Years)
- Split of Peak Shift Administrative Staff is Expected to be 47% on CSB Level / 53% on RAC Level
- No Consensus on Maximum Acceptable Walking Distance
- Response is Mixed in Desire for Heavy Maintenance

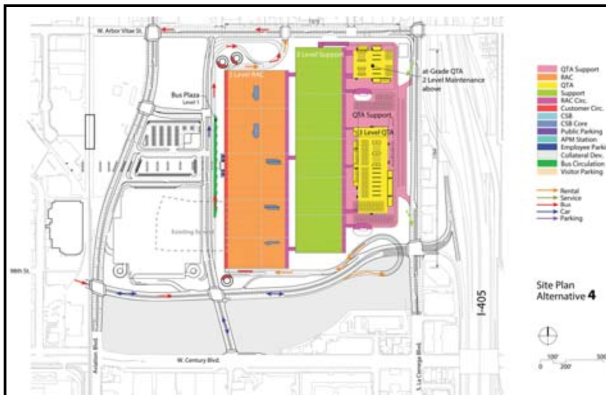
Survey Responses from RAC Industry

Component	Program	Provided
Ready/Return Area (RAC) (area where customers pick-up and return vehicles)	7,600 rental equivalent stalls	7,600 rental equivalent stalls
Quick-Turnaround Area (QTA) (facilities for multi-level fueling, wash and vehicle maintenance)	704 staging positions 180 fuel nozzles 37 wash bays 64 maintenance bays	704 staging positions 186 fuel nozzles 37 wash bays 64 maintenance bays
QTA Support and Additional Site Functions (fuel storage and distribution; supervisor and vendor parking; car carrier delivery; vehicle staging corrals; loading docks/service yard)		
Customer Service Building (CSB) ("mini-mall" lobby with customer service counters, restrooms, retail amenities and other functions connected to the APM station via an open courtyard and to the Ready/Return area via vertical cores with escalators and elevators)	90,000 to 115,000 square feet 5 vertical cores	90,000 to 115,000 square feet 5 vertical cores
Airport People Mover Station (APM) (provides customers with convenient connection to the Central Terminal Area with separate platforms for unloading and loading customers)		
Bus Plaza (for shuttle bus operations for a potential interim shuttle bus operation and for off-airport rental car companies)	12 bus bays 2 vertical cores connected to the CSB	12 bus bays 2 vertical cores connected to the CSB
Idle Storage (for overflow vehicles to meet peak demand)	10,000 stalls	11,900 stalls
Employee and Visitor's Parking (for overflow vehicles to meet peak demand and employee parking)	1,100 + employee stalls 100 visitor stalls	1,100 + employee stalls 100 visitor stalls

Program Requirements



Typical Traffic Circulation



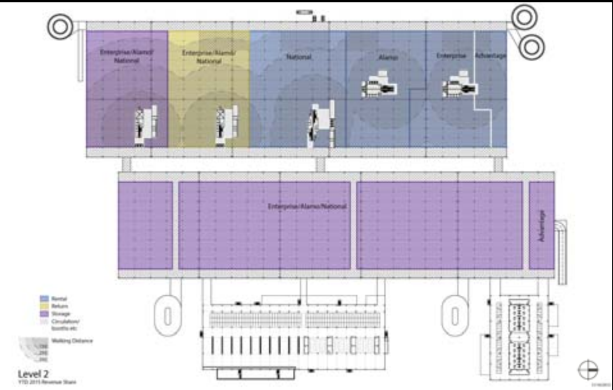
ConRAC – Overall Plan

Allocation to Tenants (2015 Blended Market Share)							
	Total	Advantage	Avis/ Budget	Enterprise/ Alamo/ National	Hertz/ Dollar/ Thrifty	Fox	Independent
Market Share		2.2%	22.3%	31.4%	33.9%	5.3%	5.0%
Ready/Return Blocks	942.8	21.1	210.6	295.3	318.6	50.2	47.1
Equivalent Ready Stalls	7,542	169	1,685	2,362	2,549	401	376
Storage Blocks	850.0	18.7	189.5	266.9	288.1	45.0	42.5
Equivalent Storage Stalls	11,900	262	2,653	3,736	4,033	630	595

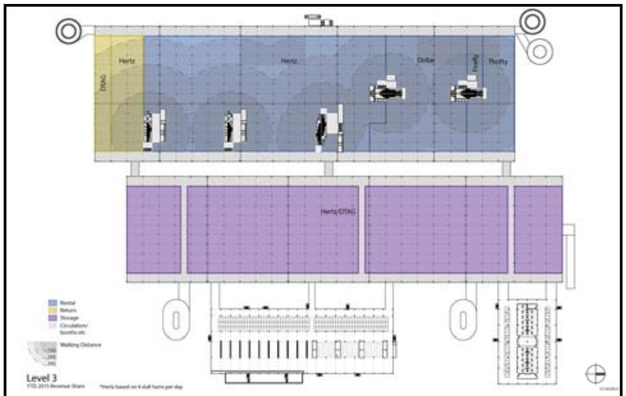
1 Ready Block = 8 Stalls   1 Return Block = 12 Stalls   1 Storage Block = 14 Stalls

Allocation – Ready/Return and Storage

ConRAC - Level 1



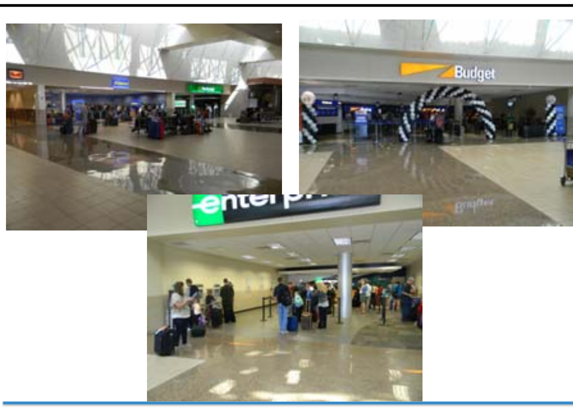
ConRAC - Level 2



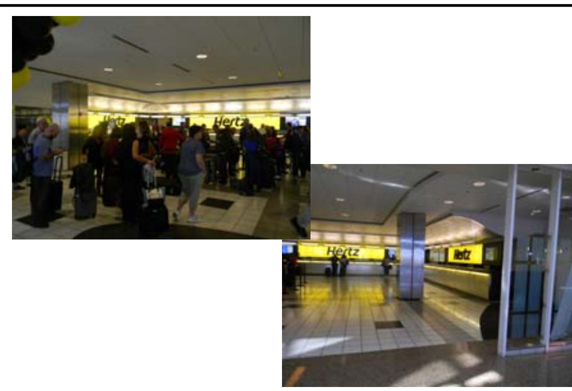
ConRAC - Level 3

CSB Example: Pass-Through Counter

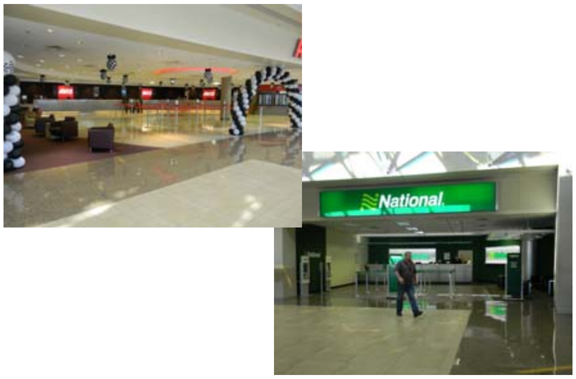
CSB Example: PHX on NASCAR Friday



CSB Example: PHX on NASCAR Friday



CSB Example: PHX on NASCAR Friday

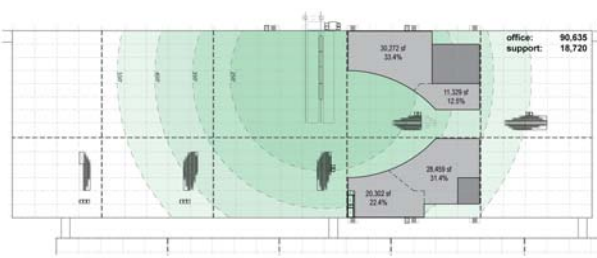


CSB Example: PHX on NASCAR Friday

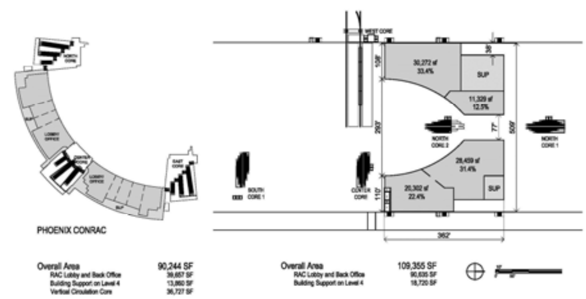
Evaluation Criteria

- Cores Touch Decks to Maximize Customer Service
- Most North-South Pedestrian Movement on Level 4
- Bus Curb Access Similar to APM Access
- Allow Pass Thru Counter Area
- Allocate Space Near the Core Where Customers are Headed
- Visibility from APM Station
- Shortest Walking Distance from APM Station to Storefront and from the Counter to the Core
- Orthogonal Shaped Spaces
- Ease of Reallocation
- “Shop-ability”

CSB Evaluation Criteria



CSB – Concept A



CSB – Concept A Size Comparison

CSB – Concept A View from APM

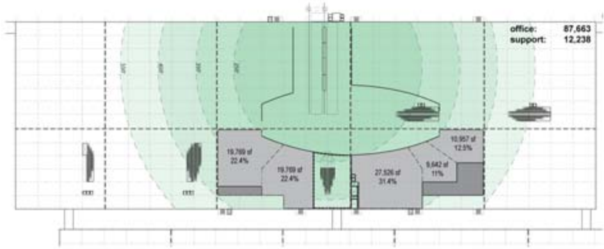
Pros

- Storefront Closest to the APM Platform
- Most APM Riders Can See All the Options as They Step From the Train
- More Intimate Courtyard – Easier to Shop for Both Visibility and Walking Distance Reasons
- Independent Expansion Capability

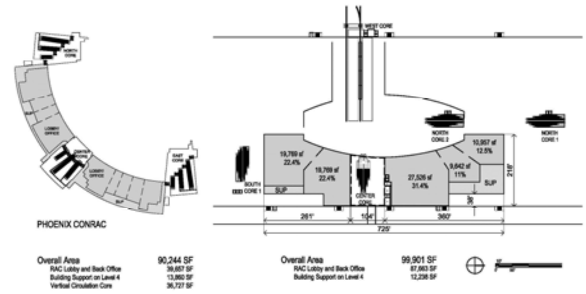
Cons

- Odd Shaped Spaces
- Structural Complexity
- Oblique View Angle to the Storefront

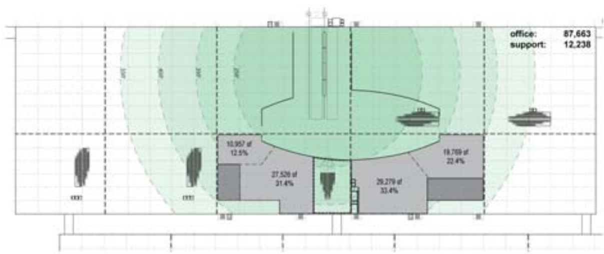
CSB – Concept A



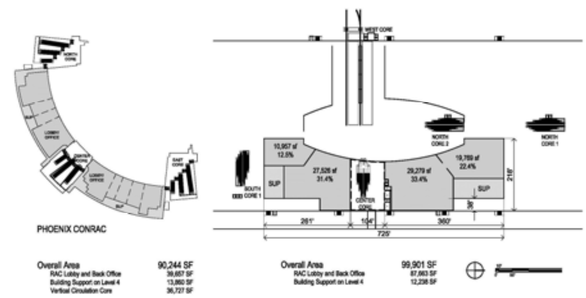
CSB – Concept B1



CSB – Concept B1 Size Comparison



CSB – Concept B2



CSB – Concept B2 Size Comparison

CSB – Concept B1/B2 View from APM

CSB – Concept B1/B2 View from APM

CSB – Concept B1 or B2

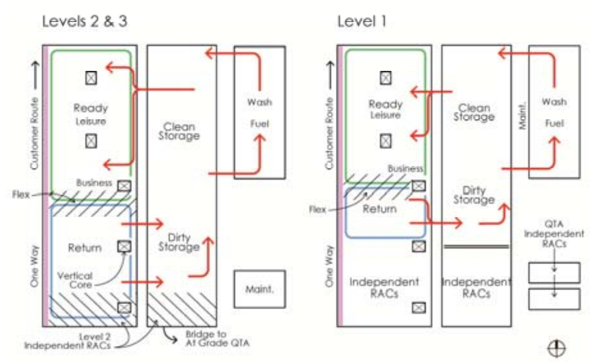
Pros

- Simultaneous Exposure to All Storefront at the Mouth of the Tunnel (Similar to PHX)
- Shorter Net Walking Distances
- Independent Expansion Capability
- Works Equally Well When APM Arrives at the South Track

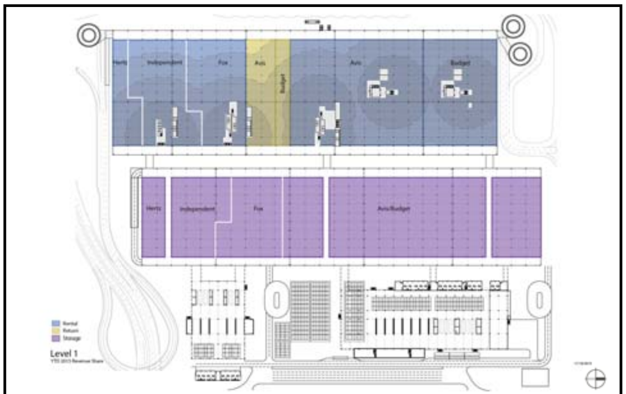
Cons

- Odd Shaped Spaces
- Shopping for Alternatives is Difficult for Visibility and Walking Distance Reasons
- Longer Walking Distance from the APM Platform

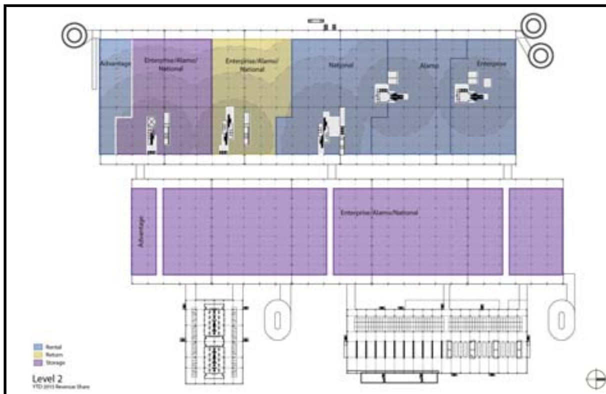
Typical Traffic Circulation (Flipped)



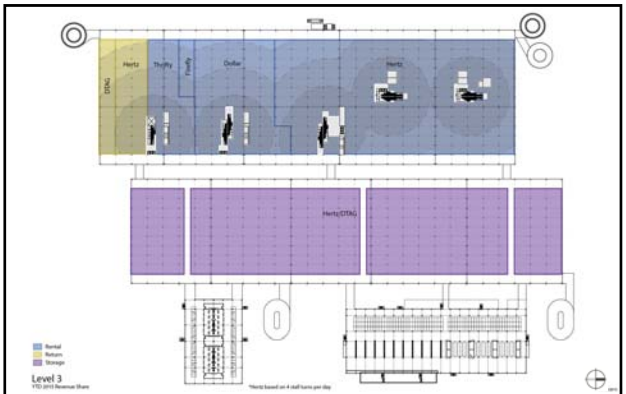
ConRAC - Level 1 (Flipped)



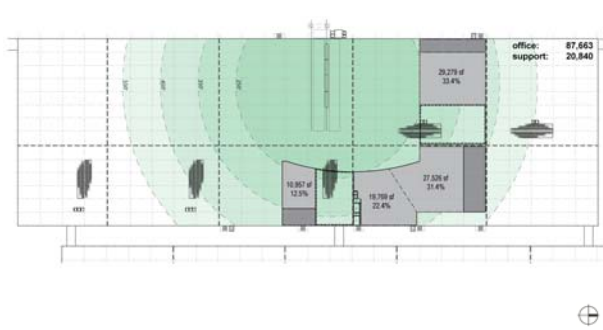
ConRAC - Level 2 (Flipped)

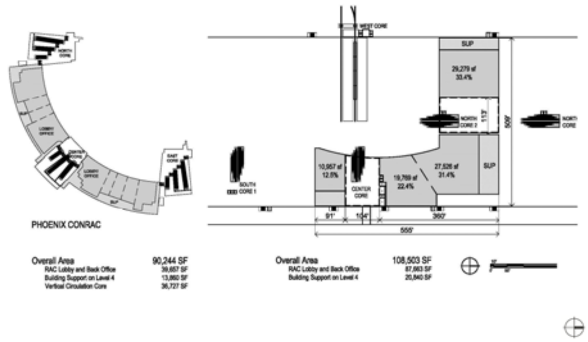


ConRAC - Level 3 (Flipped)



CSB – Concept C





CSB – Concept C Size Comparison

CSB – Concept C View from APM

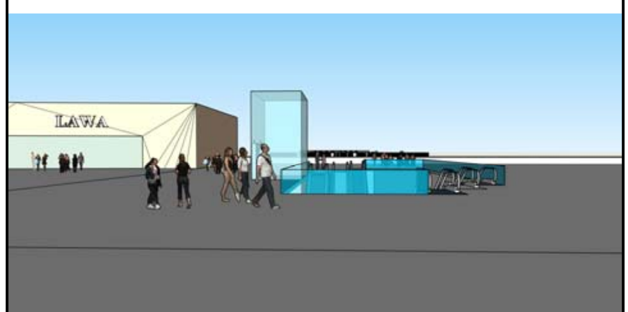
Pros

- Three Viable Locations for the Three Major Brand Families to Choose From
- More Regularly Shaped Spaces
- Independent Expansion Capability
- Simplest Structure

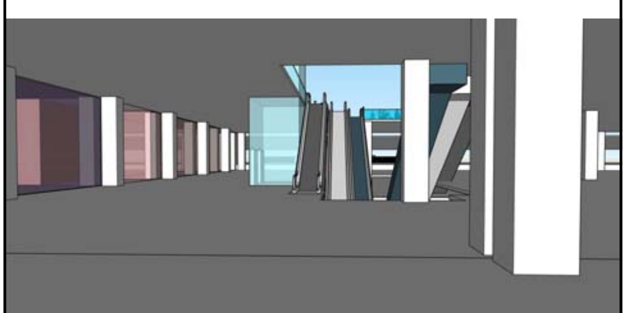
Cons

- Farthest Net Walking Distance
- Poor Visibility to Independent Companies
- Consumes More of the 4th Level Deck

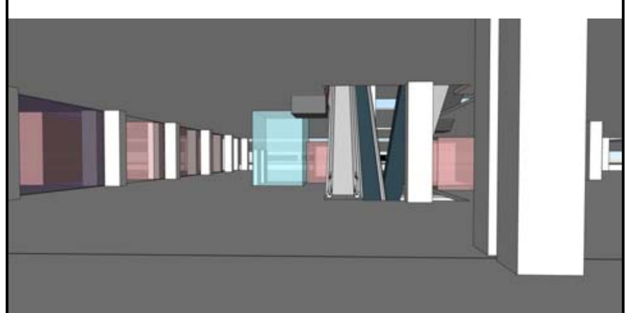
CSB – Concept C



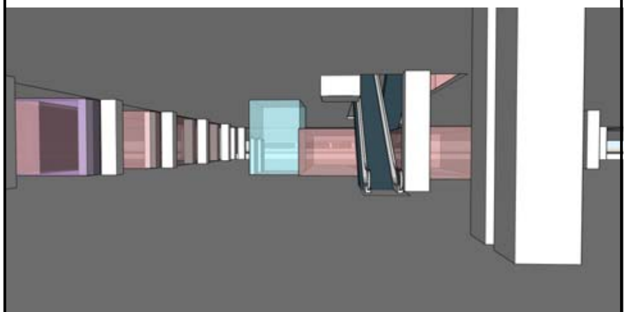
CSB Central Core – 4th Level



CSB Central Core – 3rd Level

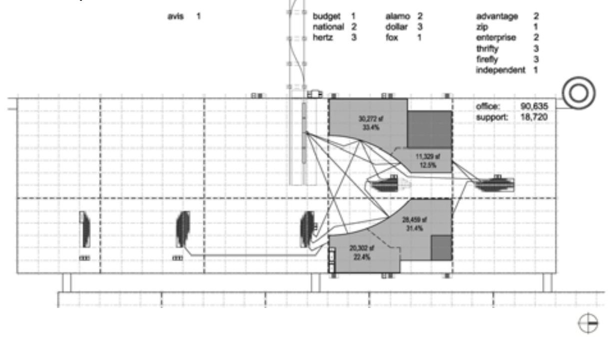


CSB Central Core – 2nd Level



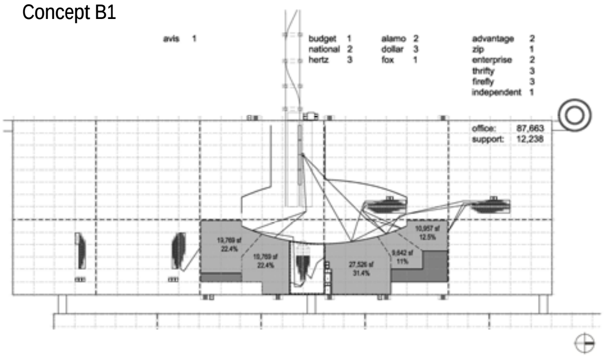
CSB Central Core – 1st Level

Concept A



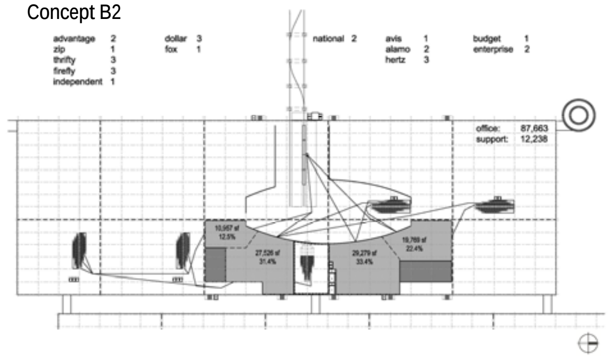
CSB Walking Distance Comparison

Concept B1



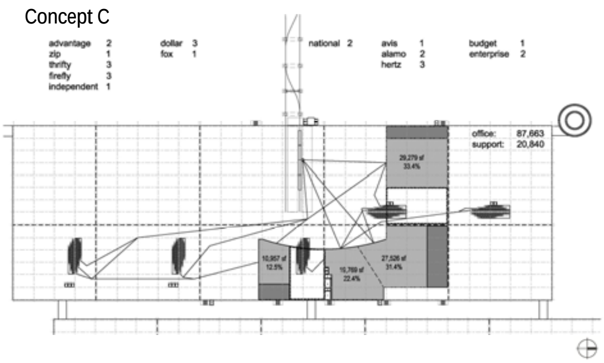
CSB Walking Distance Comparison

Concept B2



CSB Walking Distance Comparison

Concept C



CSB Walking Distance Comparison

Walking Distances for Each RAC Company

scheme	ADVAN	AVIS	BUDGET	ZIP	ALAMO	NATION	ENTER	HERTZ	DOLLAR	THRIFTY	FIREFLY	FOX	INDEP	Average
Distance to Lobby														
A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B2 Flip	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C Flip	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Distance to Cars														
A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B2 Flip	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C Flip	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CSB Walking Distance Comparison

Average Walking Distances

CSB Concept	Distance to Lobby	Distance to Core	Total
A	274	245	519
B1	317	156	473
B2	315	247	562
C	284	293	577

CSB Walking Distance Comparison

Which CSB Concept Do You Prefer?

	Advantage	Avis/ Budget	Enterprise/ Alamo/ National	Hertz/ Dollar/ Thrifty	Fox	Independent
Concept A						
Concept B1						
Concept B2						
Concept C						

RAC Preferences for CSB Design

Feasibility of Future Checked Baggage Service Operation

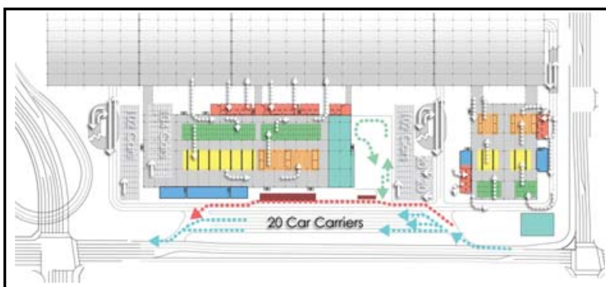
- Managed by Third Party Contractor Certified by TSA
- Capacity in Range of 300 – 425 Bags Per Hour


PHX ConRAC Checked Bag Service

CSB Remote Bag Check-in

- Baggage Check Facility Sized to Accommodate
  - Multiple Check-in Kiosks with Boarding Pass Scanners and Tag Printers
  - Customer Service Positions with Bag Wells to Place Tagged Bags
  - Baggage Staging Area to Accumulate and Load Bags into Containers
  - Loading Positions for Secure Trucks/Vans
  - Back Office Space

CSB Remote Bag Check-in

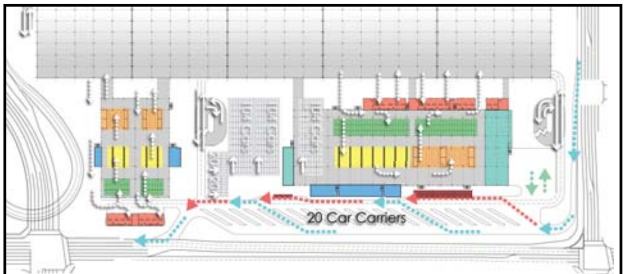


- Yard Entrance from North End of Site off of La Cienega
- Parallel Car Carrier Staging Lanes
- Yard Exit at South End onto La Cienega

QTA Site Circulation Plan (Option 1)

- Yard Entrance from South End of Site off of La Cienega
- Parallel Car Carrier Staging Lanes
- Yard Exit at North End onto La Cienega
- Auxiliary Lane to Allow for Deceleration/Acceleration

QTA Site Circulation Plan (Option 2)



- Yard Entrance off of Eastbound Arbor Vitae
- 15-Ft Wide Angled Car Carrier Stalls with Adjacent 8-Ft Wide Staging Lanes
- Yard Exit at South End onto La Cienega
- Accommodates Larger QTA Building to be Located at North End of Site

QTA Site Circulation Plan (Option 3)

	Light Maintenance	Heavy Maintenance
Definitions (Per California Electrical Code)	Lubrication, Inspection, Minor Work to Include Tune Up, Parts Changes, Fluid Changes (Oil, Antifreeze, Transmission, Brake, Refrigeration), Brake Repairs, and Tire Rotations	Major Repairs Such as Engine Overhauls, Painting, Body/Fender Work, and Other Repairs That May Require Fuel Tank Draining
Occupancy	Moderate-Hazard Storage Group S-1 (Motor Vehicle Repair Garages Complying with the Maximum Allowable Quantities of Hazardous Materials)	Likely to be Factory Group F-1 but Could be High-Hazard Group H-2 or H-3 if Maximum Allowable Quantity (MAQ) Exceeded (For Example: > 120 Gallons of Gasoline on the Floor in Storage or > 30 Gallons in Open Use)

Comparison of Light vs Heavy Maintenance

Size Requirements

- Paint Booth (~14’-6” x 27’-6” x 11’-0”): Prefabricated Structure with Engineered Ventilation to Collect Overspray and Flammable Vapors
- Mixing Room (~9’-0” x 12’-0”): Adjacent to Booth for Storing and Processing Paints
- Prep Station (~24’-0” x 24’-0” x 11’-0”): Area to Prepare Vehicle for Painting
- Having a Single Paint Booth will Limit Throughput (to Allow Painted Car/Parts to Dry Inside Booth)

Heavy Maintenance – Paint Booth

Fire and Electrical Code Requirements

- Paints Add to Maximum Allowable Quantity of Flammable IC & IB Liquids on Floors
- Paint Booths Add to Likelihood of Group H Classification (Maximum Allowable Quantities on Third Level is 120 Gallons)
- Booth and Surrounding Areas are Classified Class I, Division 2 within 3’ of Outside of Paint Booth Doors
- Strict Air Permitting Requirements

Heavy Maintenance – Paint Booth

Challenges

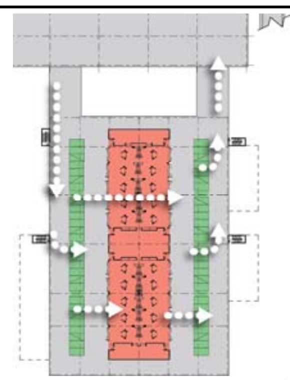
- Paints Add to Maximum Allowable Quantity of IB and IC Flammable Liquids in a Control Area
- Additional Electrical Hazard Areas Added with Presence of Paint Booth
- Paint Booths Do Not Have a Fast Turn Around for Vehicles/Parts due to Paint Dry Times
- Additional Permits are Required for Paint Booths
- Flammable Liquids and Risks Need to be Addressed in the Request for Modification with Code Officials

Heavy Maintenance – Paint Booth

color	zone name
	light maintenance (oil changes)
	wash bays
	fueling
	vehicle queuing
	administration offices
	support/third party offices
	circulation

North QTA Level 2 Summary:

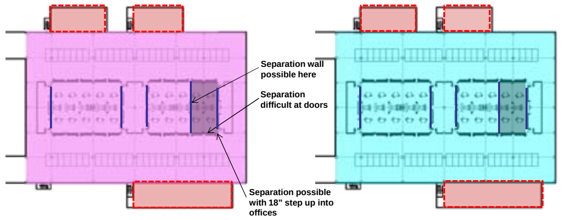
Approximate Floor Area *	69,900 SF
Administration/Storage Floor Area	5,200 SF
Light Maintenance Bays	20
Queuing Spaces	46



* Floor area does not include stairs, elevators or ramps.

Light Maintenance Layout (Typical)

Require Classified Floor Area or **Mechanical Ventilation Throughout**



- Heavy Maintenance Bays (Ability to Drain Fuel Tanks) Require Classifying the Floor Area or Providing Mechanical Ventilation Throughout the Entire Floor Area
- Classified Floor Areas Require All Equipment Located within 18 Inches of Floor to be Rated for use in Class I, Div 2 Environments

Heavy Maintenance Layout (Typical)

Implications of Providing Heavy Maintenance at the QTAs:

- Potential Higher Hazard Use Group Classification
- Greater Floor Area Demand for Heavy Maintenance:
  - Assumed Additional 8,000 SF of Parts Storage Area for Each Maintenance Level (24,000 SF for Entire Facility)
- Higher Construction Costs (Rough Order of Magnitude Cost Increase of $7,200,000 – Excluding Paint Booths – to Convert and Equip 20% of Maintenance Bays as Heavy)
- Co-Location of Heavy Maintenance with Multi-Level, Indoor Fueling Subject to Approval by Fire and Building Departments

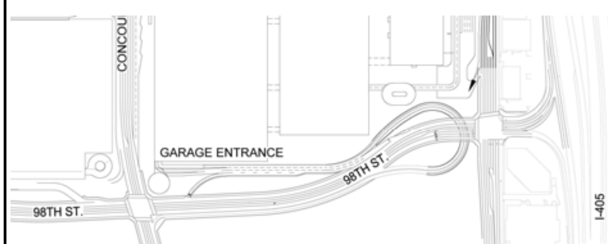
Heavy Maintenance Functions

- Ongoing Discussions with LA Department of Building and Safety and LA Fire Department
  - Reviewed Code Mitigations of Other Multi-Level QTAs
  - Will Present Specific Code Matrix for LAX ConRAC
  - Will Review Revised Code Request for Modification (RFM) for Indoor Fueling

Fire & Building Code Approval Process

ConRAC Garage Entrance:

- Underpass for Eastbound 98th Street Traffic
- 600 Ft Distance for Merge Lanes to RAC Garage



RAC Garage Entrance Roadway

- See Handout for Preliminary Tenant Improvement List
- List Organized by CSB, RAC/Support and QTA Areas

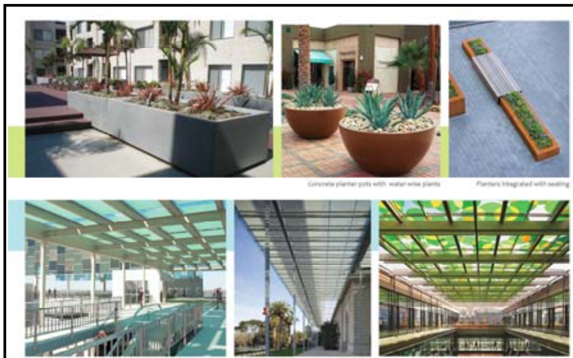
EXHIBIT A
SCHEDULE OF IMPROVEMENTS

AREA	ITEM	SUPPLIED BY AIRPORT	SUPPLIED BY TENANT	COMMENTS
CSB - Customer Service Building				
Courtyard and Circulation Cores				
	APM Station Platform	X		
	Circulation Cores to Shuttle Bus Bays	X		
	Circulation Cores to RAC Floors	X		
	Canopies and Overhangs	X		
	Hardscaping and Landscaping	X		
	Directional Signage	X		
	Elevators and Escalators	X		
	Moving Sidewalks	X		
	Restrooms	X		
	Exterior Lighting	X		
	Exterior Screening	X		
	Exterior Glazing	X		
	Exterior Signage	X		
Lobby and Queuing Areas				
	Demising Wall Framing, Gyp Board and Finish	X		
	Standard Vinyl/Carpet Floor Finish	X		
	Ceilings - Open Above	X		
	HVAC System	X		
	Lighting	X		
	Seating	X		120 seats assumed
	Waste Receptacles	X		
	Portable Queuing Stanchions and Straps	X		
	Power and Data Conduit for Customer Kiosks	X		
	Customer Kiosks		X	

Airport and Tenant Delineation List

Decorative metal screen fencing
Vertical landscape screen with drought tolerant planting
Acoustic barrier louvered screen wall
Enclosed lobby for Automated People Mover
Tunnel enclosure for Automated People Mover
Semi-enclosed shelter for Automated People Mover
Examples of Screens & APM Enclosures

CSB Customer Experience



Concrete planter pots with water-wise plants

Planters integrated with seating

Breezeway canopy with ETFE panels (Ethylene tetrafluoroethylene)

Photovoltaic canopy

Kalwall canopy with graphic

Examples of Canopies and Planters

CSB Customer Experience

Consolidated Rental Car Facility at Los Angeles International Airport

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Luminous escalator signage

Multi-dimensional signage

Signage family- kiosks, banners, pedestrian signs

Overhead signage

Pylon Signage with landing identification

Pylon Signage

Examples of Wayfinding

CSB Customer Experience

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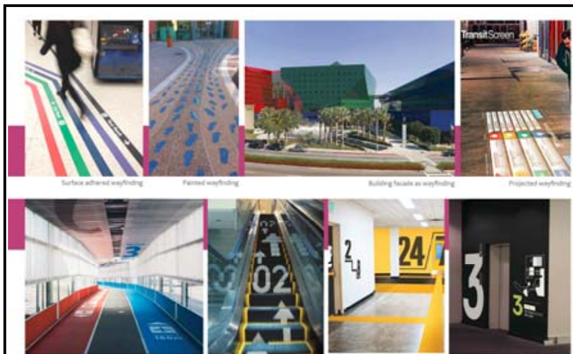

Surface adhered wayfinding

Painted wayfinding

Building facade as wayfinding

Projected wayfinding

Integrated graphic wayfinding

Examples of Wayfinding

CSB Customer Experience

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Facility	2014 FAA Enplanements	From Terminal Gate to RAC Lobby (feet) *	From RAC Lobby to Ready Stall (feet)	Average Distance from Terminal Gate to Ready Stall (feet)
MIA	19.5M	1,000 – 4,050	275 – 840	3,083
BUR	1.9M	1,515 – 3,330	0 – 720	2,783
PDX **	7.9M	1,475 – 3,450	0 – 625	2,775
PVD	1.8M	1,530 – 2,610	0 – 750	2,445
ATL	46.6M	1,300 – 2,400	0 – 900	2,300
BNA	5.4M	0 – 1,710	720 – 1, 570	2,000
LAX	**34.3M**	**650 – 2,550**	**0 – 800**	**2,000**
AUS	5.2M	685 – 2,090	0 - 915	1,845
ORD	33.8M	355 – 2,130	0 – 660	1,573
FLL	12.0M	305 – 1,045	0 - 800	1,075

* Distance does not include traveling on bus or APM.
** Figures for PDX represent planned future ConRAC.

Airport Walking Distance Comparison

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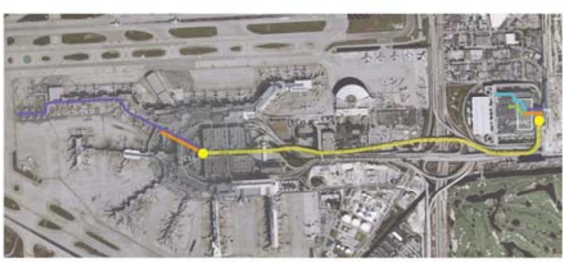

Terminal/Transit Node Farthest to RAC Lobby = 4,050 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,000 feet
RAC Lobby to Ready/Return Closest = 275 feet
RAC Lobby to Ready/Return Farthest = 840 feet
APM Route

Walking Distance Comparison - MIA

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Terminal/Transit Node Farthest to RAC Lobby = 3,330 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,515 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 720 feet

Walking Distance Comparison - BUR

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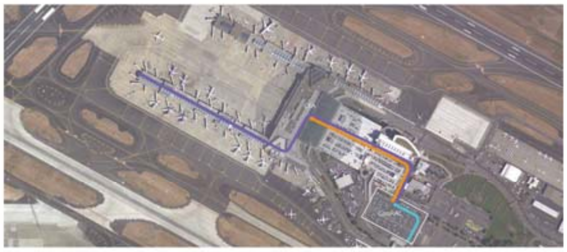

Walking Distance Comparison - PDX

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Walking Distance Comparison – ATL (1)

LAX Los Angeles World Airports

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Consolidated Rental Car Facility at Los Angeles International Airport 74

Walking Distance Comparison – ATL (2)

LAX Los Angeles World Airports

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Consolidated Rental Car Facility at Los Angeles International Airport 75

Walking Distance Comparison - PVD

LAX Los Angeles World Airports

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Walking Distance Comparison - BNA

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Walking Distance Comparison – AUS

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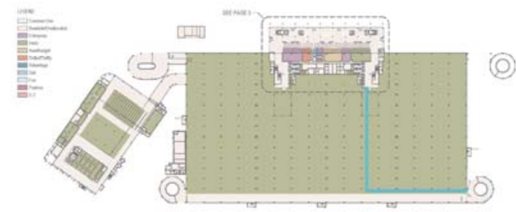
Consolidated Rental Car Facility at Los Angeles International Airport 78

Terminal/Transit Node Farthest to RAC Lobby = 2,130 feet
Terminal/Transit Node Nearest to RAC Lobby = 335 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 660 feet
APM Route

Walking Distance Comparison – ORD (1)



Terminal/Transit Node Farthest to RAC Lobby = 2,130 feet
Terminal/Transit Node Nearest to RAC Lobby = 335 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 660 feet
APM Route

Walking Distance Comparison – ORD (2)

Terminal/Transit Node Farthest to RAC Lobby = 1,045 feet
Terminal/Transit Node Nearest to RAC Lobby = 305 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 800 feet
Bus Route

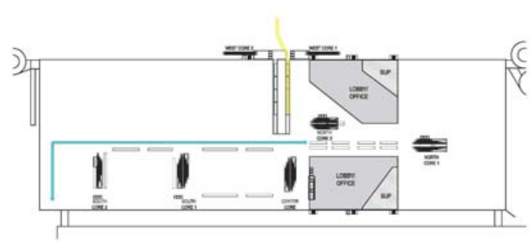
Walking Distance Comparison - FLL

Terminal/Transit Node Farthest to RAC Lobby = 2,550 feet
Terminal/Transit Node Nearest to RAC Lobby = 650 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 800 feet
APM Route

Walking Distance Comparison – LAX (1)

Terminal/Transit Node Farthest to RAC Lobby = 2,550 feet
Terminal/Transit Node Nearest to RAC Lobby = 650 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 800 feet
APM Route

Walking Distance Comparison – LAX (2)



Terminal/Transit Node Farthest to RAC Lobby = 2,550 feet
Terminal/Transit Node Nearest to RAC Lobby = 650 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 800 feet
APM Route

Walking Distance Comparison – LAX (3)

Next Steps

- Complete ConRAC Schematic Design and Submit Project Definition Document to LAWA by Early January 2016
- Next RAC Industry Meeting – Tuesday, January 19, 2016 (Meeting Times to be Confirmed)
- Proceed with QTA 30% Conceptual Design for Completion in April 2016

Next Steps

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

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EXHIBIT A
SCHEDULE OF IMPROVEMENTS

AREA	ITEM	SUPPLIED BY AIRPORT	 TENANT	COMMENTS
CSB - Customer Service Building				
Courtyard and Circulation Cores				
	APM Station Platform	X		
	Circulation Cores to Shuttle Bus Bays	X		
	Circulation Cores to RAC Floors	X		
	Canopies and Overhangs	X		
	Hardscaping and Landscaping	X		
	Directional Signage	X		
	Elevators and Escalators	X		
	Moving Sidewalks	X		
	Restrooms	X		
	Exterior Lighting	X		
	Exterior Screening	X		
	Exterior Glazing	X		
	Exterior Signage	X		
Lobby and Queuing Areas				
	Demising Wall Framing, Gyp Board and Finish	X		
	Standard Vinyl/Carpet Floor Finish	X		
	Ceilings - Open Above	X		
	HVAC System	X		
	Lighting	X		
	Seating	X		120 seats assumed
	Waste Receptacles	X		
	Portable Queuing Stanchions and Straps	X		
	Power and Data Conduit for Customer Kiosks	X		
	Customer Kiosks		X	
Counters, Service Areas and Backwalls				
	Communications, Voice & Data	X		Empty conduits
	Electrical Service - Power Points	X		
	HVAC System	X		
	Standard Lighting	X		
	Complete Counter Unit	X		Includes counter shells/millwork, divider screen and inserts
	Counter Backwall Framing, Gyp Board and Finish	X		
	Counter Backwall Signage	X		4 ft width assumed
	Tenant Check-in/Reservations Systems		X	
	Tenant Telephone Communications Systems		X	
	Tenant Computer/ WAN Other Systems		X	
	Tenant Plug-in Equipment, Monitors, Software		X	Assumed tenant relocation of existing
Back Offices - Behind CSB Service Counters				
	Standard Vinyl/Carpet Floor Finish	X		
	Ceilings - Open Above	X		
	HVAC System	X		
	Standard Lighting	X		
	Standard Painted Gyp Board Partitions and Doors	X		
	Breakroom Sink with Garbage Disposal	X		
	Breakroom Casework	X		
	Breakroom Equipment	X		Includes refrigerator, microwave oven, coffee machine, water cooler, toaster oven and electric kettle
	Office Furnishings		X	Assumed tenant relocation of existing
	Breakroom Funishings	X		
	Notice Boards	X		
Airport, Building Manager and Retail Manager Offices				
	Standard Carpet Floor Finish	X		
	Ceilings - Standard 2x4 ACT	X		
	Airport and Retail Administration	X		
	Breakroom Sink with Garbage Disposal	X		
	Breakroom Casework	X		6 ft long per breakroom assumed
	Breakroom Equipment	X		Includes refrigerator, microwave oven, coffee machine, water cooler, toaster oven and electric kettle
	Airport Management Space		X	Fit-out by Airport tenants
	Retail Management Space		X	Fit-out by Airport tenants

EXHIBIT A

SCHEDULE OF IMPROVEMENTS

AREA	ITEM	SUPPLIED BY AIRPORT	SUPPLIED BY TENANT	COMMENTS
RAC and SB - Ready/Return Garage and Support Buildings				
Ready/Return and Circulation Areas				
	Electrical Service - Power Points	X		
	Garage Lighting	X		
	Bottom of Deck Finish	X		
	Columns and Vertical Surface Finishes		X	Brand Colors OK
	Tenant Branding		X	
	Floor Striping - Primary Circulation	X		
	Floor Striping - Stalls	X		Per RAC Striping Plan
	Stall Locations Signage	X		Allow standard typical aluminum sign hung to u/s of slab
	Garage Floor Demising Barricades	X		
	Movable Traffic Barrier System	X		Water filled system
	Stairs - Code Required	X		
	Signage - Code Required	X		
	Sprinklers - Code Required	X		
	Fire/Life/Safety Annunciator System	X		
	Data/Communications Rooms	X		
	Communications, Voice & Data	X		Empty conduits
	Restrooms	X		
	Retail Spaces	X		Allowance for Tenant fit-out
Customer Service Booths, Exit Booths and Vehicle Security				
	Customer Service Booths	X		Assumed 60,000 SF total, includes booth floor, ceiling and enclosure walls
	HVAC System	X		
	Mechanical/Electrical Hook-ups to Booths	X		
	Exit Booth and Gate Control Equipment	X		
	Exit Booth Barricade Operational Systems	X		Software system for car exit verifier and detector (microprocessor based)
	Fit-outs for VIP Waiting Areas (air-conditioned)	X		Assumed 2,500 SF total
	Office Furniture and Equipment		X	Assumed tenant relocation of existing
	Special Signage	X		Tenant's own special identification signage
	Vehicle Security	X		CCTV provided in public spaces only (lobby and stairwells)
	Mainteance and Repairs Equipment		X	Assume tenant operators to relocate existing
Back Offices - on RAC Floor				
	Standard Vinyl/Carpet Floor Finish	X		
	Ceilings - Standard 2x4 ACT	X		
	Standard Painted Gyp Board Partitions and Doors	X		
	HVAC System	X		
	Office Furnishings		X	Assumed tenant relocation of existing
Support Building				
	Electrical Service - Power Points	X		
	Garage Lighting	X		
	Bottom of Deck Finish		X	
	Columns and Vertical Surface Finishes		X	
	Floor Striping - Primary Circulation	X		
	Floor Striping - Stalls	X		Per RAC Striping Plan
	Garage Floor Demising Barricades	X		
	Stairs - Code Required	X		
	Signage - Code Required	X		
	Sprinklers - Code Required	X		
	Fire/Life/Safety/Annunciator Systems	X		
	Data/Communications Rooms	X		
	Communications, Voice & Data	X		Empty conduits
	Vehicle Vacuum System	X		Assumed 16 vacuum stations per floor
	Overhead Vacuum Reels & Hoses	X		

EXHIBIT A

SCHEDULE OF IMPROVEMENTS

AREA	ITEM	SUPPLIED BY AIRPORT	 TENANT	COMMENTS
QTA - Quick Turn Around Area Buildings				
General Building Systems				
	Electrical Service - Power Points	X		
	QTA Area Lighting	X		
	Deck and Ramps Between Support and QTA Buildings	X		
	Fire/Life/Safety/Annciator Systems	X		
	Stairs - Code Required	X		
	Signage - Code Required	X		
	Sprinklers - Code Required	X		
	Fuel Island (Inc Structural Upgrades)	X		
	Wash Bay Structure	X		
	Wash Bay Exterior Walls	X		
	Wash Bay Enclosure-Bay Demising Walls	X		
	Maintenance Bay Structure	X		
	Mainteanance Bay Roll-up Doors	X		1 per bay
Fuel and Wash Equipment and Systems				
	Multi-level Fuel Distribution System	X		
	Fuel Dispensers Inc. Nozzles	X		
	Fuel Monitoring System	X		
	Overhead Hose Reel System	X		2 reels per island
	Overhead Hose Reels	X		Air and washer fluid
	Overhead Fluid Distribution System	X		Air and washer fluid
	Vehicle Vacuum System	X		
	Overhead Vacuum Reels & Hoses	X		
	Water Supply Hose Bib	X		1 per island
	Drive-through Vehicle Wash System	X		
	Vehicle Wash Rocker Panel System	X		
	Vehicle Wash Blower Drying System	X		
	Vehicle Wash Reverse Osmosis System	X		
	Excess Water Drainage System	X		
	Oil/Water Separator	X		
Maintenance Area Equipment and Systems				
	Maintenance Lift Equipment	X		
	Overhead Hose Reel System	X		2 reels per bay
	Mainteance and Repairs Equipment		X	Assumed tenant relocation of existing
	Tire Storage Racks	X		
QTA Office and Administration				
	Standard Vinyl/Carpet Floor Finish	X		
	Ceilings - Standard 2x4 ACT	X		
	HVAC System	X		
	Standard Lighting	X		
	Standard Painted Gyp Board Partitions and Doors	X		
	Restrooms	X		
	Lockers	X		
	Office Furnishings		X	Assumed tenant relocation of existing
	Breakroom Sink with Garbage Disposal	X		
	Breakroom Casework	X		
	Breakroom Equipment	X		Includes refrigerator, microwave oven, coffee machine, water cooler, toaster oven and electric kettle
	Breakroom Funishings	X		
	Notice Boards	X		
	Vending Outlets	X		
	Vending Machines		X	
Loading Dock Area				
	Delivery Staging Area	X		
	Vehicle Access Gates	X		
	Manager's Office	X		
	Restrooms	X		
	Conference/Training Room	X		
	Emergency Generator	X		
	Emergency Power Distribution System	X		
	Trash Receptacles and Compactor	X		
	Hose bibb Trash Area	X		
	Bicycle Rack	X		

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LAX ConRAC – RAC Industry Meeting

Meeting Date: Tuesday, January 19, 2016, 10:00 am – 12:00 pm PST
Location: LAWA Admin East

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the ConRAC design developments. Copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis (TranSystems) reviewed the list of program elements and noted that the current design meets or exceeds all program requirements with the exception of the car carrier staging positions (19 included in current design versus 20 noted in the program).
2. The basic configuration of the ConRAC site was reviewed. Robert Hunsinger (EHI) asked why the number of idle storage stalls is only 10,600, compared to 11,900 shown in previous meetings. Mr. Jarvis noted that the actual program number of idle storage stalls should be 10,000, but it was inaccurately shown as 11,900 due to a double-counting of transaction data for one of the RAC companies. The team has since corrected this error. The provided number of idle storage stalls actually exceeds the program by 600.
3. The initial plan was to use a portion of the roof (Level 4) of the Idle Storage Building for RAC idle storage overflow, but since the program can be met within Levels 1 through 3, the use of Level 4 is assigned to LAWA for airport employee or public parking. The cost of the upper level is estimated as a separate line item and is excluded from the cost estimate of the ConRAC. It was noted that the project cost and characterization of costs are two key components of the business agreement.
4. Multiple areas of usage will be anticipated for roof (Level 4) of the Ready/Return Building. RAC employee parking will most likely occur at the north end on Level 4 of the Ready/Return Building. Revenue control system will be provided to manage all parking use. There was a request that helix demand during peak periods be analyzed. **ACTION: TranSystems will provide details on how the helices will function.**
5. The CSB design has been refined since last November, based on comments received from the industry and one-on-one discussions with each of the RAC companies to understand how their spaces would likely be used. The number of vertical circulation cores within the Ready/Return Building has been reduced from five to four, and they are located near various brands, with potential to flow through from front to back of tenant space, if desired.
6. In the CSB plan, percentages showing blended (a combination of revenue and transaction) market share are used as means of illustrating concept only; the actual market share to be used will be determined by business agreements with the RACs. It was noted that the CSB concept allows for flexibility of tenant space to grow or shrink without impacting neighboring tenant spaces. In addition, balance between width and depth, pedestrian movement within the courtyard, and customer sightlines were considered in the design.
7. Pat Tomcheck (LAWA) indicated that TranSystems' contracted scope is for sizing and concept refinement of the RAC/CSB portions of the project. Because of the complexity of the QTA Buildings and to ensure continuity of code modification approval by agencies, TranSystems is contracted to advance the QTA design further. LAWA is anticipating that the ConRAC project will be procured through a Request for Proposal (RFP) process for Design-Build-Finance-Operate-Maintain (DBFOM) project delivery method, and

it is likely that a new design team, under the DBFOM contract, will complete the design and construction documents for the RAC and CSB portions of the project.

8. Connie Gurich (Hertz/DTAG) noted her concerns with changing the design team midway through the project and risk starting over or reversing some design decisions that have been made and agreed upon by the RAC industry. Mr. Tomcheck emphasized that LAWA is not interested in throwing away work that has been done to this point. Diego Alvarez (LAWA) noted that the RFP will include technical design criteria to require new designer to proceed within specified project parameters and that proposed changes will not be implemented without LAWA and RAC industry's acceptance. Ms. Gurich requested for LAWA to review the RFP approach and consider proceeding with the current design team.
9. Mr. Jarvis indicated that the goal for this meeting is to receive approval from the RAC industry to proceed with the proposed CSB concept. Lori Tallarico (Avis Budget) noted that their facilities group may have already reviewed the proposed CSB design, but she could not confirm this without having an opportunity to discuss with her counterparts. ACTION: TranSystems to follow up with Avis Budget on their acceptance of the CSB concept.
10. Mr. Jarvis reviewed the typical vertical circulation core plans on all floors. Direct escalators will be provided from CSB on Level 4 to each of the RAC levels. It was noted that the general orientation of the escalators has changed from scissor arrangement to a parallel arrangement to allow for more efficiency in the use of space beneath the escalators, for storage and data rooms.
11. Three elevators are shown for the two south cores, whereas two elevators are shown for the two north cores. This decision was made based on analysis of transaction data and reviewing level of service metrics with the team's vertical circulation consultant.
12. John Vermeersch (Hertz/DTAG) asked if there are interior stairs next to escalators for use by RAC customers and employees. Mr. Jarvis noted that exit stairs are provided along the perimeter of the building to satisfy code requirements, but no interior stairs are anticipated. It was acknowledged that using interior stairs may be faster for a fit person traveling up or down by one floor; however, cores are compressed as much as possible to maximize space for rental stalls. ACTION: TranSystems to evaluate whether interior stair(s) should be added to the project.
13. Mr. Vermeersch restated his company's belief that gross revenue should be used exclusively to determine space allocations for the CSB, not a combination of revenue and transactions. Hertz/DTAG needs to know the specific area allocations for their operations staff to determine whether they will have sufficient space for their operations.
14. A number of renderings showing building massing were presented. Possible canopies connecting APM Platforms, CSB lobbies and the vertical circulation cores were shown. The at-grade bus plaza will have space for seating for queuing, with shelters provided.
15. Rosa Doran (RAW International) presented possible amenities that could be provided at the CSB on Level 4 to enhance customer experience. Ms. Doran noted that inclusion of the following elements will help provide a basic level of amenities:
    a. Physical screening for sound and visual separation between the courtyard outside of the CSB lobbies and the rooftop parking areas.
    b. Raised planters that can be incorporated with seating.
    c. Covered walkways to provide weather protection for customers traveling between APM platforms and the CSB lobbies and over the escalators at the vertical circulation cores.

   d. Various wayfinding methods such as use of three-dimensional signs, branded signs, banners, pylon signage and integrated wayfinding strategies.

16. Craig Dickson (TranSystems) provided an overview of the dynamic model analysis of the customer experience at the shuttle bus curb and its vertical circulation core to the CSB Level 4. Highlights from this analysis are summarized below:
   a. The dynamic model was prepared using a program called Any Logic, which is a general purpose tool, with customizations added to suit specific needs.
   b. The West Vertical Circulation Core is roughly centered on the curb cuts. At the bus plaza, the center four buses are estimated to receive 44% of all buses, but bus loading/unloading assignment can vary if needed.
   c. The Design Team's vertical transportation consultant has considered use of elevators and escalators as well as sole use of elevators. Recommendation is to only provide four 5,000-lb elevators (no escalators) to serve this core. Because of the vertical travel distance between Levels 1 and 4, it is difficult to locate direct escalators that would work well at both the bus plaza level and the CSB level.
   d. There is concern that all elevators may become inactive immediately after a seismic event. Although redundancy is provided via stairs, traveling up three levels is prohibitive to some individuals.
   e. Average round trip time for an elevator to go to Level 4 and back to Level 1 is 36.6 seconds according to the elevator consultant and 40 seconds according to this dynamic model analysis. The elevator only stops on Levels 1 and 4.
   f. Pedestrian density at the bus curb and at the elevator lobbies was reviewed. Level-of-Service A or B is achieved consistently at the bus curb. However, at the initial layout of the elevator lobby, which has an approximately 20 feet x 20 feet area, the pedestrian density is too high. The Level of Service is significantly improved if the 20 feet distance is widened to 34 feet.
   g. ACTION: TranSystems to confirm that elevator use alone would be adequate to handle the peak demands and to review whether a more efficient elevator layout is possible. They will look at elevators with two doors and no lobby/vestibule.

17. Steve Culberson (Ricondo and Associates) joined the meeting by phone and was introduced to the group as the consultant for the Environmental Impact Report (EIR) and environmental assessment for the Landside Access Modernization Program (LAMP). Mr. Culberson noted that the draft EIR is scheduled to be released in April or May 2016, with the Final EIR completed by the end of 2016. All hearings for the EIR are anticipated to be completed during the first half of 2017. They have begun agency coordination and meeting with City and other agencies. Initial feedback to date has been on facility size, and potential offsets for visual impact. Other concerns have come from City of Inglewood, with car rental tax base loss if RACs relocate out of their city to the ConRAC. Mr. Culberson has requested the RACs' participation in a questionnaire to help the EIR Team obtain needed information for the environmental assessment. This questionnaire will be sent out to the RACs (via email from Pat Tomcheck of LAWA). Participation is strictly voluntary, and results will be treated as confidential on request. ACTION: LAWA to email out questionnaire to RAC industry representatives.

18. Mr. Jarvis shared with the group updated traffic circulation diagrams of the RAC floors, as well as mock allocation plans of each RAC level, based on TranSystems' assumption on how each level would operate,

with initial input from RACs provided. These diagrams are provided to illustrate possible layout and functionality of the facility as a whole.

19. Structural design concept, particular shear wall layout, was presented:
    a. As Los Angeles is located in a high seismic zone, the horizontal seismic forces are much larger than the gravity loads and would therefore dictate the design.
    b. The San Jose ConRAC was used as an example of how seismic design was addressed at that facility, where shear walls are located along both directions, but are kept away from traffic flow. At LAX, the size of the RAC garage is much larger, and seismic joints are needed to potentially treat the RAC garage as up to ten separate structures, each requiring its own shear walls that span both directions.
    c. At the north cores, shear walls can be provided around the vertical circulation elements, therefore making them less noticeable or disruptive to flow of traffic.
    d. At the south cores, the escalators currently run in the east-west direction and would not have the opportunity to hide the shear walls. One solution is to provide a number of moment frame columns near the south end of the building. However, this makes RAC return traffic more difficult to manage, with the additional columns that would need to be protected.
    e. It was noted that the Burbank ConRAC uses bay isolators. However, due to the projected size, Mr. Jarvis noted that this approach would likely be cost prohibitive for this project.
    f. ACTION: TranSystems to analyze re-orienting the two south cores, review/optimize seismic joint locations, and further develop seismic design solutions to minimize impacts to RAC operation.
20. The QTA site circulation was reviewed. Current concept provides a wide entrance turn for truck traffic, with large turning radii to avoid pinch points. A dedicated merge lane is also provided for truck entering and exiting the QTA site. There have not been revisions to the general QTA floor plan layout.
21. RB Laurence (Stantec) provided an update on the code review process with Los Angeles Fire Department (LAFD) and Los Angeles Department of Building and Safety (LADBS):
    a. The Design Team has met with the building and fire departments multiple times to review this project and to discuss proposed mitigations to allow multi-level indoor fuel dispensing at the QTA Buildings.
    b. At the last code review meeting, the Design Team had asked the building officials for their opinion regarding approval of heavy maintenance functions within the QTA Buildings. The building officials noted that heavy maintenance functions would most likely require a more restrictive type of classification (High Hazard or H occupancy) than the classification (Factory or F occupancy) that is currently proposed.
    c. It was clarified that light maintenance functions include work such as oil change, tires, filters and other related tasks (which are accommodated by current QTA design). Heavy maintenance functions include painting and body work or repairs involving fuel systems, such as post-accident repairs that requires engine removal.
    d. The Design Team believes that code officials LAFD and LADBS are comfortable with the direction of the project without complicating the issues by introducing heavy maintenance into the project.
    e. The Design Team plans to submit the formal Request for Modification (RFM) to LAFD within the next few weeks and expects to receive formal review comments from the code officials.

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22. Ms. Gurich noted that the RAC industry is working with Warren Adams of WJ Advisors on the business deal, including costs, debt service, and operating costs such as electrical, water and sanitary. Chuck Rowe (TranSystems) noted that Warren Adams has provided a draft of the operating and maintenance costs for internal review by the project team. The Design Team will also be reviewing cost/ benefit analyses on a range of potential sustainability features that will reduce energy and water use.
23. The next in-person meeting with the RAC industry will be scheduled on Tuesday, March 15, 2016, from 10:00 am to Noon.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

A2: Meeting Presentation (58 pages)

LAX
Los Angeles World Airports

TranSystems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	January 19, 2016
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, Executive Conference Room

Name	Representing	Telephone Number	Email Address	
Norman Lin	TranSystems	312-669-5831	nlin@transystems.com	
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David Lee	TranSystems	510-835-9916	dklee@transystems.com	
Scott Goldstein	EHI			By Phone
Robert Hunsinger	EHI			By Phone
Lori Tallarico	Avis Budget			By Phone
Diego Alvarez	LAWA			By Phone
Steve Culberson	Ricondo & Assoc			By Phone
Rosa Doran	RAW			By Phone
Steve Lott	RAW			By Phone
Mick Erlandson	Sixt			By Phone
Neil MacAloney	Stantec			By Phone
Chuck Rowe	Transystems			By Phone
Justin Neel	Transystems			By Phone

Agenda – January 19, 2016

1. Customer Service Building Design
2. CSB Customer Experience
3. RAC and Idle Storage Level 4 Parking
4. LAMP EIR Updates
5. Bus Curb Pedestrian Flow Analysis / Dynamic Models
6. RAC Garage Design and Cores Development
7. Quick Turn-Around Site Circulation Design
8. Next Steps

RAC Industry Meeting

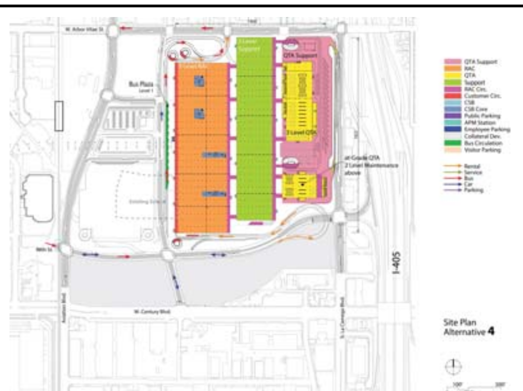
Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

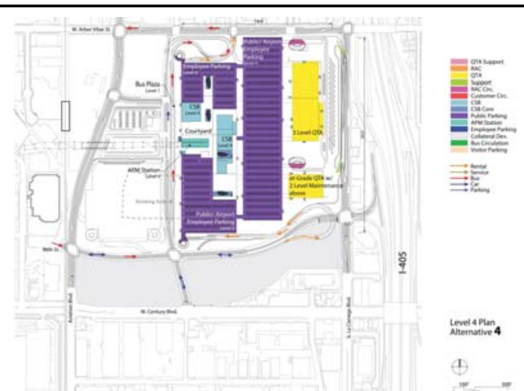
Functional Values

Component	Program	Provided
Ready/Return Area (RAC) (area where customers pick-up and return vehicles)	7,600 rental equivalent stalls	7,600 rental equivalent stalls
Quick-Turnaround Area (QTA) (facilities for multi-level fueling, wash and vehicle maintenance)	704 staging positions 180 fuel nozzles 37 wash bays 64 maintenance bays	704 staging positions 186 fuel nozzles 37 wash bays 64 maintenance bays
QTA Support and Additional Site Functions (fuel storage and distribution; supervisor and vendor parking; car carrier delivery; vehicle staging corrals; loading docks/service yard)	20 car carrier staging positions	19 car carrier staging positions
Customer Service Building (CSB) ("mini-mall" lobby with customer service counters, restrooms, retail amenities and other functions connected to the APM station via an open courtyard and to the Ready/Return area via vertical cores with escalators and elevators)	90,000 to 115,000 square feet 4 vertical cores	100,000 square feet 4 vertical cores
Airport People Mover Station (APM) (provides customers with convenient connection to the Central Terminal Area with separate platforms for unloading and loading customers)		
Bus Plaza (for shuttle bus operations for a potential interim shuttle bus operation and for off-airport rental car companies)	12 bus bays Vertical core connected to the CSB	12 bus bays Vertical core connected to the CSB
Idle Storage (for overflow vehicles to meet peak demand)	10,000 stalls	10,600 stalls
Employee and Visitor's Parking (for personal vehicle parking)	1,100 employee stalls 100 visitor stalls	1,100 employee stalls 100 visitor stalls

Program Requirements

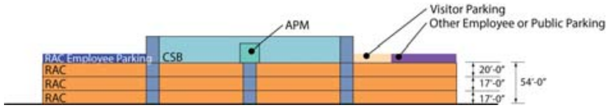


ConRAC – Site Plan



ConRAC – Level 4 Plan

West-East Section



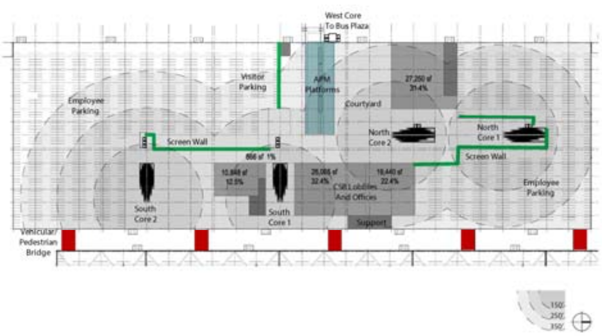
North-South Section

ConRAC – Typical Building Sections

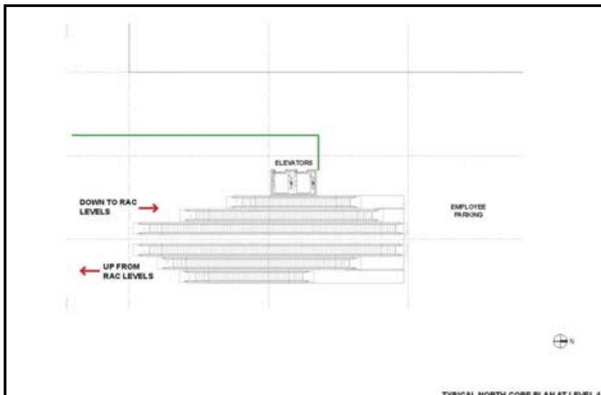
Evaluation Criteria

- Cores Touch Decks to Maximize Customer Service
- Most North-South Pedestrian Movement on Level 4
- Bus Curb Access Similar to APM Access
- Allow Pass Thru Counter Area
- Allocate Space Near the Core Where Customers are Headed
- Visibility from APM Station
- Shortest Walking Distance from APM Station to Storefront and from the Counter to the Core
- Orthogonal Shaped Spaces
- Ease of Reallocation
- "Shop-ability"

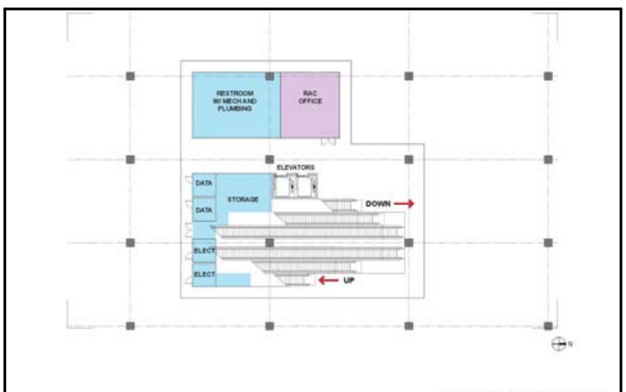
CSB Evaluation Criteria



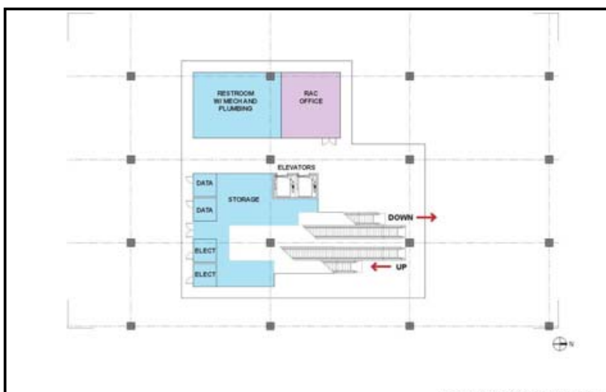
CSB Level 4 Plan



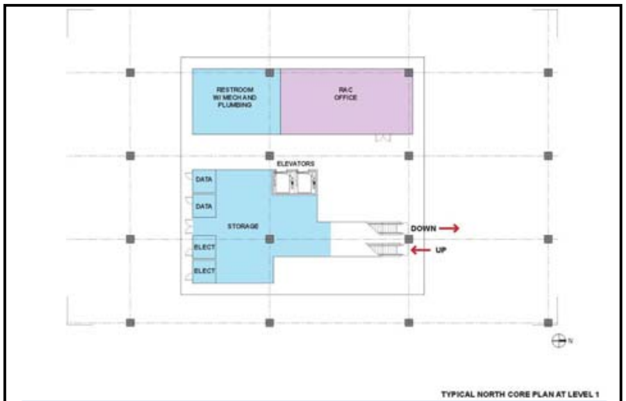
Typical North Core Plan at Level 4



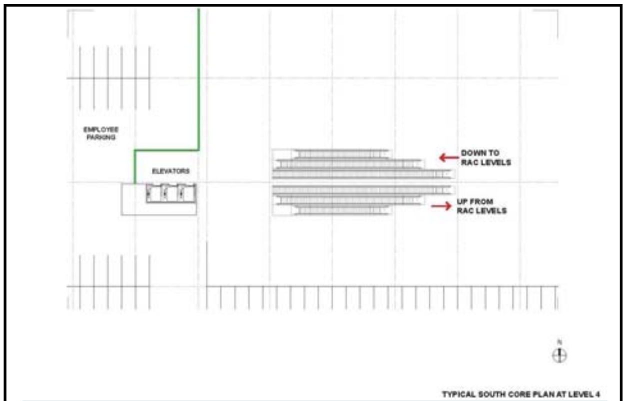
Typical North Core Plan at Level 3



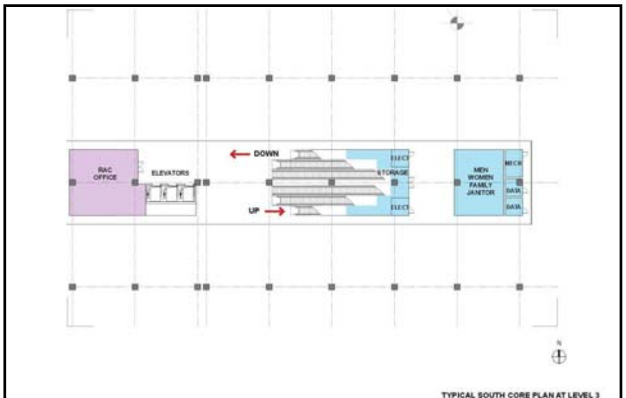
Typical North Core Plan at Level 2



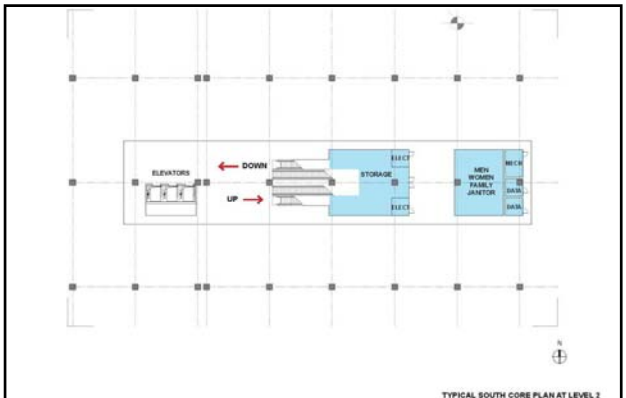
Typical North Core Plan at Level 1



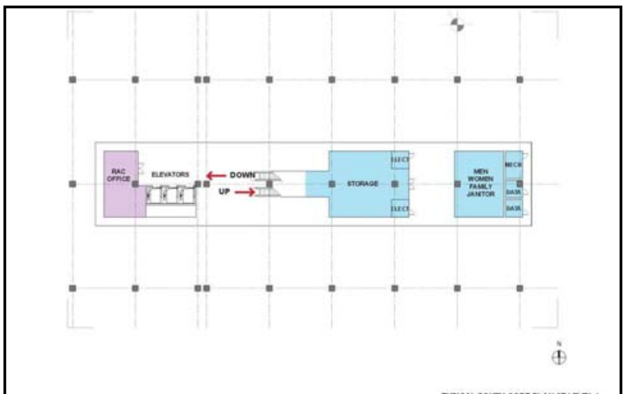
Typical South Core Plan at Level 4



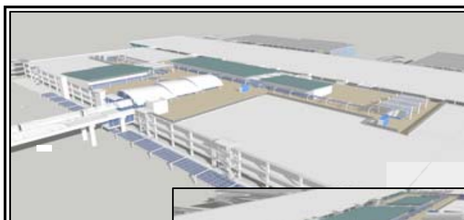
Typical South Core Plan at Level 3



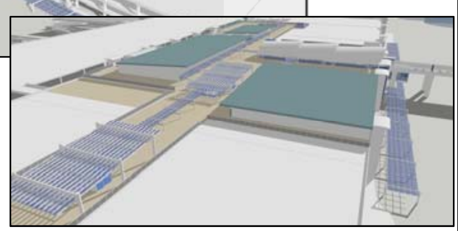
Typical South Core Plan at Level 2



Typical South Core Plan at Level 1

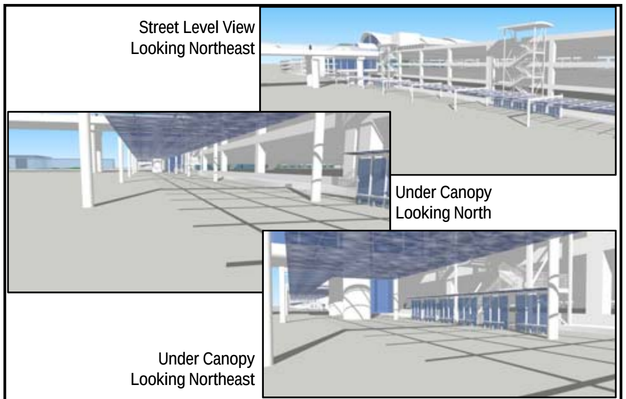


Aerial View from Southwest

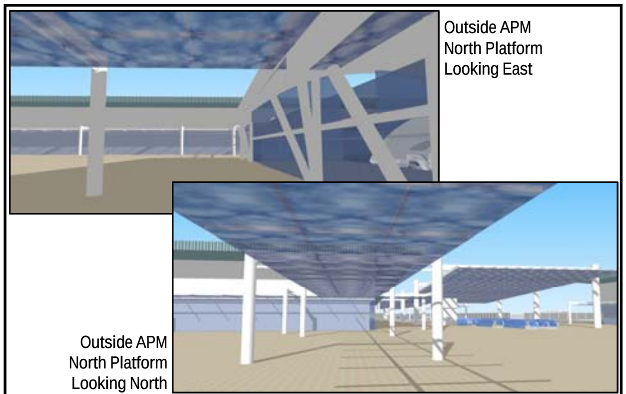


Aerial View from Northwest

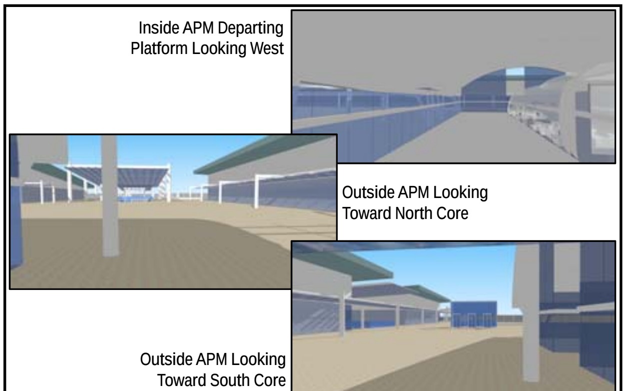
Aerial Views of APM Station and CSB



Views of Bus Plaza



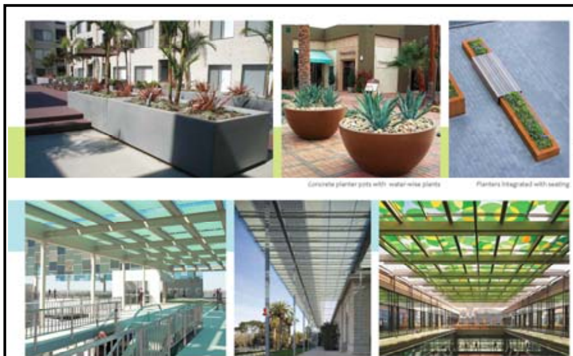
Views of CSB from APM



Views of CSB from APM

Decorative metal screen fencing · Vertical landscape screen with drought tolerant planting · Acoustic barrier louvered screen wall
Enclosed lobby for Automated People Mover · Tunnel enclosure for Automated People Mover · Semi-enclosed shelter for Automated People Mover
Examples of Screens & APM Enclosures

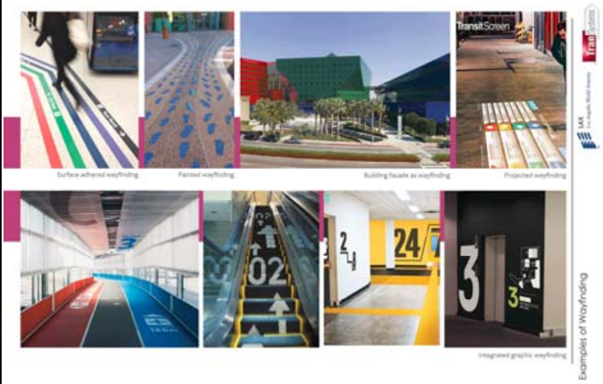
CSB Customer Experience


Concrete planter pots with water-wise plants · Planters integrated with seating
Breezeway canopy with ETFE panels (Ethylene tetrafluoroethylene) · Photovoltaic canopy · Kalwall canopy with graphic
Examples of Canopies and Planters

CSB Customer Experience


Luminous escalator signage · Multi-dimensional signage · Signage family: kiosks, banners, pedestrian signs
Overhead signage · Pylon Signage with landing identification · Pylon Signage
Examples of Wayfinding

CSB Customer Experience



CSB Customer Experience

Purpose and Need for a Dynamic Model of Bus Curb

- Analyze Customer Experience During Peak Volume Hours
- Address the Following Questions in Design:
  - Are There Enough Curb Locations for Buses so They Do Not Have to Wait Before Disembarking?
  - Is the Size and Configuration of the Curbside Area Appropriate?
  - Is There Enough Space so that Passengers Can Move Freely?
  - Is the Configuration of the Elevators Appropriate to Reduce Congestion?
  - Confirm Capacity of Elevators (as Calculated by Independent Elevator Consultant)

Pedestrian Flow Analysis at Bus Curb

Assumptions:

- Passenger Volume at ConRAC Opening in 2023 (8.1 MAP)
  - 21% Growth over 2013
- Peak Hour Assumed at 10.2% of Day
- Business Rentals at 1.5 Passengers per Car
- Leisure Rentals at 2.5 Passengers per Car
- Peak Rental Day = Monday
  - 60% Business, 40% Leisure
  - Peak Rental Hour = 2,470 Rental Passengers, 2,116 Return Passengers
- Peak Return Day = Friday
  - 40% Business, 60% Leisure
  - Peak Return Hour = 2,396 Rental Passengers, 2,840 Return Passengers

Assumptions: Passenger Volume

- Stated Bus Capacity: 30 Passengers
- Modeled Capacity:
  - Maximum of 27 Passengers per Bus
  - Average of 24 Passengers during Peak Hours
- Two Doors
- Average of 5 Seconds per Passenger to Enter or Exit Bus (Exclusive of Queueing Time)
  - Per Observations at PHX ConRAC

Assumptions: Buses

- Twelve Curb Cuts: Four Each for Three Different Routes
  - Curb Cuts Can Be Reassigned to Different Routes if Needed
- Elevators Roughly Centered on Curb Cuts
- Center Set of Four Locations Serves Highest-Volume Route
  - 44% of Total Passengers
  - A Bus Arrives on Average Every 1 Minute 8 Seconds
- Outer Two Sets of Four Locations Each Serve 28% of Passengers
  - A Bus Arrives on Average Every 1 Minute 50 Seconds for Each of the Two Routes

Assumptions: Bus Curb Configuration

- Capacity per Elevator: Average 14 Passengers
  - Maximum 16 Passengers
  - Most Trips Have Fewer Passengers (See Results)
- Travel Time Between Ground Level and Level 4 CSB = 8 Seconds
- Per Elevator Consultant, Average Round Trip = 36.6 Seconds
  - Model Performed Similarly

Assumptions: Elevators

- ➢ Average Passenger Size = 4.5 Square Feet (Includes Luggage)
- ➢ Passenger Walk Speed = Average of 3 mph with a Standard Deviation of 0.57 mph

Source: Seth B. Young, "Evaluation of Pedestrian Walking Speed in Airport Terminals", Transportation Research Record 1674

Assumptions: Passengers

- ➢ How to Determine if a Configuration is Acceptable?
- ➢ Buses:
  - o Buses Do Not Have to Queue Up to Get to a Curb

Analysis Metrics: Buses

- ➢ How to Determine if a Configuration is Acceptable?
- ➢ Pedestrian Areas (Curbside and Elevator Lobbies):
  - o Passenger Density Allows Relatively Unimpeded Flow Throughout (LOS A or B)
  - o Pedestrian Queueing Level of Service (LOS) Standards*:
    - LOS A: Greater than 19.4 Square Feet per Passenger
    - LOS B: Between 16.1 and 19.4 Square Feet per Passenger
    - LOS C: Between 14.0 and 16.1 Square Feet per Passenger
    - LOS D: Between 12.9 and 14.0 Square Feet per Passenger
    - LOS E: Between 11.8 and 12.9 Square Feet per Passenger
    - LOS F: Less than 11.8 Square Feet per Passenger

* LOS Standards Per IATA Airport Development Reference Manual

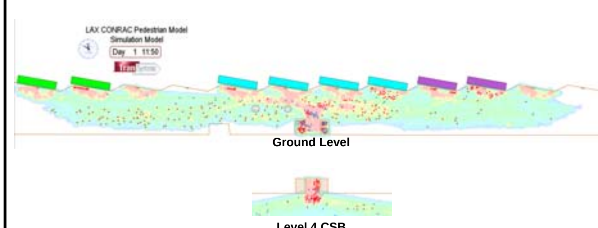
Analysis Metrics: Pedestrian Areas

- ➢ Validate that This Pedestrian Simulation Matches the Analysis by Independent Elevator Consultant
- ➢ Average Elevator Cycle Time
  - o Per Elevator Consultant = 36.6 Seconds

Analysis Metrics: Elevators

- ➢ Average Passenger Wait Time for Elevator
- ➢ Average Return Customer Wait Time for a Bus with Available Capacity
- ➢ Average Total Trip Time, Bus ⇔ Level 4 CSB
  - o Return Customers:
    Walk from Vertical Circulation Core > Walk to Elevator >
    Wait for Elevator > Load, Travel and Exit Elevator > Walk Towards Buses >
    Wait for Available Bus > Walk to Bus > Wait for Unloading to Complete >
    Get in Line > Enter Bus
  - o Rental Customer:
    Wait for Others to Exit Bus > Exit Bus and Gather Group >
    Walk to Elevator > Wait for Elevator > Load, Travel and Exit Elevator >
    Walk Towards CSB

Analysis Metrics: Passenger Experience



- ➢ Red Dots = Return Customers
- ➢ Blue Dots = Rental Customers
- ➢ Shading = Pedestrian Density Over Time

Simulation Image

- Number of Bus Locations Used by Each of the Three Bus Routes:
- √ No Queuing Observed: a Bus Location Was Always Available

	Minimum	Average	Maximum	
Sawtooth Utilization 1 - 4	1	1.9	4	Buses at curb
Sawtooth Utilization 5 - 8	1	3.1	4	Buses at curb
Sawtooth Utilization 9 - 12	1	2.0	3	Buses at curb

Results: Buses

- Average Elevator Cycle Time = 39.8 Seconds
- √ Less than 9% Different Than Predicted by Independent Elevator Consultant

Results: Elevators

- Curbside Areas Consistently at LOS A or B
- Bus Loading Transiently Lower during Loading, as Expected

Results: Pedestrian Areas

- Areas Just Outside the Elevator Lobby are Very Crowded

PEDESTRIAN AREA DENSITY STATISTICS

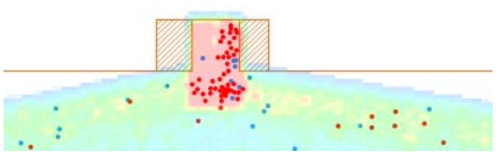
	Avg	Avg + 1 Std Dev	Max	
Upper Elevator Lobby & Outside Area	17.3	14.4	10.7	Sq. Ft. per Passenger
Lower Elevator Lobby & Outside Area	21.1	16.3	10.7	Sq. Ft. per Passenger
Upper Elevator Area Outside Lobby	10.7	8.6	5.4	Sq. Ft. per Passenger
Lower Elevator Area Outside Lobby	14.4	10.6	6.2	Sq. Ft. per Passenger

Pedestrian Queuing LOS (min. ft^2 / passenger)

A	B	C	D	E	F
19.4	16.1	14.0	12.9	11.8	0

Results: Pedestrian Areas

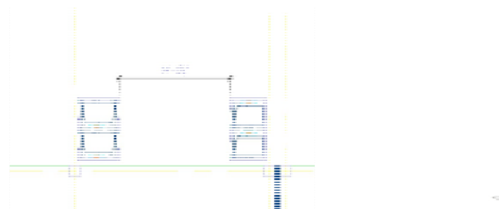
- Return Customers (Red) Waiting for Elevator Frequently Impede Rental Customers (Blue) Leaving the Elevator



Level 4 CSB

Results: Pedestrian Areas

- Move North Bank of Elevators
- ~34' Wide Lobby (vs. Initial ~20' Wide)
- Each Bank of Elevators Operates Independently



Possible Solution: Wider Elevator Lobby

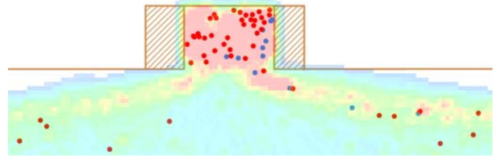
- With Wider Lobby, Maintains at LOS A with Peaks at LOS C

PEDESTRIAN AREA DENSITY STATISTICS				
	Average	Avg + 1 Std Dev	Maximum	
Upper Elevator Lobby	23.8	19.9	15.4	ft^2 per passenger
Lower Elevator Lobby	30.9	23.9	15.8	ft^2 per passenger

Pedestrian Queuing LOS (min. ft^2 / passenger)					
A	B	C	D	E	F
19.4	16.1	14.0	12.9	11.8	0

With Larger Elevator Lobby

- Wider Opening Reduces Conflicts Between Rental Customers and Return Customers



Level 4 CSB

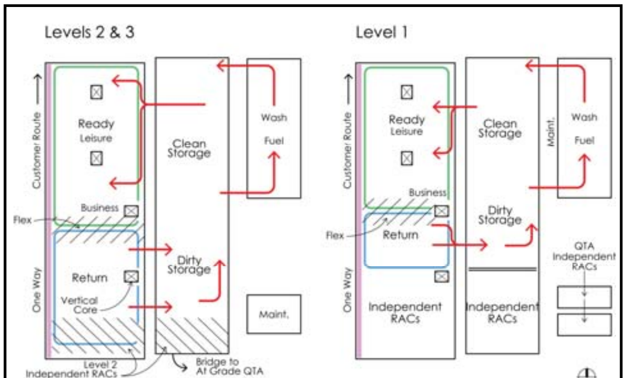
Results: Pedestrian Areas

- Summary

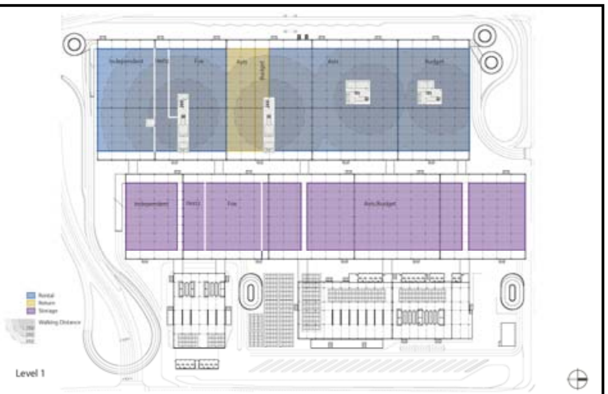
	Minimum	Average	Maximum
Return Customer Trip Time (Minutes)	2.8	7.0	13.9
Rental Customer Trip Time (Minutes)	1.1	2.8	6.0
Passenger Wait Time For Bus (Minutes)	0.1	2.2	6.2
Passenger Wait Time at Level 1 (Seconds)	11.6	28.0	58.6
Passenger Wait Time at Level 4 (Seconds)	16.2	34.2	72.0

* Passenger Wait Time for Bus is Extracted from the Overall Return Customer Trip Time

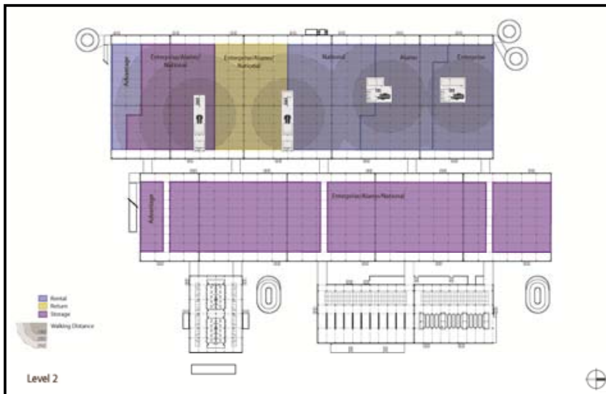
Results: Passenger Experience



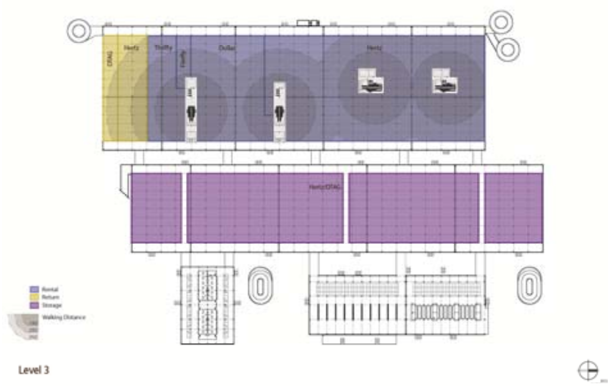
Typical Traffic Circulation



RAC - Level 1 Mock Allocation



RAC - Level 2 Mock Allocation



RAC - Level 3 Mock Allocation

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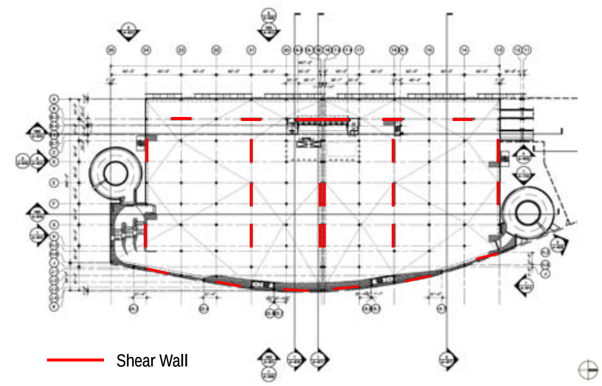
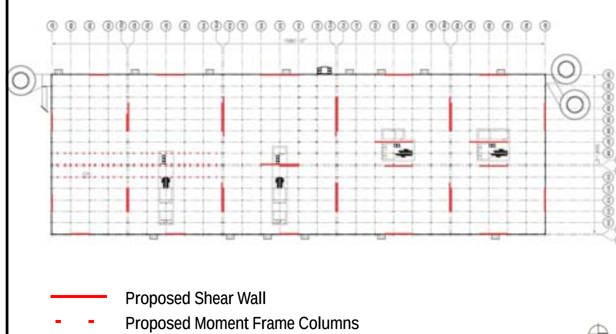


RAC Garage Shear Wall Layout at SJC

Consolidated Rental Car Facility at Los Angeles International Airport

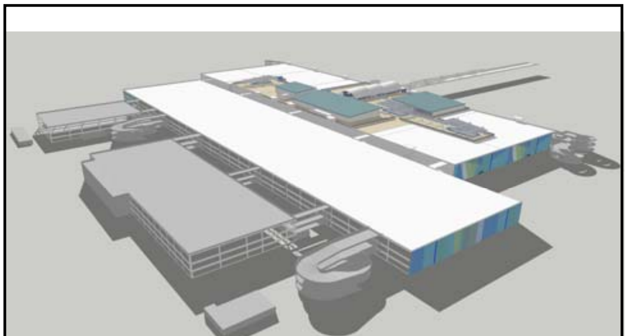
RAC Garage Shear Walls at SJC

Consolidated Rental Car Facility at Los Angeles International Airport



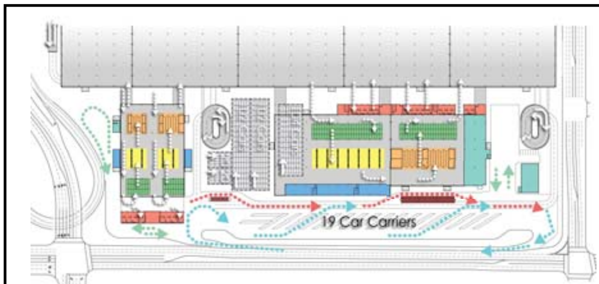
Proposed RAC Garage Shear Wall Layout

Consolidated Rental Car Facility at Los Angeles International Airport



Aerial View of ConRAC from Northeast

Consolidated Rental Car Facility at Los Angeles International Airport



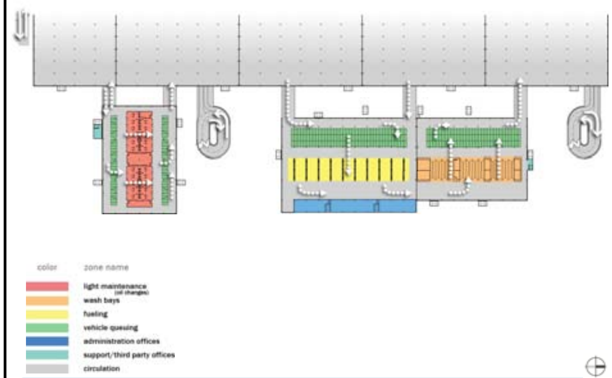
color / zone name
- light maintenance (oil changes)
- wash bays
- fueling
- vehicle queuing
- administration offices
- support/third party offices
- circulation

- Yard Entrance from South End of Site off of La Cienega
- 15-Ft Wide Angled Car Carrier Stalls with Adjacent 8-Ft Wide Staging Lanes
- Yard Exit at North End onto La Cienega
- Auxiliary Lane to Allow for Deceleration/Acceleration

QTA Level 1 and Site Circulation Plan

Consolidated Rental Car Facility at Los Angeles International Airport

QTA Level 2 Plan



QTA Level 3 Plan

Code Review Updates

- Team Discussed Possibility of Accommodating Major Repairs at QTA Maintenance Bays with LA Fire and Building Departments
- Agencies Have Concerns with Classifications of Uses and How Specific Code Requirements Will be Addressed

Heavy Maintenance Bays

Next Steps

- Next RAC Industry Meeting – Tuesday, March 15, 2016 (10:00 AM to Noon)
- Complete QTA 30% Conceptual Design by April 2016

Next Steps

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LAX ConRAC – RAC Industry Meeting

Meeting Date: Tuesday, March 15, 2016, 10:00 am – 11:30 am PDT
Location: LAWA Admin East

Attendees: See Attachment A1 for Attendance Roster

The purpose of the meeting was to review the ConRAC design developments. Copy of the meeting presentation is included as Attachment A2. The items discussed are noted below. Items in **Bold Font** represent action items to which the design team, the RACs or LAWA will respond.

1. Jeff Jarvis (TranSystems) reviewed the agenda items with the group and noted that the design team has provided additional development of the CSB and circulation cores since the last industry meeting. This is a milestone meeting, in that the design team believes that all basic functions of the ConRAC and those elements that affect customer service are in place.
2. Two core configuration schemes were presented. Scheme A includes four full north-south circulation cores (provided with both up and down direct escalators and elevators). Scheme B includes three full north-south circulation cores and an "express" east-west circulation core with down-only direct escalators and elevators at the core closest to the APM platform to accommodate premium customers who will bypass counters and go directly to the ready/return floor. The CSB lobby space is deeper in dimension for Scheme B but the layout and structural design allow for room to grow the CSB space to the east, without impacting other RAC companies, if future market share allocation adjustment is required.
3. The design intent is that the customer will be covered through the entire car rental process. The canopies shown are only intended to represent a possible structure. A key characteristic to be carried into final design is to maintain a light structure to maximize visibility and reduce costs. The APM platform details have not been finalized and will be completed by the APM design team to provide consistency between stations. Screen walls are provided to make the arrival and departure more pleasant experiences.
4. One helix and two direct access ramps at the entry and two helices at the exit are provided for entry and exit to and from the Ready/Return areas, based on the projected traffic volume. Helices run in the counter-clockwise direction.
5. Buttresses located outside of the Ready/Return Building provide shear elements for portions of the building that do not have enclosed areas that can double as shear walls. It would not be feasible, given the large size of the facility, to provide moment frames in lieu of shear walls, as the increased size of the columns would significantly impact operation.
6. The following comments on the two schemes were noted:
    a. The location of Core 2 at Scheme A may obscure the view of the CSB Lobby areas beyond the structure and canopy for the core.
    b. The location of Core 2 at Scheme B may be too close to the APM Platform and might cause confusion for customers who are not familiar with the facility (i.e. customers who need to go to the CSB Lobby may mistakenly take the direct escalators down to the ready/return floor).
    c. A suggestion was made to locate Core 2 two bays to the north and locate Core 1 one bay to the north to create more separation distance while providing the convenience of direct escalators close to the APM platform.

  d. Joe Olivera (Advantage/E-Z) noted that Core 2 allows for separation of business and leisure travelers. Andrew Jaksich (Avis/Budget/Payless/Zipcar) stated that wayfinding and branded signs should be used at this location, to reduce the amount of back tracking required, especially due to the large overall size of the facility. Each direct escalator may service multiple premium service brands.
  e. Updated exhibits showing the revised configuration to Scheme B are included as Attachment A3. ACTION: TranSystems will follow-up with the RAC industry to receive confirmation that the functional layout with work with their anticipated operation.

7. The design team has provided further analysis of the circulation core connecting the shuttle bus plaza (which serves the interim bus operation until APM is in use) to the CSB on Level 4. At the previous meeting, four 5,000-lb elevators were presented. Upon further review by the design team's vertical transportation consultant, the recommendation is for five to six 5,000-lb elevators. Three options for arranging the elevator layout were presented:
   a. Option 1 includes two groups of three elevators facing each other within a common elevator lobby.
   b. Option 2 includes a group of five elevators in a row with front and rear access doors.
   c. Option 3 includes two groups of three elevators in a row with front and rear access doors (with the two groups separated by 62 feet of clear distance).

   Option 1 is preferred by the group as the layout appears to provide the best access and visibility of all elevators. Additional luggage, with a larger number of international travelers, has been considered in the analysis.
8. Typical ready/return level plans around the circulation cores were presented. Plans and renderings were provided to illustrate openings in the decks for light wells to let in natural light and ventilation to the lower levels. Anticipated areas where RAC customer booths and back offices were also shown in the exhibits. The following comments were received:
   a. Mr. Jaksich noted that because of the large size of the facility and the walking distance from one core to another, more administrative spaces on the ready/return floor should be allocated at this facility. This will allow for improved management of employees. Mr. Jarvis noted that with Avis/Budget being located on Level 1, there is more opportunity for administrative spaces to be located at the base of the circulation core openings.
   b. Mr. Jaksich indicated that providing a shell space with base building (including infrastructure and ready for tenant improvement) is preferred over prefabricated booths.
9. Rosa Doran (RAW International) provided an overview of wayfinding strategies that are possible at the vertical circulation cores, which include branding on floor signs and multiple layers of signage to guide people.
10. The design team has explored including interior stairs to the vertical circulation cores. John Vermeersch (Hertz/DTAG) noted that this would be useful for employee use and for some customers who are in a hurry or do not have a lot of bags. On the other hand, Mr. Jaksich noted that this might not be useful for his customers due to the anticipated Level 1 location. Updated exhibits (included as Attachment A3) show interior stairs at two of the circulation cores closest to the CSB Lobbies. The stairs are designed to accommodate two-way traffic (approximately 6 feet wide).

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11. The design team presented a plan showing the expected route of emergency vehicles, which would travel along the open space between buildings. The open space would also be an ideal location for underground utilities.
12. Plans illustrating security perimeter for between RAC brand families/companies on Levels 1 and 2 were presented. A Level 3 Security Plan was not shown as the entire floor is assumed to be dedicated to a single brand family. The QTA service agent helices are considered public areas, as secured access will be provided at the bridge connecting the Idle Storage floor.
13. The QTA service yard and typical floor plans were presented. Locations of the car carrier staging and fuel tanks have been refined. It was suggested that space for an 8' x 8' security booth outside of each brand family's car corral area shall be provided.
14. Illustrations showing the typical travel path of a tow truck passing and hooking to a stalled vehicle within the two-way service helix and the one-way customer entrance or exit helix were presented. The design team will continue to refine the design development and layout of the helices.
15. The anticipated ConRAC procurement timeline was discussed. Pat Tomcheck (LAWA) noted that the EIR process is ongoing. LAWA Environmental Team is working with Los Angeles Unified School District, to narrow options on new facilities for relocation of the existing school currently located within Manchester Square, as well as with owners of remaining properties.
16. Mr. Tomcheck noted that the procurement schedule for the APM package is approximately six months ahead of the ConRAC procurement process. It is believed that construction of the APM will take at most two years longer than the ConRAC.
17. The program document that TranSystems is providing will include reference to the concept design guidelines, created by LAWA at the Tom Bradley International Terminal, a clear height below the APM to match the height of the other levels, light levels, with 10 footcandles at the Ready/Return area, and information on building systems. It will be submitted to LAWA in April, with industry review in May.
18. The next in-person meeting with the RAC industry is tentatively scheduled for Tuesday, May 17, 2016. Invitation will be sent out to RAC industry representatives once meeting date and time is confirmed.

These minutes have been prepared by David Lee of TranSystems (dklee@transystems.com). Please let the preparer know of any additions or corrections to the notes within 5 business days of issuance.

Attachments:

A1: Attendance Roster (1 page)

A2: Meeting Presentation (28 pages)

A3: Updated CSB Layout and Views (7 pages)

LAX
Los Angeles World Airports

Tran Systems

MEETING SIGN-IN SHEET

Project	ConRAC Programming and Planning	Date:	March 15, 2016
	Los Angeles International Airport	Time:	10:00 am – 12:00 pm
Re::	RAC Industry Meeting	Location:	LAWA Admin Building East, LA NEXT Conference Room

Name	Representing	Telephone Number	Email Address	
Andrew Jaksich	Avis Budget Grp	650-616-0145	Andrew.Jaksich@AvisBudget.com	
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Doug Steen	TranSystems	201 681 1300	dasteen@transystems.com	
Jeff Jarvis	Tran Systems	602 576 1733	jqjarvis@transystems.com	
Kathy Van Ness	LAWA	424-646-7343	kvanness@lawa.org	
Patrick Tomcheck	LAWA Planning	424-646-5192	ptomcheck@lawa.org	
Fatima Hashim	LAWA - Planning	424-646-5173	fhashim@gmail.com	
Steven Lott	RAW Int'l	213-622-4993	SLOTT@RAWINTERNATIONAL.COM	
Rosa Doran	RAW Int'l	213 622 4993	RDORAN@RAWINTERNATIONAL.COM	
David Lee	TranSystems	510-835-9916	dklee@transystems.com	
Cynthia Guidry	LAWA	424-646-7690	cguidry@lawa.org	
Joe Olivera	Advantage			By Phone
Bill Bettison, Matt Wiegand, Neil Moody, Robert Hunsinger, Scott Goldstein, EHI				By Phone
Connie Gurich	Hertz			By Phone
Jorge Arevalo	Midway			By Phone
Mick Erlandson	Sixt			By Phone
Robert Burlingham	LAWA			By Phone
Chuck Rowe, Justin Neel	TranSystems			By Phone
RB Laurence, Neil MacAloney	Stantec			By Phone

Los Angeles International Airport
Consolidated Rental Car Facility

RENTAL CAR INDUSTRY MEETING

MARCH 15, 2016

LAX Los Angeles World Airports

TranSystems

Agenda – March 15, 2016

1. RAC Level 4 / CSB Concept
2. Circulation Core Configurations
3. RAC Garage Layout
4. Site Emergency Access Plan
5. Service Yard and QTA Configurations
6. Helix Design Studies
7. DBFOM Procurement Timeline / Next Steps

RAC Industry Meeting

Consolidated Rental Car Facility at Los Angeles International Airport

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Top Functional Values (Facility Design Criteria)

1. Customer Service
2. Operational Efficiencies
3. Efficient Use of Money
4. Flexibility
5. Level Competitive Playing Field
6. Safety and Security

Functional Values

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Component	Program	Provided
Ready/Return Area (RAC) (area where customers pick-up and return vehicles)	7,600 rental equivalent stalls	7,600 rental equivalent stalls
Quick-Turnaround Area (QTA) (facilities for multi-level fueling, wash and vehicle maintenance)	704 staging positions 180 fuel nozzles 37 wash bays 64 maintenance bays	704 staging positions 186 fuel nozzles 37 wash bays 64 maintenance bays
QTA Support and Additional Site Functions (fuel storage and distribution; supervisor and vendor parking; car carrier delivery; vehicle staging corrals; loading docks/service yard)	20 car carrier staging positions	19 car carrier staging positions
Customer Service Building (CSB) ("mini-mall" lobby with customer service counters, restrooms, retail amenities and other functions connected to the APM station via an open courtyard and to the Ready/Return area via vertical cores with escalators and elevators)	90,000 to 115,000 square feet 4 vertical cores	100,000 square feet 4 vertical cores
Automated People Mover Station (APM) (provides customers with convenient connection to the Central Terminal Area with separate platforms for unloading and loading customers)		
Bus Plaza (for shuttle bus operations for a potential interim shuttle bus operation and for off-airport rental car companies)	12 bus bays Vertical core connected to the CSB	12 bus bays Vertical core connected to the CSB
Idle Storage (for overflow vehicles to meet peak demand)	10,000 stalls	10,600 stalls
Employee and Visitor's Parking (for personal vehicle parking)	1,100 employee stalls 100 visitor stalls	1,100 employee stalls 100 visitor stalls

Program Requirements

Consolidated Rental Car Facility at Los Angeles International Airport

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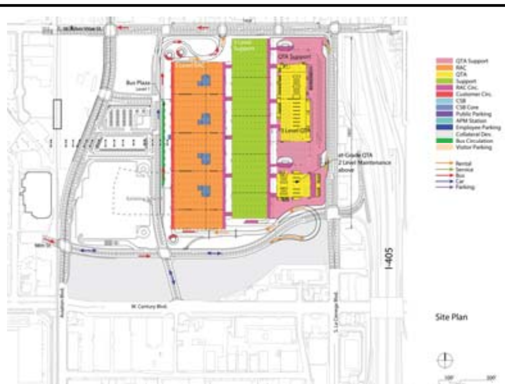

ConRAC – Site Plan

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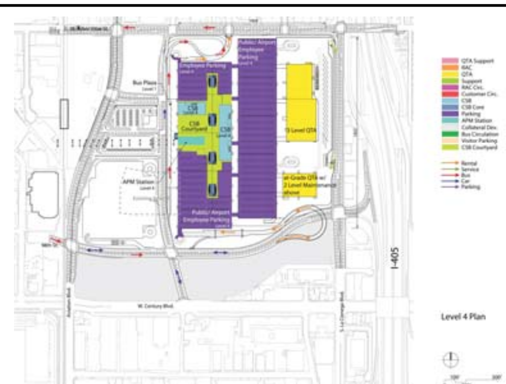

ConRAC – Level 4 Plan

Consolidated Rental Car Facility at Los Angeles International Airport

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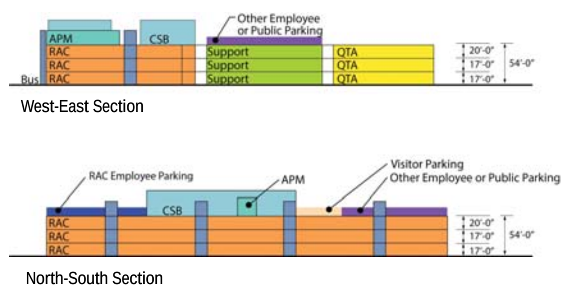
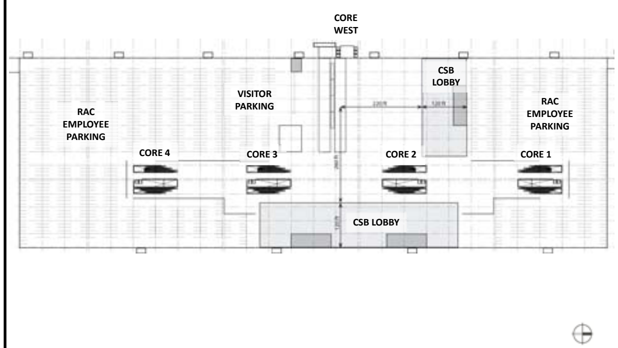
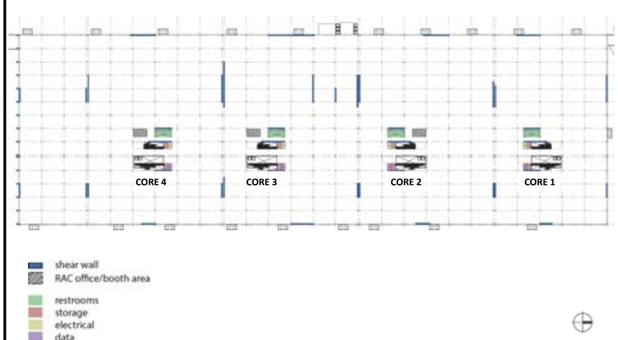


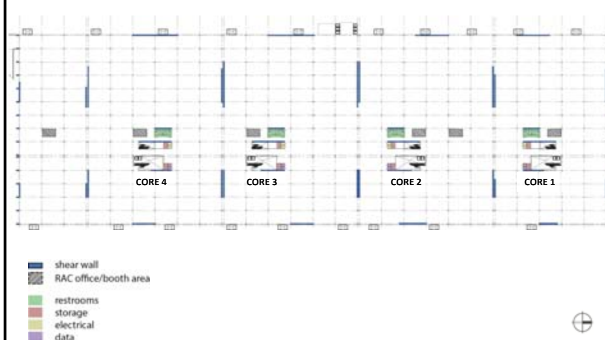
ConRAC – Typical Building Sections



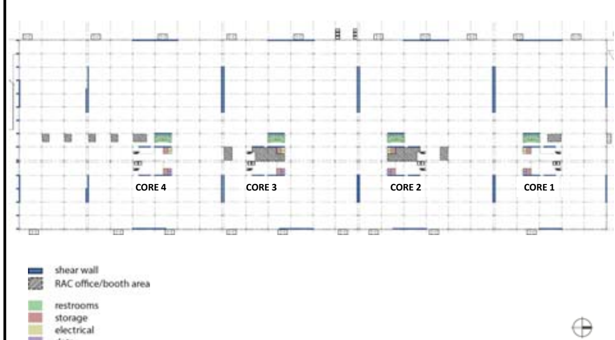
RAC Level 4 – Overall Plan (Scheme A)



RAC Level 3 – Overall Plan (Scheme A)



RAC Level 2 – Overall Plan (Scheme A)

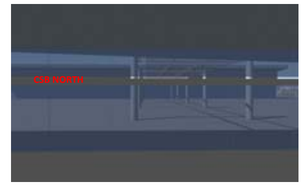


RAC Level 1 – Overall Plan (Scheme A)

View of CSB from APM (Scheme A)

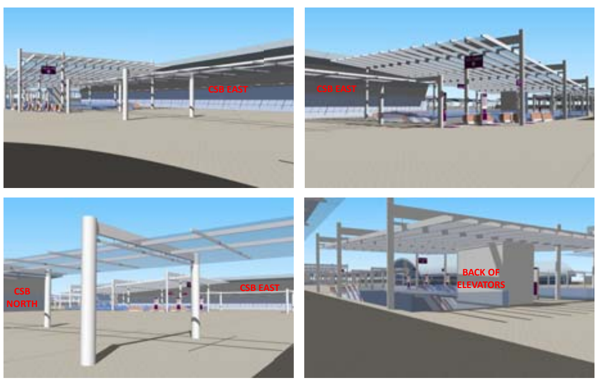
Scheme A Level 4 Aerial View

View from West Core Elevators

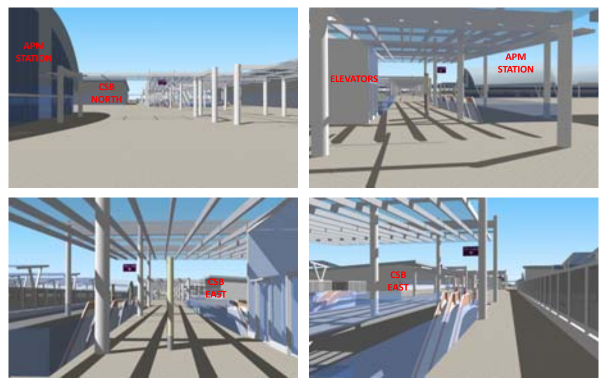


View from Inside APM Station Platform

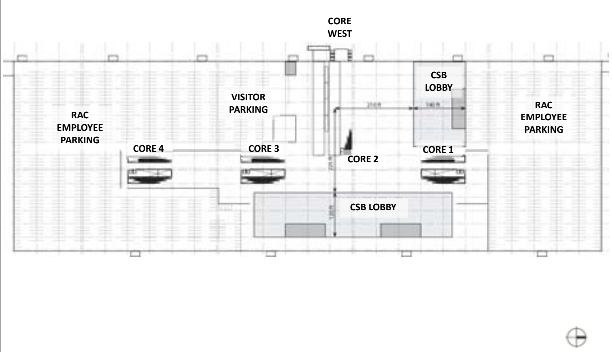
Scheme A - Arrival Views



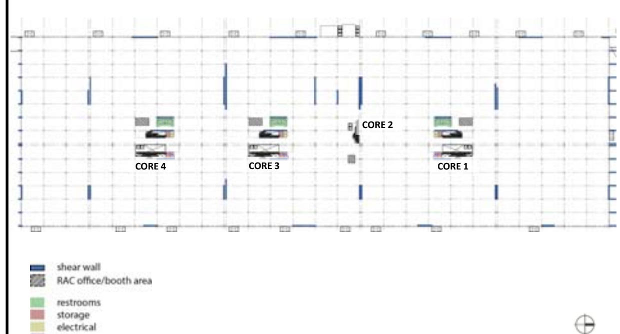
Scheme A – Circulation Core Views



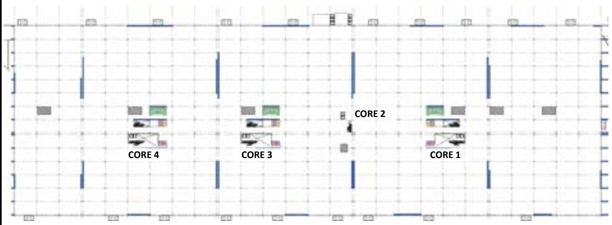
Scheme A – Circulation Core Views



RAC Level 4 – Floor Plan (Scheme B)

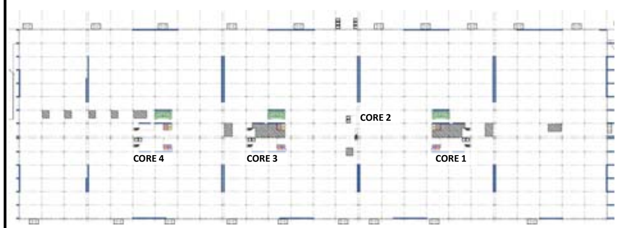


RAC Level 3 – Floor Plan (Scheme B)



shear wall
RAC office/booth area
restrooms
storage
electrical
data

RAC Level 2 – Floor Plan (Scheme B)



shear wall
RAC office/booth area
restrooms
storage
electrical
data

RAC Level 1 – Floor Plan (Scheme B)

View of CSB from APM (Scheme B)

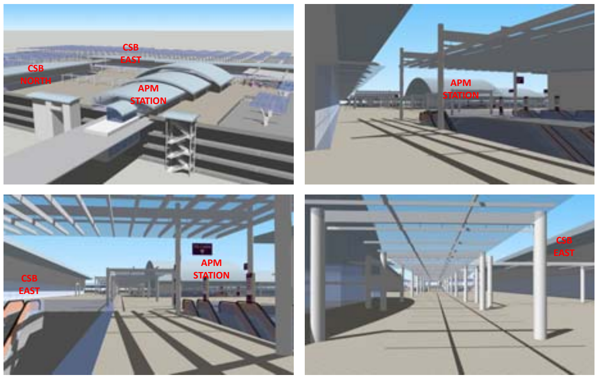
Scheme B Level 4 Aerial View

View from West Core Elevators

View from Inside APM Station Platform

Scheme B - Arrival Views

Scheme A – Circulation Core Views



Scheme B – Circulation Core Views

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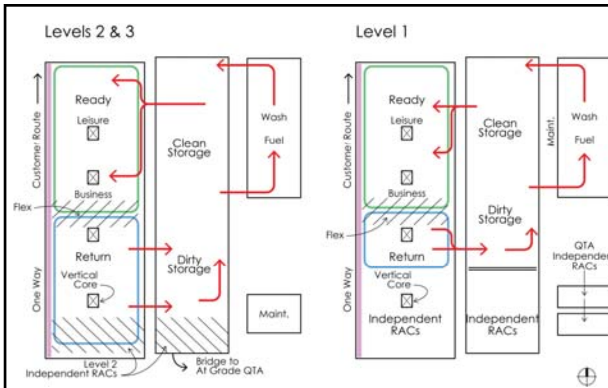
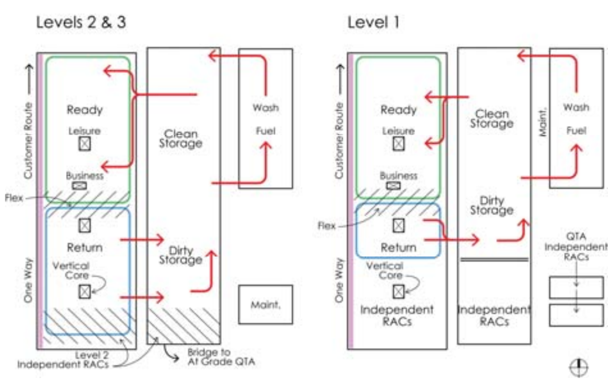


Typical Traffic Circulation (Scheme A)

LAX Los Angeles World Airports
TranSystems



Typical Traffic Circulation (Scheme B)

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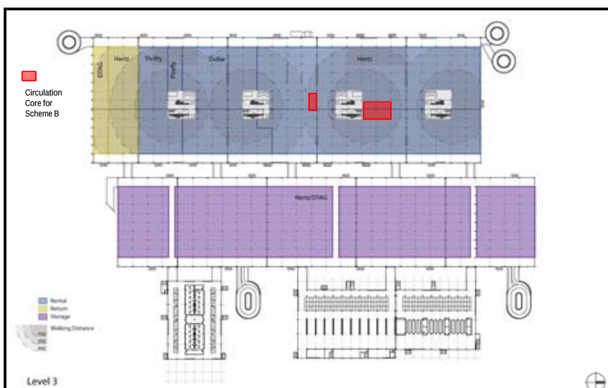
RAC - Level 1 Mock Allocation (Sch. A)

LAX Los Angeles World Airports
TranSystems

RAC - Level 2 Mock Allocation (Sch. A)

LAX Los Angeles World Airports
TranSystems



RAC - Level 3 Mock Allocation (Sch. A)

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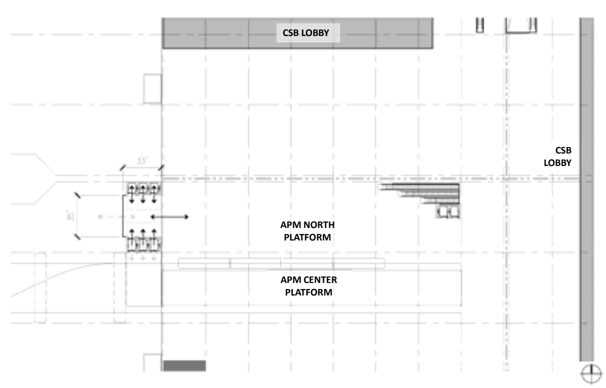
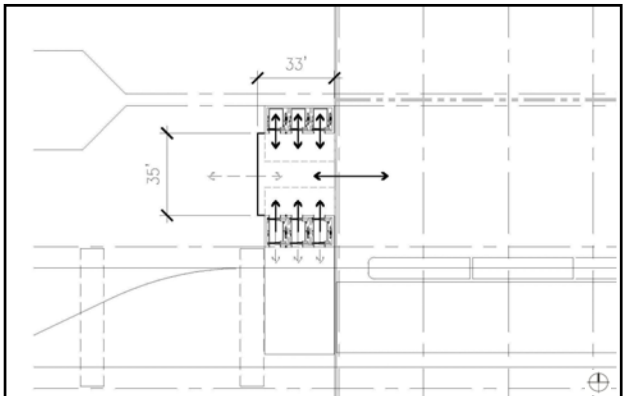
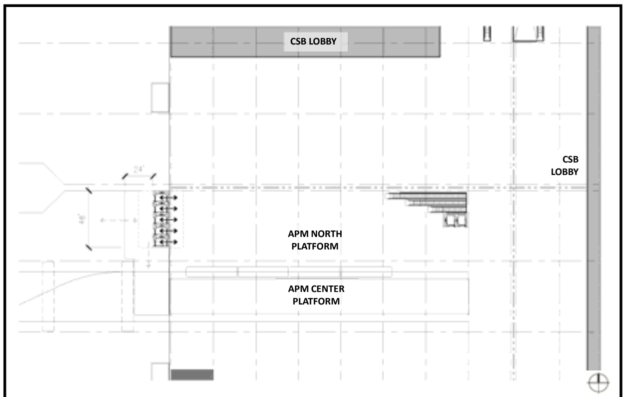
TranSystems



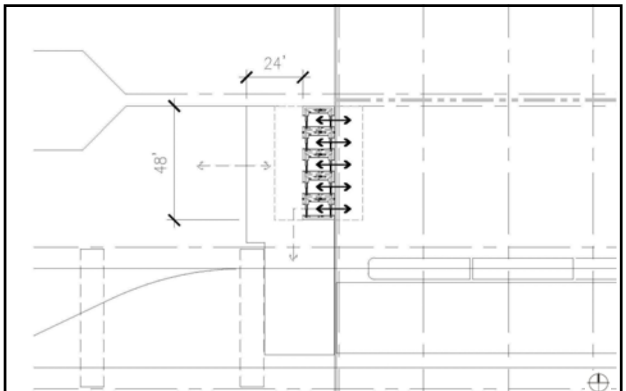
Core West Plan – Option 1



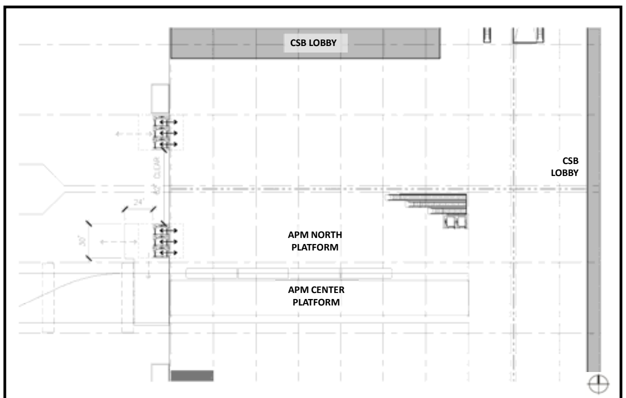
Enlarged Core West Plan – Option 1



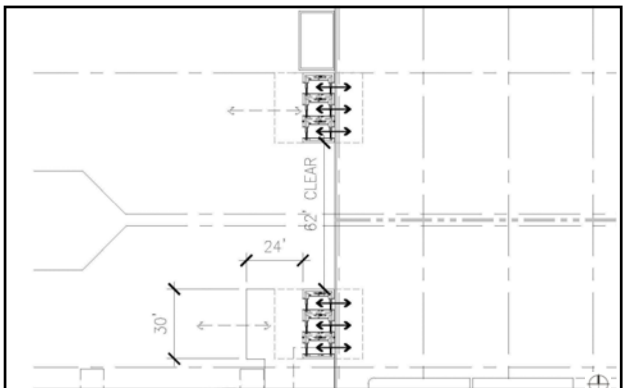
Core West Plan – Option 2



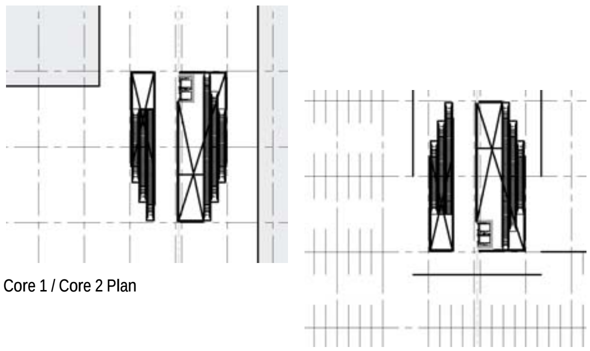
Enlarged Core West Plan – Option 2



Core West Plan – Option 3



Enlarged Core West Plan – Option 3



Core 1 / Core 2 Plan

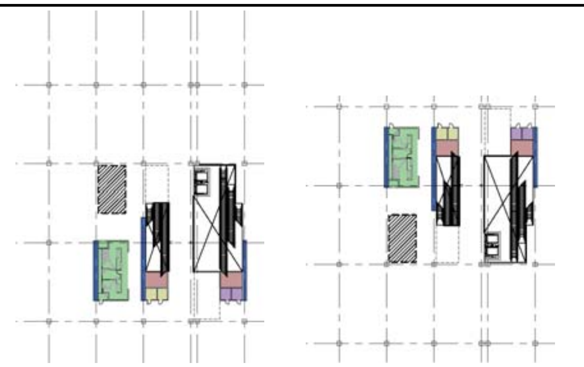
Core 3 / Core 4 Plan

Enlarged Core Plans – Level 4 (Scheme A)

LAX Los Angeles World Airports

Consolidated Rental Car Facility at Los Angeles International Airport

TranSystems 37



Core 1 / Core 2 Plan

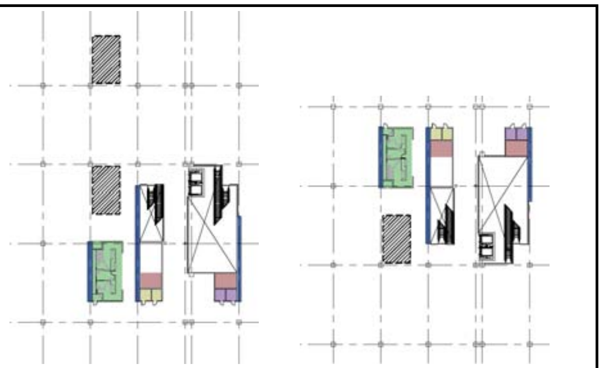
Core 3 / Core 4 Plan

Enlarged Core Plans – Level 3 (Scheme A)

LAX Los Angeles World Airports

Consolidated Rental Car Facility at Los Angeles International Airport

TranSystems 38



Core 1 / Core 2 Plan

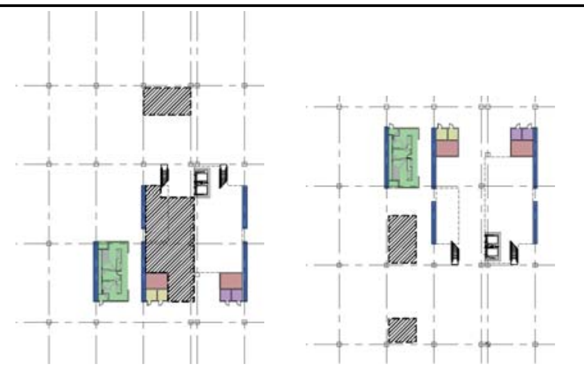
Core 3 / Core 4 Plan

Enlarged Core Plans – Level 2 (Scheme A)

LAX Los Angeles World Airports

Consolidated Rental Car Facility at Los Angeles International Airport

TranSystems 39



Core 1 / Core 2 Plan

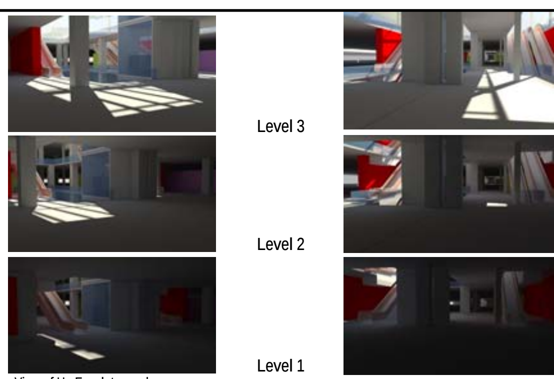
Core 3 / Core 4 Plan

Enlarged Core Plans – Level 1 (Scheme A)

LAX Los Angeles World Airports

Consolidated Rental Car Facility at Los Angeles International Airport

TranSystems 40



View of Up Escalator and Back of Elevators

View Under Pedestrian Bridge

Cores – Natural Light Study

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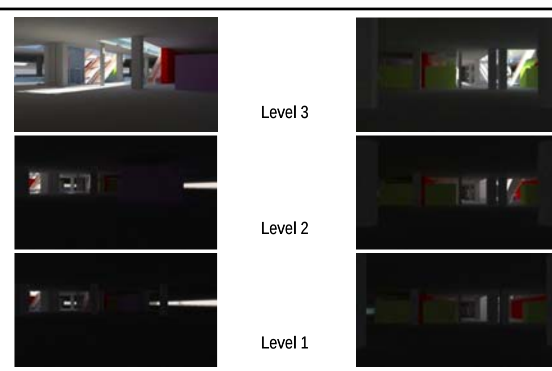
Consolidated Rental Car Facility at Los Angeles International Airport

TranSystems 41



View of Down Escalators and Front of Elevators

View from South (Opposite of Escalator Landings)

Cores – Natural Light Study

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Consolidated Rental Car Facility at Los Angeles International Airport

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Aerial View of Level 4

Cores with Signage and Planter

Consolidated Rental Car Facility at Los Angeles International Airport

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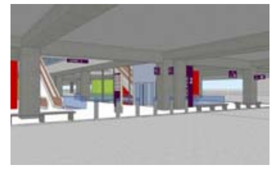
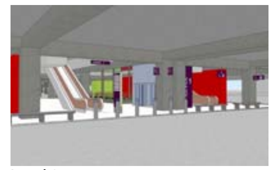
Level 4



Level 2

Level 3



Level 1

Cores with Signage and Planter

Consolidated Rental Car Facility at Los Angeles International Airport

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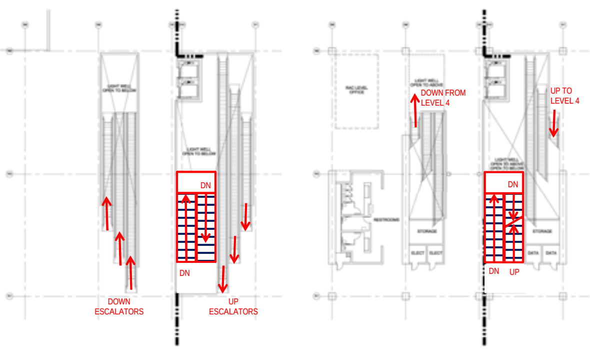


Core 2 Level 4 Plan

Core 2 Level 3 Plan

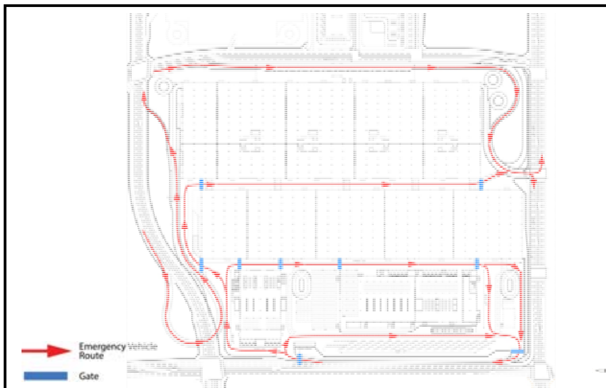
Cores – Interior Stair Study

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

TranSystems

45



Emergency Access Plan – Overall Site

Consolidated Rental Car Facility at Los Angeles International Airport

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Security Plan – Level 1

Consolidated Rental Car Facility at Los Angeles International Airport

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Security Plan – Level 2

Consolidated Rental Car Facility at Los Angeles International Airport

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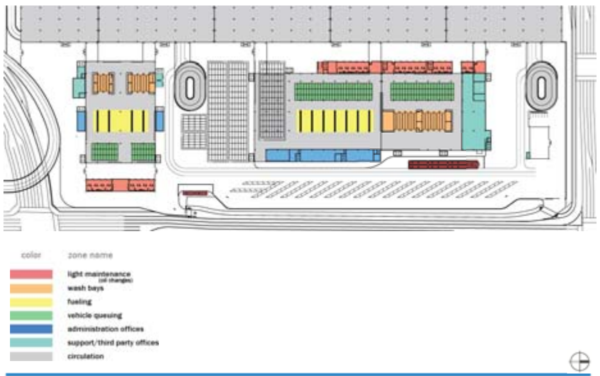
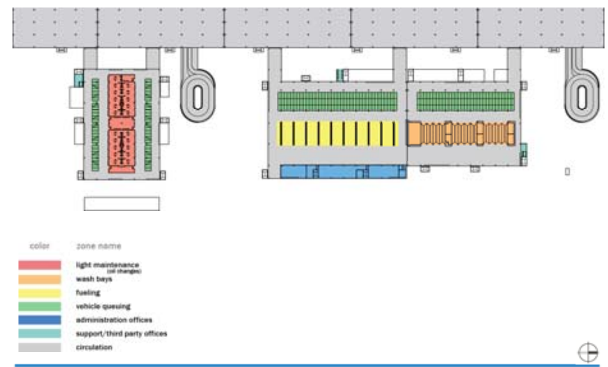
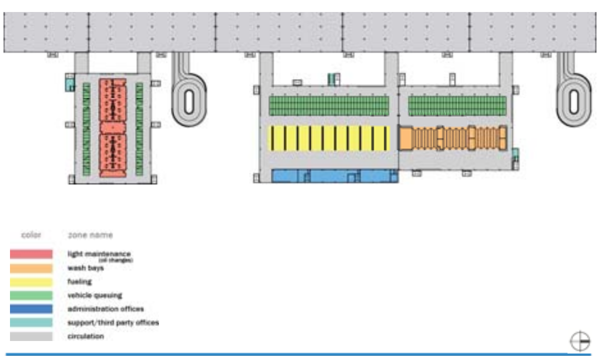


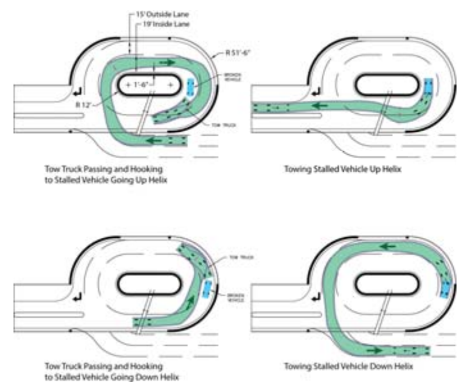
QTA Level 1 and Service Yard Plan



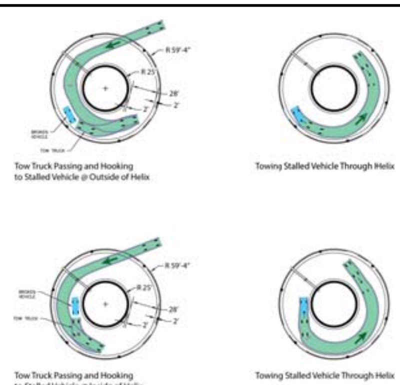
QTA Level 2 Plan



QTA Level 3 Plan



Helix Study – Two-Way Service Agent



Helix Study – Ready/Return

LAWA's DBFOM Procurement Timeline

- Release RFQ to Industry – 3rd Quarter of 2016
- Rental Car Agreement – 4th Quarter of 2016
- Release RFP to Shortlisted Firms – 2nd Quarter of 2017
- Proposals Due – 3rd Quarter of 2017
- Board Approval and Award – 4th Quarter of 2017

DBFOM Procurement Timeline

Next Steps

- Complete ConRAC Refinement and QTA 30% Conceptual Design by end of April
- Next RAC Industry Meeting – Tuesday, May 17th (10:00 AM to Noon)

Next Steps

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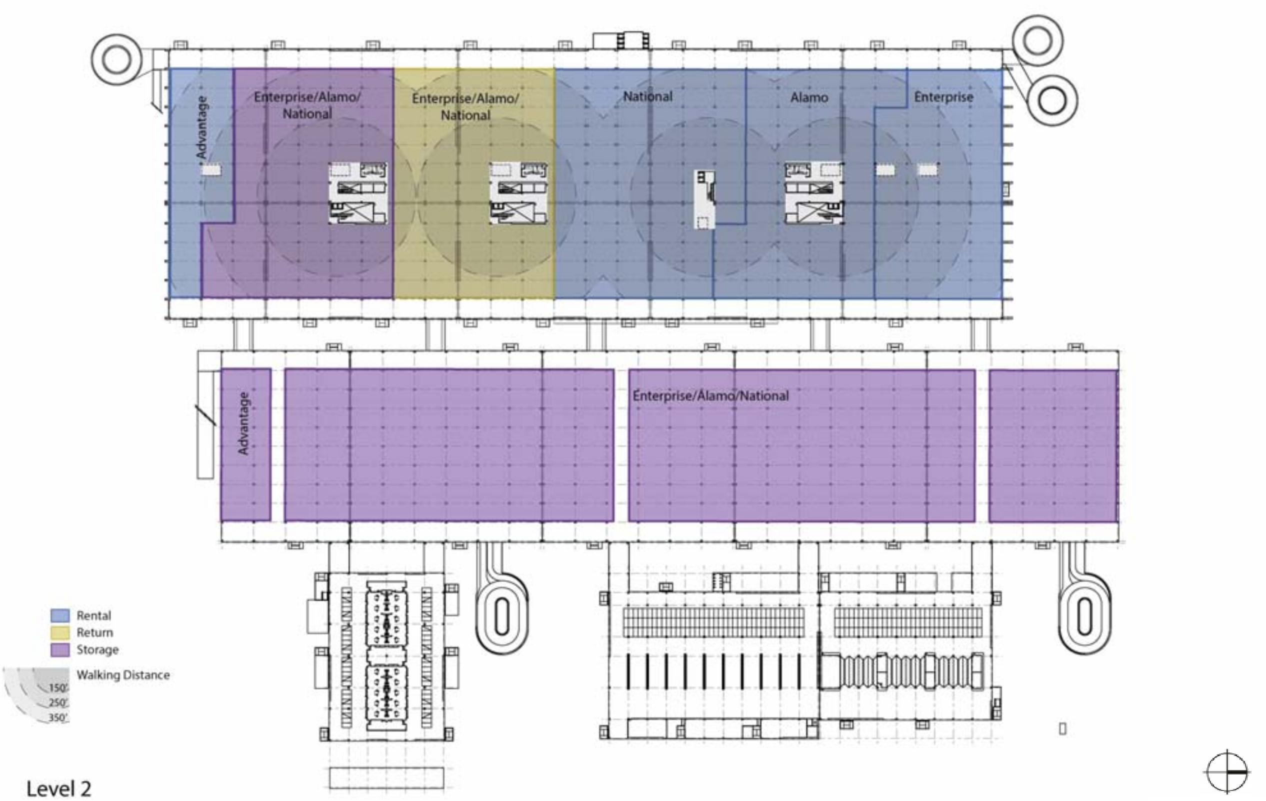
Los Angeles World Airports

TranSystems

March 21, 2016

RAC – Level 1 Mock Allocation

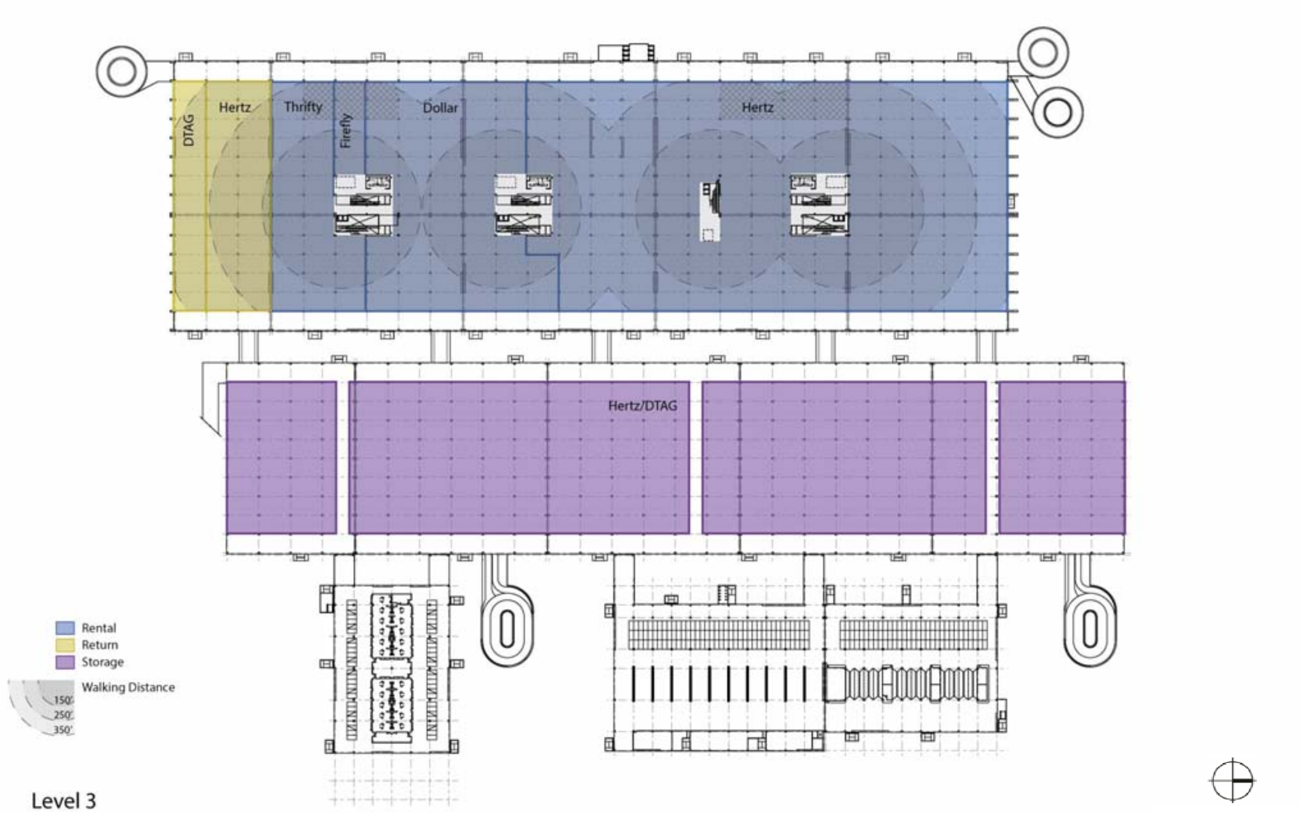
LAX
Los Angeles World Airports
TranSystems



March 21, 2016

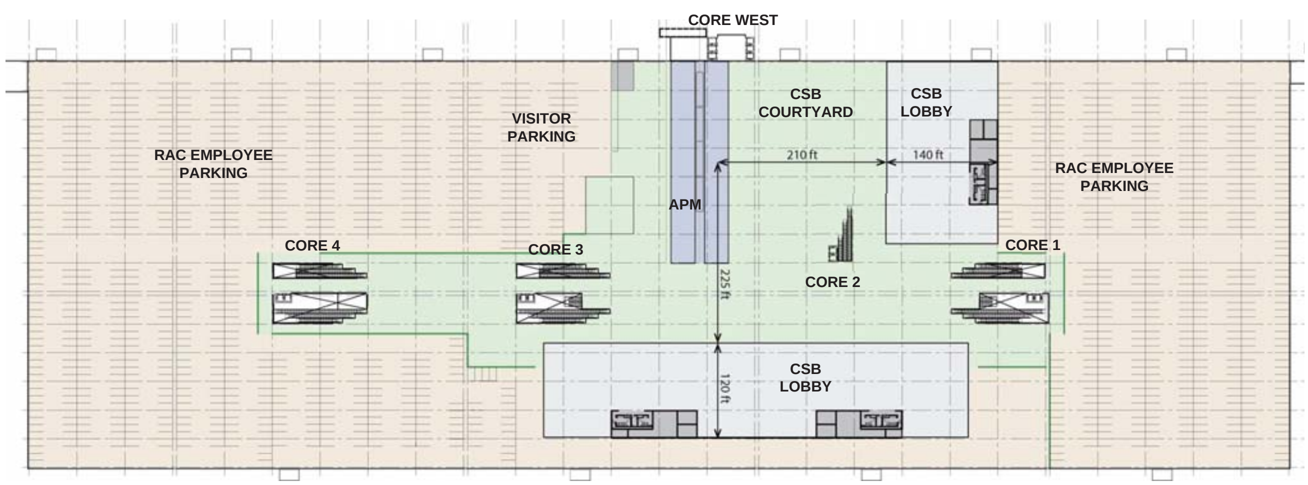
RAC – Level 2 Mock Allocation

LAX
Los Angeles World Airports
TranSystems



March 21, 2016

RAC – Level 3 Mock Allocation



March 21, 2016

CSB – Level 4 Plan

March 21, 2016

CSB – Level 4 Aerial View

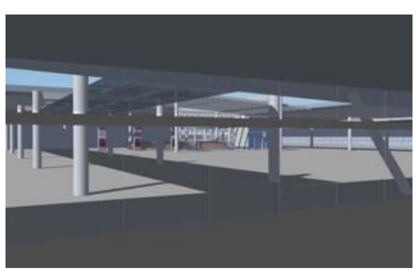
Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

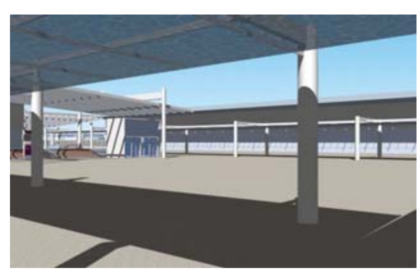
TranSystems

From West Elevators to Core 2 and CSB East

From APM Platform Looking North



From APM Platform Looking Northeast



From APM Platform Looking East

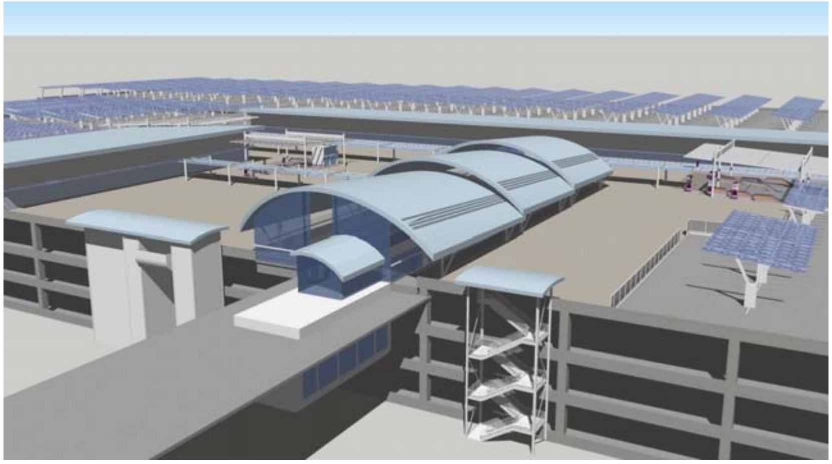
March 21, 2016

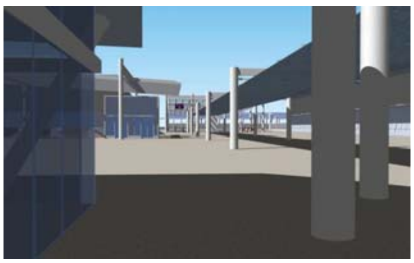
CSB Level 4 – Arrival Views

Consolidated Rental Car Facility at Los Angeles International Airport

LAX Los Angeles World Airports

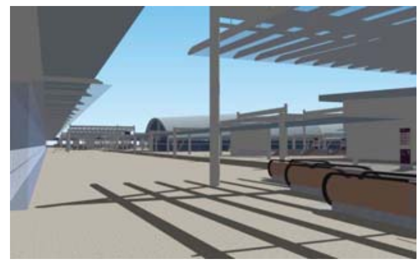
TranSystems





From End of APM Platform Looking North

From CSB North Looking Southeast



From CSB East Looking Southwest

March 21, 2016

CSB Level 4 – Circulation Core Views

Appendix 8.1 Sustainability Approach Checklist

Appendix 8.1 Sustainability Approach Checklist

The project is located in the City of Los Angeles. The prevailing green code is 2014 L.A. Amendment Green Building Code. (Article 9, Chapter IX of LA Municipal Code, amended by Ordinance No. 182849). This is an amendment of the 2013 California Green Building Standards Code ("CalGreen"). Note that the Amendment is not a conformed version; it does not contain all un-amended portions of the Cal Green code. So in order to see the full picture one must review both.

The LA Amendment Green Building Code requires certain mandatory measures for non-residential buildings (Division 5 in LA Green Code, Chapter 5 in Cal Green code). In addition, the LA Green Code contains two sets of Nonresidential Voluntary Measures (Division 12, Appendix A5 of LA Green Code, and Appendix A5 in CalGreen code); Tier 1 and Tier 2. The checklist below shows a list of measures for the project (in green) which reach Tier 2 status.

"Status" column below indicates whether the design team estimates that a given measure will be readily achieved (green) very difficult, impossible to achieve (red), or presents some difficulty or requires some cost/benefit decision or further analysis (yellow).

"Comments" column below includes additional background or further action required for this measure.

KEY:		
	X = mandatory for that level	YES: this measure to be included in project
	measures we propose to undertake	MAYBE: under review/presents some difficulty
		NO: Very difficult/impossible or not applicable
		NA: MANDATORY, BUT NOT APPLICABLE

CHECKLIST	MANDATORY	VOLUNTARY		STATUS	COMMENTS
		CalGreen Tier 1	CalGreen Tier 2		
Requirements					
Project meets all of the requirements of Divisions 5.1 through 5.5.	X	___	___	YES	
Planning and Design					
Site Selection					
A5.103.1 Community connectivity. Locate project on a previously developed site within a 1/2 mile radius of at least ten basic services, listed in Section A5.103.1.		1	1	YES	
A5.103.2 Brownfield or greyfield site redevelopment or infill area development. Select for development a brownfield in accordance with Section A5.103.2.1 or on a greyfield or infill site as defined in Section A5.102.		1	1	YES	
A5.103.2.1 Brownfield redevelopment. Develop a site documented as contaminated and fully remediated or on a site defined as a brownfield.		___	___	NO	
Site Preservation					
A5.104.1.1 Local zoning requirement in place. Exceed the zoning's open space requirement for vegetated open space on the site by 25%		___	___	NO	
A5.104.1.2 No local zoning requirement in place. Provide vegetated open space area adjacent to the building equal to the building footprint area.		___	___	NO	
A5.104.1.3 No open space required in zoning ordinance. Provide vegetated open space equal to 20% of the total project site area.		___	___	NO	
Deconstruction and Reuse of Existing Structures					
A5.105.1.1 Existing building structure. Maintain at least 75% of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing) based on surface area. Exceptions: 1. Window assemblies and nonstructural roofing material. 2. Hazardous materials that are remediated as a part of the project. 3. A project with an addition of more than two times the square footage of the existing building.		no	no	NO	

A5.105.1.2 Existing nonstructural elements. Reuse existing interior nonstructural elements (interior walls, doors, floor coverings and ceiling systems) in at least 50% of the area of the completed building (including additions).		no	no	NO	
A5.105.1.3 Salvage. Salvage additional items in good condition such as light fixtures, plumbing fixtures and doors for reuse on this project in an onsite storage area or for salvage in dedicated collection bins. Document the weight or number of the items salvaged.		no	no	NO	
Site Development					
5.106.1 Storm water pollution prevention. Newly constructed projects which disturb land shall prevent the pollution of stormwater runoff from the construction activities through best management practices (BMP) in Section 5.106.1.2	X			YES	
A5.106.2 Storm water design. Design storm water runoff rate and quantity in conformance with Section A5.106.3.1 and storm water runoff quality by Section A5.106.3.2 or by local requirements, whichever are stricter. A5.106.2.1 Storm water runoff rate and quantity. Implement a storm water management plan resulting in no net increase in rate and quantity of storm water runoff from existing to developed conditions. Exception: If the site is already greater than 50% impervious, implement a storm water management plan resulting in a 25% decrease in rate and quantity.		1	1	YES	
A5.106.2.2 Storm water runoff quality. Use post construction treatment control best management practices (BMPs) to mitigate (infiltrate, filter or treat) storm water runoff from the 85th percentile 24-hour runoff event (for volume-based BMPs) or the runoff produced by a rain event equal to two times the 85th percentile hourly intensity (for flow-based BMPs).		1	1	YES	
A5.106.3 Low impact development (LID). Reduce peak runoff in compliance with Section 5.106.3.1. Employ at least two of the following methods or other best management practices to allow rainwater to soak into the ground, evaporate into the air or collect in storage receptacles for irrigation or other beneficial uses. LID strategies include, but are not limited to those listed in Section A5.106.4.		1	1	YES	
5.106.4 Bicycle parking. Comply with Sections 5.106.4.1 and 5.106.4.2; or meet local ordinance, whichever is stricter.	X			YES	
5.106.4.1 Short-term bicycle parking. If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.	X			YES	Calculated based on **public ("visitor") users**.
5.106.4.2 Long-term bicycle parking. For buildings with over tenant-occupants, provide secure bicycle parking for 5% of tenant-occupied motorized vehicle parking capacity, with a minimum of one space.	X			YES	Calculated based on **employees**.
A5.106.4.3 Changing rooms. Provide changing/shower facilities in accordance with Table A5.106.4.3 or document arrangements with nearby changing/shower facilities.		1	1	YES	Calculated based on **employee parking**.
A5.106.5.1 Designated parking for fuel-efficient vehicles. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in: A5.106.5.1.1 Tier 1 spaces per Table A5.106.5.1.1		X		YES	Calculated based on **employee + visitor parking**.
A5.106.5.1.2 Tier 2 spaces per Table A5.106.5.1.2			X	YES	Calculated based on **employee + visitor parking**.
5.106.5.2 Designated parking. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.6.2.	X			YES	Calculated based on **employee + visitor parking**.
5.106.5.3.1 Single charging space requirements. When only a single charging space is required, install a listed raceway capable of accommodating a dedicated branch circuit. The raceway shall not be less than trade size1. The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box, or enclosure. Sufficient conductor sizing and service capacity to install Level 2 EVSE shall be provided.	X			NA	Project will have more than 1

5.106.5.3.2 Multiple charging spaces required. When multiple charging spaces are required, plans shall include the location(s) and type of the EVSE, raceway method(s), wiring schematics and electrical calculations to verify that the electrical system has sufficient capacity to charge simultaneously all the electrical vehicles at all designated EV charging spaces at their full rated amperage. Plan design shall be based upon Level 2 EVSE at its maximum operating ampacity. Provide raceways from the electrical service panel to the designated parking areas that are required to be installed at the time of construction.	X			YES	5% is mandatory per LAMC.
A5.106.5.3.3 Tier 1. At least 7% of the total parking spaces, but not less than one, shall be capable of supporting installation of future EVSE.		1		MAYBE	To be calculated based on ALL parking: **RAC and Idle, employee + visitor parking** 7%. **DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT of 10% vs 5%.**
A5.106.5.3.5 Tier 2. At least 10% of the total parking spaces, but not less than two, shall be capable of supporting installation of future EVSE.				MAYBE	To be calculated based on ALL parking: **RAC and Idle, employee + visitor parking** 10%. **DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT of 10% vs 5%.**
5.106.5.3.5 Labeling requirement. A label stating "EV CHARGE CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and the EV charging space.	X			YES	
A5.106.6 Parking capacity. Design parking capacity to meet but not exceed minimum local zoning requirements. A5.106.6.1 Reduce parking capacity. With the approval of the enforcement authority, employ strategies to reduce on-site parking area by 20%. 1. Use of on street parking or compact spaces, illustrated on the site plan; or		___	___	NO	
2. Implementation and documentation of programs that encourage occupants to carpool, ride share or use alternate transportation.		___	___	YES	
A5.106.7 Exterior walls. Meet requirements in the current edition of the California Energy Code and comply with either Section A5.106.7.1 or A5.106.7.2 for wall surfaces: A5.106.7.1 Fenestration. Provide vegetative or man-made shading devices for all fenestration on east-, south- and west-facing walls. A5.106.7.1.1 East and west walls. Shading devices shall have 30% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less.		___	___	NO	Comply through A5.106.7.2 instead.
A5.106.7.1.2 South walls. Shading devices shall have 60% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less.		___	___	NO	Comply through A5.106.7.2 instead.
A5.106.7.2 Opaque wall areas. Use wall surfacing with SRI 25 (aged), for 75% of opaque wall areas.		1	1	YES	
5.106.8 Light pollution reduction [N]. Outdoor lighting systems shall be designed and installed to comply with the following: 1. The minimum requirements in the California Energy Code for Lighting Zones 1-4 as defined in Chapter 10 of the California Administrative Code; and 2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and 3. Allowable BUG ratings not exceeding those shown in Table 5.106.8, or	X or			YES	

Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent. Exceptions: [N] 1. Luminaires that qualify as exceptions in Section 147 of the California Energy Code. 2. Emergency lighting.	X			NA	COMPLYING VIA ABOVE
5.106.10 Grading and paving. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include those shown in Items 1-5. See exception for additions or alterations.	X			YES	
5.106.11 Heat island effect. Reduce nonroof heat islands and roof heat islands as follows: 5.106.11.1 Hardscape alternatives. Use one or a combination of strategies 1 through 4 for 25% of site hardscape. 1. Provide shade (mature within 5 years of occupancy). 2. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with ASTM Standards E 1918 or C 1549. 3. Use open-grid pavement system or pervious or permeable pavement system. 4. Use solar panel arrays to create a canopy shade system.	X			YES	
A5.106.11.1 Hardscape alternatives. Use one or a combination of strategies 1 through 3 for 75% of site hardscape. 1. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with ASTM Standards E 1918 or C 1549.		1	1	YES	
2. Use open-grid pavement system or pervious or permeable pavement system.		___	___	NO	Top level of garage counts as hardscape, this path not possible. But path 1 above is.
3. Use solar panel arrays to create a canopy shade system.		___	___	MAYBE	**SOLAR CONSULTANT CURRENTLY EVALUATING COST VS BENEFIT**
A5.106.11.2 Cool roof. Use roofing materials having a minimum 3-year aged solar reflectance and thermal emittance complying with Sections A5.106.11.2.1 and A5.106.11.2.2: Table A5.106.11.2.2 - Tier 1 or		X		YES	
Table A5.106.11.2.3 - Tier 2.			X	YES	

Exceptions: 1. Roof constructions that have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25lbs/sf. 2. Roof area covered by building integrated solar photovoltaic and building integrated solar thermal panels.				MAYBE	**LAWA SOLAR CONSULTANT CURRENTLY EVALUATING COST VS BENEFIT OF SOLAR CANOPIES AT IDLE STORAGE (BUILDING C). DESIGN TEAM AND LAWA SOLAR CONSULTANT CURRENTLY EVALUATING COST VS BENEFIT OF STANDARD ROOF VS GREEN VS SOLAR AT QTAs (BUILDINGS A AND B).**
Energy Efficiency					
Performance Requirements					
5.201.1 Scope. Building meets or exceeds the requirements of the California Building Energy Efficiency Standards.3	X	X 2	X2	YES	
A5.203.1 Energy efficiency. Nonresidential, high-rise residential and hotel/motel buildings that include lighting and/or mechanical systems shall comply with Sections A5.203.1.1 and either A5.203.1.2.1 or A5.203.1.2.2. Newly constructed buildings as well as additions and alterations are included in the scope of these sections. Buildings permitted without lighting or mechanical systems shall comply with Section A5.203.1.1 but are not required to comply with Sections A5.203.1.1.2 or A5.203.1.2.		1	1	YES	
A5.203.1.1.1 Outdoor lighting. Newly installed outdoor lighting power is no greater than 90% of the Title 24, Part 6 calculated value of allowed outdoor lighting power.		X 2	X2	YES	
A5.203.1.1.2 Service water heating in restaurants. Newly constructed restaurants 8,000 square feet or greater and with service water heaters rated 75,000 Btu/h or greater installed a solar water-heating system with a minimum solar savings fraction of 0.15 or meet one of the exceptions.		X 2	X2	NA	Not Applicable - no restaurants >8000SF
A5.203.1.1.3 Functional areas where compliance with residential lighting standards is required. For newly constructed high-rise residential dwelling units and hotel and motel guest rooms, indoor lighting complies with the applicable requirements in Appendix A4 Residential Voluntary Measures, Division A4.2 - Energy Efficiency, Section A4.203.1.1.3. For additions and alterations to high-rise residential dwelling units and hotel and motel guest rooms, indoor lighting complies with the applicable requirements in Appendix A4 Residential Voluntary Measures, Division A4.2 - Energy Efficiency, Section A4.204.1.1.1.		X 2	X2	NA	Not Applicable - Not residential
A5.203.1.2.1 Tier 1. For building projects that include indoor lighting or mechanical systems, but not both, the Energy Budget is no greater than 95% of the Title 24, Part 6 Energy Budget for the Proposed Design Building. For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 90% of the Title 24, Part 6 Energy Budget for the Proposed Design Building.		X 2		YES	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT OF MANDATORY VS TIER 1 VS TIER2.**

A5.203.1.2.2 Tier 2. For building projects that include indoor lighting or mechanical systems, but not both, the Energy Budget is no greater than 90% of the Title 24, Part 6 Energy Budget for the Proposed Design Building. For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 85% of the Title 24, Part 6 Energy Budget for the Proposed Design Building.			X2	YES	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT OF MANDATORY VS TIER 1 VS TIER2.**
Renewable Energy					
A5.211.1 On-site renewable energy. Use on-site renewable energy for at least 1% of the electrical service overcurrent protection device rating calculated in accordance with the 2013 Los Angeles Electrical Code or 1KW, whichever is greater, in addition to the electrical demand required to meet 1% of natural gas and propane use calculated in accordance with the 2013 Los Angeles Plumbing Code. A5.211.1.1 Documentation. Calculate renewable on-site system to meet the requirements of Section A5.211.1. Factor in net-metering, if offered by local utility, on an annual basis. A5.211.3 Green power. Participate in the local utility's renewable energy portfolio program that provides a minimum of 50% electrical power from renewable sources. Maintain documentation through utility billings.		___	___	MAYBE	**LAWA SOLAR CONSULTANT CURRENTLY EVALUATING COST VS BENEFIT OF SOLAR ON IDLE STORAGE, AND QTAs.**
5.211.1 Space for future electrical solar system installation [N]. Comply with Section 110.10 of the California Energy Code.	X			YES	
5.211.1.1 Prewiring for future electrical solar system [N]. Install conduit from the building roof, eave, or other locations approved by the Department to the electrical service equipment. The conduit shall be labeled as per the Los Angeles Fire Department requirements. Exception: Buildings not required to provide a solar zone per Section 110.10 of the California Energy Code.	X			YES	
Elevators, Escalators and Other Equipment					
A5.212.1 Elevators and escalators. In buildings with more than one elevator or two escalators, provide systems and controls to reduce the energy demand of elevators and escalators as follows. Document systems operation and controls in the project specifications and commissioning plan. A5.212.1.1 Elevators. Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion.		1	1	YES	
A5.212.1.1.1 Car lights and fan. A parked elevator shall turn off its car lights and fan automatically until the elevator is called for use.		1	1	YES	
A5.212.1.2 Escalators. An escalator shall have a VVVF motor drive system that is fully regenerative when the escalator is in motion.		1	1	YES	
Energy Efficient Steel Framing					
A5.213.1 Steel framing. Design for and employ techniques to avoid thermal bridging.		1	1	YES	
Water Efficiency and Conservation					
Indoor Water Use					
5.303.1 Meters. Separate meters shall be installed for the uses described in Sections 5.303.1.1 and 5.303.1.2. 5.303.1.1 New buildings or additions in excess of 50,000 square feet. Separate submeters shall be installed as follows: 1. For each individual leased, rented or other tenant space within the building projected to consume more than 100 gal/day.	X			YES	
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems: a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)	X			YES	
b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)	X			YES	IF APPLICABLE
c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)	X			YES	IF APPLICABLE

5.303.1.2 Excess consumption. A separate submeter or metering device shall be provided within a new building or within an addition that is projected to consume more than 1,000 gal/day (3800 L/day).	X			YES	
5.303.2 Water Reduction. Plumbing fixtures shall meet the maximum flow rate values shown in Table 5.303.2.3 Exception: Buildings that demonstrate 20% overall water use reduction. In this case, a calculation demonstrating a 20% reduction in the building "water use baseline," as established in Table 5.303.2.2 shall be provided.	X			YES	Syed Ali of City of LA Green Building advised 1/8/16 that this is to be calculated by removing car washes from the water use calculation. **DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT OF CAPTURING REVERSE OSMOSIS REJECT WATER AS CAR WASH RINSE WATER.**
5.303.2.1 Areas of additions or alterations. For those occupancies within the authority of the California Building Standards Commission as specified in Section 103, the provisions of Section 5.303.2 and Section 5.303.3 shall apply to new fixtures in additions or areas of alterations to the building.	NA			NA	Not an alteration
A5.303.2.3.1 Tier 1 - 30% savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30% shall be provided.		X		YES	Syed Ali of City of LA Green Building advised 1/8/16 that this is to be calculated by removing car washes from the water use calculation. **DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT OF CAPTURING REVERSE OSMOSIS REJECT WATER AS CAR WASH RINSE WATER.**

A5.303.2.3.2 Tier 2 - 35% savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 35% shall be provided.			X	YES	Syed Ali of City of LA Green Building advised 1/8/16 that this is to be calculated by removing car washes from the water use calculation. **DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT OF CAPTURING REVERSE OSMOSIS REJECT WATER AS CAR WASH RINSE WATER.**
A5.303.2.3.3 40% savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 40% shall be provided. (Calculate savings by Water Use Worksheets)		___	___	NO	
A5.303.2.3.4 Nonpotable water systems for indoor use. Utilizing nonpotable water systems (such as captured rainwater, treated graywater, and recycled water) intended to supply water closets, urinals, and other allowed sues, may be used in the calculations demonstrating the 30, 35 or 40% reduction. The nonpotable water systems shall comply with the current edition of the Los Angeles Plumbing Code.		___	___	MAYBE	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT FOR RECYCLED WATER USE AT CAR WASHES.**
5.303.3 Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:	X			YES	
5.303.3.1 Water closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S EPA WaterSense Specification for Tank-Type Toilets. Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.	X			YES	
5.303.3.2 Urinals. The effective flush volume of urinals shall not exceed 0.5 gallons per flush.	X			YES	
5.303.3.3 Showerheads.	X			YES	
5.303.3.3.1 Single Showerhead. Showerheads shall have a maximum flow rate of not more than 2.0 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S EPA WaterSense Specification for Showerheads.	X			YES	
5.303.3.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all showeheads and/or other shower outlets controlled by a single valve shall not exceed 2.0 gallons per minute at 80psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time. Note: A hand-held shower shall be considered a showerhead.	X			NA	
A5.303.3 Appliances. 1. Clothes washers shall have a maximum Water Factor (WF) that will reduce the use of water;		___	___	NA	
2. Dishwashers shall meet the criteria in Section A5.303.3(2)(a) and (b);		1	1	YES	Include in tenant guidelines

3. Ice makers shall be air cooled;		1	1	YES	Include in tenant guidelines
4. Food steamers shall be connectionless or boilerless;		___	___	NA	
5. The use and installation of water softeners shall be limited or prohibited by local agencies;		___	___	NA	
6. Combination ovens shall not consume more than 10 gph (38 L/h) in the full operational mode;		___	___	NA	
7. Commercial pre-rinse spray valves manufactured on or after January 1, 2006 shall function at equal to or less than 1.6 gpm (0.10 L/s) at 60 psi (414 kPa); and a. Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate . b. Be equipped with an integral automatic shutoff. c. Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gpm (0.08 L/s) or less.		___	___	NA	
5.303.4 Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:	As applicable			YES	method 1
1. The installation of water-conserving fixtures or	_X_			YES	
2. Utilizing nonpotable water systems.	_X_			MAYBE	
A5.303.5 Dual plumbing. New buildings and facilities shall be dual plumbed for potable and recycled water systems.		___	___	MAYBE	
5.303.6 Standards for plumbing fixtures and fittings. Plumbing fixtures and fittings shall be installed in accordance with the Los Angeles Plumbing Code, and shall meet the applicable standards referenced in Table 1401.1 of the Los Angeles Plumbing Code and in Chapter 6 of this code.	As applicable _X_			YES	
Outdoor Water Use					
5.304.1 Water budget. A water budget shall be developed for landscape irrigation use.3 Applies to additions and alterations.	_X_			YES	
5.304.2 Outdoor potable water use. For new water service or for an addition or alteration requiring upgraded water service, separate meters or submeters shall be installed for indoor and outdoor potable water use for cumulative landscaped areas of at least 1,000 square feet.	_X_			YES	
A5.304.2.1 Outdoor potable water use. For new water service not subject to the provisions of Section 304.2, separate meters or submeters shall be installed for outdoor potable water use for landscaped areas of at least 500 square feet but not more than 1,000 square feet (the level at which Section 5.304.2 applies).				NA	See A5.304.5 below, no irrigation planned
5.304.3 Irrigation design. In new nonresidential projects with at least 1,000 square feet of landscaped area, install irrigation controllers and sensors which include the following criteria and meet manufacturer's recommendations. Applies to additions and alterations.	_X_			NA	
5.304.3.1 Irrigation controllers. Automatic irrigation system controllers installed at the time of final inspection shall comply with the following: 1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.	_X_			NA	
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.	_X_ as applicable			NA	
A5.304.4 Potable water reduction. Provide water efficient landscape irrigation design that reduces by the use of potable water. A5.304.4.1 Tier 1 - Reduce the use of potable water to a quantity that does not exceed 60% of ETo times the landscape area.		_X_		NA	
A5.304.4.2 Tier 2 - Reduce the use of potable water to a quantity that does not exceed 55% of ETo times the landscape area. Methods used to accomplish the requirements of this section shall include, but not be limited to, the items listed in A5.304.4.			_X_	NA	
A5.304.4.3 Verification of compliance. A calculation demonstrating the applicable potable water use reduction required by this section shall be provided.		_X_	_X_	YES	

A5.304.5 Potable water elimination. Provide a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment. Methods used to accomplish the requirements of this section shall include, but not be limited to, the items listed in Section A5.304.4.		1	1	YES	**DESIGN TEAM CURRENTLY EXAMINING COST VS BENEFIT OF USING NO WATER VS USING RECYCLED WATER**
A5.304.6 Restoration of areas disturbed by construction. Restore all areas disturbed during construction by planting with local native and/or noninvasive vegetation.		1	1	YES	
A5.304.7 Previously developed sites. On previously developed or graded sites, restore or protect at least 50% of the site area with native and/or noninvasive vegetation.		___	___	NO	
A5.304.8 Graywater irrigation system. Install graywater collection system for onsite subsurface irrigation using graywater.		___	___	NO	
Water Reuse					
A5.305.1 Nonpotable water systems. Nonpotable water systems for indoor and outdoor use shall comply with the current edition of the Los Angeles Plumbing Code.		1	1	YES	
A5.305.2 Irrigation systems. Irrigation systems regulated by a local water efficient landscape ordinance or by the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) shall use recycled water.		___	___	MAYBE	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT.**
Material Conservation and Resource Efficiency					
Efficient Framing Systems					
A5.404.1 Wood framing. Employ advanced wood framing techniques or OVE, as permitted by the department.		___	___	NO	
Material Sources					
A5.405.1 Regional materials. Select building materials or products for permanent installation on the project that have been harvested or manufactured in California or within 500 miles of the project site, meeting the criteria listed in Section A5.405.1.		1	1	YES	
A5.405.2 Bio-based materials. Select bio-based building materials per Section A5.405.2.1 or A5.405.2.2. A5.405.2.1 Certified wood products. Certified wood is an important component of green building strategies and the California Building Standards Commission will continue to develop a standard through the next code cycle.		1	1	YES	
A5.405.2.2 Rapidly renewable materials. Use materials made from plants harvested within a ten-year cycle for at least 2.5% of total materials value, based on estimated cost.		___	___	NO	
A5.405.3 Reused materials. Use salvaged, refurbished, refinished or reused materials for at least 5% of the total value, based on estimated cost of materials on the project.		___	___	NO	
A5.405.4 Recycled content. Use materials, equivalent in performance to virgin materials, with a total (combined) recycled content value (RCV) of: Tier 1. The RCV shall not be less than 10% of the total material cost of the project.		1		YES	
Tier 2. The RCV shall not be less than 15% of the total material cost of the project. Note: Use the equations in the subsections for calculating total materials cost, recycled content, RCV of materials and assemblies, and total RCV.			1	YES	
A5.405.5 Cement and concrete. Use cement and concrete made with recycled products and complying with the following sections: A5.405.5.1 Cement. Cement shall comply with one of the following standards: 1. Portland cement shall meet ASTM C 150. 2. Blended hydraulic cement shall meet ASTM C 595. 3. Other Hydraulic Cements shall meet ASTM C 1157.		1	1	YES	

A5.405.5.2 Concrete. Unless otherwise directed by the Engineer of Record, use concrete manufactured with cementitious materials in accordance with Sections A5.405.5.2.1 and A5.405.5.2.1.1, as approved by the department.		1	1	YES	
A5.405.5.2.1 Supplementary cementitious materials (SCMs). Use concrete made with one or more of the SCMs listed in Section A5.405.5.2.1. A5.405.5.2.1.1 Mix design equation. Use any combination of one or more SCMs, satisfying Equation A4.5-14. Exception: Minimums in mix designs approved by the Engineer of Record may be lower where high early strength is needed.		1	1	YES	
A5.405.5.3 Additional means of compliance. Any of the following measures shall be permitted to be employed for the production of cement or concrete, depending on their availability and suitability, in conjunction with Section A5.405.5.2.		___	___	MAYBE	
A5.405.5.3.1 Cement. The following measures may be used in the manufacture of cement. A5.405.5.3.1.1 Alternative fuels. Where permitted by state or local air quality standards. A5.405.5.3.1.2 Alternative power. Alternate electric power generated at the cement plant and/or green power purchased from the utility meeting the requirements of Section A5.211.		___	___	MAYBE	
A5.405.5.3.2 Concrete. The following measures may be used in the manufacture of concrete. A5.405.5.3.2.1 Alternative energy. Renewable or alternative energy meeting the requirements of Section A5.211.		___	___	MAYBE	
A5.405.5.3.2.2 Recycled aggregates. Concrete made with one or more of the materials listed in Section A5.405.5.3.2.2.		___	___	MAYBE	
A5.405.5.3.2.3 Mixing water. Water recycled by the local water purveyor or water reclaimed from manufacturing processes and conforming to ASTM C1602.		___	___	NO	
A5.405.5.3.2.4 High strength concrete. Concrete elements designed to reduce their total size compared to standard 3,000 psi concrete, as approved by the Engineer of Record.		1	1	YES	
Enhanced Durability and Reduced Maintenance					
A5.406.1 Choice of materials. Compared to other products in a given category, choose materials from the following for a minimum of 5% of the total value, based on estimated cost of materials on the project. A5.406.1.2 Reduced maintenance. Select materials that require little, if any, finishing.		1	1	YES	
Weather Resistance and Moisture Management					
5.407.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by Los Angeles Building Code Section 1403.2 and California Energy Code Section 150, manufacturer's installation instructions or local ordinance, whichever is more stringent.3	X			YES	
5.407.2 Moisture control. Employ moisture control measures by the following methods: 5.407.2.1 Sprinklers. Prevent irrigation spray on structures.	X			YES	
5.407.2.2 Entries and openings. Design exterior entries and openings to prevent water intrusion into buildings.	X			YES	
Construction Waste Reduction, Disposal and Recycling					
5.408.1 Construction waste management. Comply with Section 66.32 of the Los Angeles Municipal Code.	X			YES	
5.408.3 Excavated soil and land clearing debris. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. Exception: Reuse, either on-or off-site, of vegetation or soil contaminated	X			YES	
A5.408.3.1 Enhanced construction waste reduction - Tier 1. Divert to recycle or salvage at least 65% of nonhazardous construction and demolition waste generated at the site.		X		YES	
A5.408.3.1.1 Enhanced construction waste reduction - Tier 2. Divert to recycle or salvage at least 80% of nonhazardous construction and demolition waste generated at the site.			X	YES	
A5.408.3.1.2 Verification of compliance. A copy of the completed waste management report or documentation of certification of the waste management company utilized shall be provided. Exceptions: 1. Excavated soil and land-clearing debris. 2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist. 3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.		X	X	YES	
Life Cycle Assessment					

A5.409.1 General. Life cycle assessment shall be ISO 14044 compliant. The service life of the building and materials assemblies shall not be less than 60 years.		___	___	MAYBE	
A5.409.2 Whole building life cycle assessment. Conduct a whole building life assessment, including operating energy, showing that the building project achieves at least a 10% improvement for at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change, compared to a reference building.		___	___	MAYBE	
A5.409.3 Materials and system assemblies. If whole building analysis of the project is not elected, select a minimum of 50% of materials or assemblies based on life cycle assessment of at least three for the impacts listed in Section A5.409.2.2, one of which shall be climate change.		___	___	MAYBE	
A5.409.4 Substitution for prescriptive standards. Performance of a life cycle assessment completed in accordance with Section A5.409.2 may be substituted for other prescriptive provisions of Division A5.4, including those made mandatory through local adoption of Tier 1 or Tier 2 in Division A5.6.		___	___	MAYBE	
A5.409.5 Verification of compliance. Documentation of compliance shall be provided as follows: 1. The assessment is performed in accordance with ISO 14044.		___	___	MAYBE	
2. The project meets the requirements of other parts of Title 24.		___	___	MAYBE	
3. A copy of the analysis shall be made available to the enforcement authority.		___	___	MAYBE	
4. A copy of the analysis and any maintenance or training recommendations shall be included in the operation and maintenance manual. See notes for available tools.		___	___	MAYBE	
Building Maintenance and Operation					
5.410.1 Recycling by occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling.3	X			YES	
5.410.2 Commissioning. [N] For new buildings 10,000 square feet and over, building commissioning for all building systems covered by Title 24, Part 6, process systems and renewable energy systems shall be included in the design and construction processes of the building project. Commissioning requirements shall include items listed in Section 5.410.2. Exceptions: 1. Dry storage warehouses of any size 2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses 3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.	X			YES	
5.410.2.1 Owner's Project Requirements (OPR). [N] Documented before the design phase of the project begins the OPR shall include items listed in Section 5.410.4.	X			YES	
5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project to cover the systems listed in Section 5.410.2.2.	X			YES	
5.410.2.3 Commissioning plan. [N] A commissioning plan describing how the project will be commissioned shall include items listed in Section 5.410.2.3.	X			YES	
5.410.2.4 [N] Functional performance testing shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications.	X			YES	
5.410.2.5 Documentation and training. [N] A Systems manual and systems operations training are required.	X			YES	
5.410.2.5.1 Systems manual. [N] The systems manual shall be delivered to the building owner or representative and facilities operator and shall include the items listed in Section 5.410.2.5.1.	X			YES	
5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and shall include items listed in Section 5.410.2.5.2.	X			YES	

5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.	X			YES	
A5.410.3 Commissioning. For new buildings under 10,000 square feet building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. Commissioning requirements shall include items 1-7 listed in Section A5.410.3.		___	___	NO	
5.410.4 Testing and adjusting. Testing and adjusting of systems shall be required for buildings less than 10,000 square feet. Applies to new systems serving additions or alterations.	X			YES	
5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project, the systems listed in Section 5.410.4.2.	X			YES	
5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with applicable standards on each system as determined by the department.	X			YES	
5.410.4.3.1 HVAC balancing. Before a new space-conditioning system serving a building or space is operated for normal use, balance in accordance with the procedures defined by national standards listed in Section 5.410.4.3.1 or as approved by the enforcing agency.	X			YES	
5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.	X			YES	
5.410.4.5 Operation and maintenance manual. Provide the building owner with detailed operating and maintenance instructions and copies of guaranties/warranties for each system prior to final inspection.	X			YES	
5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the department.	X			YES	
Environmental Quality					
Fireplaces					
5.503.1 Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace or a sealed woodstove and refer to residential requirements in the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150. 5.503.1.1 Woodstoves. Woodstoves shall comply with US EPA Phase II emission limits.	X As applicable X			NA	
Pollutant Control					
A5.504.1 Indoor air quality (IAQ) during construction. Maintain IAQ as provided in Sections A5.504.1.1 and A5.504.1.2. A5.504.1.1 Temporary ventilation. Provide temporary ventilation during construction in accordance with Section 121 of the California Energy Code, CCR, Title 24, Part 6 and Chapter 4 of CCR, Title 8 and as listed in Items 1 and 2 in Section A5.504.1.2.		1	1	YES	
A5.504.1.2 Additional IAQ measures. Employ additional measures as listed in Items 1 through 5 in Section A5.504.1.2.		___	___	MAYBE	
5.504.1.3 Temporary ventilation. If the HVAC system is used during construction, use return air filters with a MERV of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy. Applies to additions or alterations.	X			YES	
A5.504.2 IAQ postconstruction. Flush out the building per Section A5.504.2 prior to occupancy or if the building is occupied.		1	1	YES	
A5.504.2.1 IAQ Testing. A testing alternative may be employed after all interior finishes have been installed, using testing protocols recognized by the United State Environmental Protection Agency (U.S. EPA) and in accordance with Section A5.504.2.1.2. Retest as required in Section A5.504.2.1.3.		1	1	YES	
A5.504.2.1.1 Maximum levels of contaminants. Allowable levels of contaminant concentrations measured by testing shall not exceed the following:		As applicable	As applicable	YES	
1. Carbon Monoxide (CO): 9 parts per million, not to exceed outdoor levels by 2 parts per million;		1	1	YES	
2. Formaldehyde: 27 parts per billion;		1	1	YES	
3. Particulates (PM10): 50 micrograms per cubic meter;		1	1	YES	
4. 4-Phenylcyclohexene (4-PCH): 6.5 micrograms per cubic meter; and		1	1	YES	
5. Total Volatile Organic Compounds (TVOC): 300 micrograms per cubic meter. A5.504.2.1.2		1	1	YES	

Test protocols. Testing of indoor air quality should include the elements listed in Items 1 through 4.		1	1	YES	
A5.504.2.1.3 Noncomplying building areas. For each sampling area of the building exceeding the maximum concentrations specified in Section A5.504.2.1.1, flush out with outside air and retest samples taken from the same area. Repeat the procedures until testing demonstrates compliance.		1	1	YES	
5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the department to reduce the amount of dust, water and debris which may enter the system.	X			YES	
5.504.4 Finish material pollutant control. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.4. 5.504.4.1 Adhesives, sealants, caulks. Adhesives and sealants used on the project shall meet the requirements of the following standards: 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2.	X			YES	
2. Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507	X			YES	
5.504.4.3 Paints and coatings. Architectural paints and coatings shall comply with Table 5.504.4.3 unless more stringent local limits apply.	X			YES	
5.504.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product - Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances (CCR, Title 17, Section 94520 et seq).	X			YES	
5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the department.	X			YES	
5.504.4.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the standards listed in Section 5.504.4.4.	X			YES	
5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.	X			YES	
5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.	X			YES	
5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in Table 5.504.4.	X			YES	
A5.504.4.5.1 No added formaldehyde. Use composite wood products approved by the ARB as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.		1	1	YES	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT**
5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the department. Documentation shall include at least one of the following.	as applicable	1	1	YES	
1. Product certifications and specifications.	X			YES	
2. Chain of custody certifications.	X			YES	
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.)	X			YES	
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.	X			YES	
5. Other methods acceptable to the department.	X			YES	

5.504.4.6 Resilient flooring systems. Comply with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.	X			YES	
A5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.	X			YES	
A5.504.4.7 Resilient flooring systems, Tier 1. For 90% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.		X		YES	
A5.504.4.7.1 Resilient flooring systems, Tier 2. For 100% of floor area to scheduled to receive resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.			X	YES	
A5.504.4.7.2 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.		X	X	YES	
A5.504.4.8 Thermal insulation, Tier 1. Comply with the standards listed in Items 1 through 3.		X		YES	
A5.504.4.8.1 Thermal insulation, Tier 2. Install thermal insulation which complies with Tier 1 plus does not contain any added formaldehyde.			X	YES	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT**
A5.504.4.8.2 Verification of compliance. Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.		X	X	YES	
A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2 and with the VOC- emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database.		1	1	YES	
A5.504.4.9.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.		1	1	YES	
A5.504.5 Hazardous particulates and chemical pollutants. Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas. A5.504.5.1 Entryway systems. Install permanent entryway systems measuring at least six feet in the primary direction of travel to capture dirt and particulates at entryways directly connected to the outdoors as listed in Items 1 through 3 in Section A5.504.5.1.		1	1	YES	
A5.504.5.2 Isolation of pollutant sources. In rooms where activities produce hazardous fumes or chemicals, exhaust them and isolate them from their adjacent rooms as listed in Items 1 through 3 in Section A5.504.5.2.		1	1	YES	
5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a MERV of 8. MERV 8 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual. Exception: 1. An ASHRAE 10% to 15% efficiency filter shall be permitted for an HVAC unit meeting the 2013 California Energy Code having 60,000 Btu/h or less capacity per fan coil, if the energy use of the air delivery system is 0.4 W/cfm or less at design air flow. 2. Existing mechanical equipment	X			YES	
A5.504.5.3.1 Filters, Tier 1. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a MERV of 11.		1		YES	

A5.504.5.3.1.1 Filters, Tier 2. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a MERV of 13.			1	YES	
5.504.7 Environmental tobacco smoke (ETS) control. Prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows where outdoor areas are provided for smoking and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of the City.	X			YES	
Indoor Moisture and Radon Control					
5.505.1 Indoor moisture control. Buildings shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1203 and Chapter 14.1.3	X			YES	
Air Quality and Exhaust					
5.506.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 of the California Energy Code and Chapter 4 of CCR, Title 8 or the applicable local code, whichever is more stringent.3	X			YES	
5.506.2 Carbon dioxide (CO2) monitoring. For buildings equipped with demand control ventilation, CO2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the California Energy Code, CCR, Section 121(c).3	X			YES	
Environmental Comfort					
A5.507.1 Lighting and thermal comfort controls. Provide controls in the workplace as described in Sections A5.507.1.1 and A5.507.1.2. A5.507.1.1 Single-occupant spaces. Provide individual controls that meet energy use requirements in the 2007 California Energy Code by Sections A5.507.1.1.1 and A5.507.1.1.2.		___	___	MAYBE	
A5.507.1.1.1 Lighting. Provide individual task lighting and/or daylighting controls for at least 90% of the building occupants.		___	___	NO	
A5.507.1.1.2 Thermal comfort. Provide individual thermal comfort controls for at least 50% of the building occupants by Items 1 and 2 in Section A5.507.1.1.2.		___	___	MAYBE	**DESIGN TEAM CURRENTLY EVALUATING COST VS BENEFIT**
A5.507.1.2 Multi-occupant spaces. Provide lighting and thermal comfort system controls for all shared multi-occupant spaces.		___	___	MAYBE	
A5.507.2 Daylight. Provide daylit spaces as required for toplighting and sidelighting in the California Energy Code. In constructing a design, consider Items 1 through 4 in Section A5.507.3.		___	___	MAYBE	
5.507.4 Acoustical control. Employ building assemblies and components with STC values determined in accordance with ASTM E 90 and ASTM E 413 or OITC determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.	X			YES	
5.507.4.1 Exterior noise transmission, prescriptive method. Wall and floor-ceiling assemblies exposed to the noise source making up the building envelope shall have exterior wall and roof ceiling assemblies meeting a composite STC rating of at least 50 or a composite OITC rating of no less than 40 with exterior windows of a minimum STC of 40 or OITC of 30 in the locations described in Items 1 and 2.	X			YES	
5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB Leq-1Hr during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).	X or			YES	
5.507.4.2 Performance method. For buildings located as defined in Sections A5.507.4.1 or A5.507.4.1.1, wall and roof-ceiling assemblies making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (Leq-1Hr) of 50 dBA in occupied areas during any hour of operation.	X			NA	Use Prescriptive method, above

5.507.4.2.1 Site features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the project to mitigate sound migration to the interior.	X			NA	
5.507.4.2.2 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.	X			YES	
5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.	X			YES	
Outdoor Air Quality					
5.508.1 Ozone depletion and global warming reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.	as applicable			YES	
5.508.1.1 CFCs. Install HVAC and refrigeration equipment that does not contain CFCs.3	X			YES	
5.508.1.2 Halons. Install fire suppression equipment that does not contain Halons.1	X			YES	
A5.508.1.3 Hydrochlorofluorocarbons (HCFCs). Install HVAC and refrigeration equipment that does not contain HCFCs.		1	1	YES	
A5.508.1.4 Hydrofluorocarbons (HFCs). Install HVAC complying with either of the following: 1. Install HVAC, refrigeration and fire suppression equipment that do not contain HFCs or that do not contain HFCs with a global warming potential greater than 150.		___	___	NO	
2. Install HVAC and refrigeration equipment that limit the use of HFC refrigerant through the use of a secondary heat transfer fluid with a global warming potential no greater than 1.		___	___	NO	
5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned areas, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities. Exception: Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO2) and potentially other refrigerants. 5.508.2.1 Refrigerant piping. Piping compliant with the Los Angeles Mechanical Code shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than 1/4 inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below 5.508.2.1.1 Threaded pipe. Threaded connections are permitted at the compressor rack. 5.508.2.1.2 Copper pipe. Copper tubing with an OD less than 1/4 inch may be used in system with a refrigerant charge of 5 pounds or less. 5.508.2.1.2.1 Anchorage. 1/4 inch OD tubing shall be securely clamped to a rigid base to keep vibration levels below 8 mils. 5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure controls, valve pilot lines and oil. Exception: Single-flared tubing connections may be used with a multiring seal coated with industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's recommendations. 5.508.2.1.4 Elbows. Short radius elbows are only permitted where space	X As applicable				

5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve. 5.508.2.2.1.1 Pressure detection. Pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve. 5.508.2.2.2 Access valves. Only Schrader access valves with a brass or steel body are permitted for use. 5.508.2.2.2.1 Valve caps. For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic. 5.508.2.2.2.2 Seal caps. If designed for it, the cap shall have a neoprene O-ring in place. 5.508.2.2.2.2.1 Chain tethers. Chain tethers to fit over the stem are required for valves designed to have seal caps. Exception: Valves with seal caps that are not removed from the valve during stem operation. 5.508.2.3 Refrigerated services cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils or corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances. 5.508.2.3.1 Coil coating. Consideration shall be given to the heat transfer efficiency of coil coating to maximize energy efficiency. 5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device that indicated the level of refrigerant in the receiver. 5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and charging. 5.508.2.5.1 Minimum pressure. The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300psig minimum. 5.508.2.5.2.1 Leaks. Check the system for leaks, repair any leaks, and retest for pressure using the same gauge. 5.508.2.5.3 Allowable pressure charge. The system shall stand, unaltered, for 24 hours with no more than +/- one pound pressure change from 300 psig, measure with the same gauge. 5.508.2.3 Evacuation. The system shall be evacuated after pressure testing and prior to charging. 5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns +/- 50 microns), and hold for 30 minutes. 5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30 minutes. 5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns and hold for 24hours with a maximum drift of 100 microns over a 24-hour period.				NA	
FOOTNOTES 1. Green building measures in this table may be mandatory if adopted by a city, county, or city and county as specified in Section 101.7. 2. Required prerequisite for this Tier. 3. These measures are currently required elsewhere in statute or in regulation.	TOTAL OF ADDITIONAL ELECTIVES	45	44		
	NEED	5	15		

Appendix 8.2 Cost Benefit Analysis of Selected Sustainability Measures

Appendix 8.2: Cost Benefit Analysis of Selected Sustainability Measures

8.2.1 INTRODUCTION

In the sustainability strategy meeting held on January 7, 2016, the design team presented a draft sustainability checklist to LAWA. This checklist (attached) is based upon the LA Green measures. The draft checklist indicates in green the measures that are readily achievable and should be included in the project; the color red indicates measures which are difficult or impossible to achieve in this project; and yellow indicates measures which are being evaluated. The checklist indicates a strategy which readily achieves LA Green's Tier 2 voluntary status.

In this meeting LAWA requested that the design team evaluate certain of the sustainability measures from a cost benefit standpoint, to inform the decisions whether each of the measures warrants inclusion in the project. The evaluations included herein are preliminary order-of-magnitude studies.

8.2.2 MEASURES TO BE ANALYZED

The following are the measures analyzed for costs and benefits:

1. Additional Future Electric Car Charging Stations
2. Solar Panels on Canopies at Idle Storage Building and RAC Building
3. Vegetated (Green) Roof on QTAs
4. Solar Panels on QTAs
5. Increased Energy Efficiency
6. Use of Reverse Osmosis Reject Water as Rinse Water at Car Washes
7. Use of Recycled Water for Car Washes
8. A. Use of Recycled Water for Irrigation
8. B. Use of Xeriscape
9. Thermal Comfort
10. No Added Formaldehyde
11. MERV 13 Filters

8.2.3 COST BENEFIT ANALYSES

The respective cost benefit analyses appear on the following pages. Costs and benefits are simply expressed, without calculation for inflation or present value. More detailed analysis will be required of the team selected to fully design the ConRAC. The costs and benefits of each measure are expressed relative to the baseline design, which is defined in each case. Similar to the Base Building Estimate, costs have been evaluated in 2020 dollars (11.75% increase over current dollars).

Key utility unit costs for calendar year 2015 were provided by LAWA, and were used as the bases for the following calculations. These are as follows:

- Potable water: $8.30 per hundred cubic feet current cost. $9.28 in 2020 dollars.
- Recycled water: $1.321 per hundred cubic feet current cost. $1.476 in 2020 dollars.
- Electricity 15.65 cents per kilowatt hour current cost. 17.49 cents in 2020 dollars.
- Sewer cost $4.23 per hundred cubic feet FY2015-2016. $5.44 in FY2019-2020.

Measure 1: Additional Future Electric Car Charging Stations

Introduction: LA Green 99.05.106.5.3.1, Article 9, Division 5 requires that 5% of total parking spaces are to support future Electric Vehicle Supply Equipment (EVSE) charging locations. This requires provision of raceways, and provision of sufficient capacity in the electrical system. To meet the LA Green voluntary tier 1 measure (A5.106.5.3.3) requires 7%, and to meet the tier 2 measure (A5.106.5.5) requires 10%.

Baseline: Provide raceways and electrical capacity for 5% of total parking spaces, to be distributed per table below. (LA Green Mandatory)

Option: Provide raceways and electrical capacity for 10% of total parking spaces, to be distributed per table below. (LA Green Voluntary, Tier 2)

		RAC + Idle spots	Public	Employee	Visitor	TOTAL
Overall Parking Count:		18100	2350	1100	100	21650
Future Charging	Baseline 5% spots	905	118	55	5	1083
Future Charging	Option: 10% spots	1810	235	110	10	2165
Future Charging	Difference =	**905**	**118**	**55**	**5**	**1083**

Initial Costs and Benefits:

Costs:

Additional raceways	$1,376,948
Increased electrical capacity	$528,679
CAPITAL COSTS OF OPTION	$1,905,627

Operating Costs and Benefits

Costs: No significant operating cost for provision of this future capacity.

Benefits: By installing this capacity now, one saves the cost of providing it in the future, in a retrofit fashion. This future benefit is estimated as a premium of 45% of capital costs, or approximately $858,000 - In other words, installing after construction was complete (2023) would cost $2,763,000. In addition, there would be a savings (accruing to the RAC companies) for avoiding the down time needed to install conduit and electrical capacity while the RACs are in operation.

Notes: Increase in raceways: feeder 250A for 26 transformers, and 3/4" conduit for 541 EVC stations, 43,300 LF. Increased electrical capacity: Includes cost for 2,000A switchboards 2 Each, Panel boards 400A, 26Ea, and Transformers 26 Ea. Once charging stations are actually installed, the increased demand for electrical can be offset by the power supplied by the solar panels, if solar is installed in the project (see Measure 2.) Due to the unique and varying parking arrangements used by RACs, the plan geometry of charging stations will not be typical and is TBD.

Measure 2: Solar Panels on Canopies at Idle Storage Building and RAC Building

Introduction: The checklist proposes including voluntary measure A5.106.11.1.1 "Hardscape Alternatives", through option 1- "Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with ASTM Standards E 1918 or C 1549." LEED defines top levels of parking structures as hardscape rather than roof. And the top levels of the parking structures in this project (Idle Storage Building and RAC Building) are concrete and so should satisfy this measure.

LAWA has interest in examining the option of providing solar panels on the 4th level of the Idle Storage Building and RAC Building, which would mean the measure would instead be met by option 3: "use solar panel arrays to create a canopy shade system." Level 4 features parking. The solar panels would be installed on canopies above the parking areas. A separate cost benefit analysis for the panels and canopies is currently being prepared by Lean Engineering, consultant to LAWA. Several procurement and operating options are being examined by Lean Engineering. The figures below represent *only* the estimated costs associated with the Idle Storage and RAC Buildings themselves, e.g. concrete pedestals to support the canopies; increased reinforcement in the building columns to support the canopies; the remaining aspects of cost and benefit will be presented by Lean Engineering.

Baseline: No solar panels on Idle Storage Building.

Option: Solar panels and canopies installed on 4th level of Idle Storage Building, covering the parking areas.

Initial Costs and Benefits:

Costs:

Concrete Pedestals and Increased structure at Idle Storage Building	$198,288
Concrete Pedestals and Increased structure at RAC Building	$167,280
Additional electrical equipment in building to accommodate solar	$187,000
CAPITAL COSTS OF OPTION	$552,568

(Other capital costs TBD by Lean Engineering)

Equipment/Operating Costs and Benefits

Costs: TBD by Lean Engineering

Benefits: TBD by Lean Engineering

Notes: Concrete pedestals estimated at 2'x2'x3', aligned over structural columns below. Pedestal cost currently included in Base Building Estimate. Electrical items include additional 2000A breaker, and upgrade bus bar from 3000A to 5000A.

Measure 3: Vegetated (Green) Roof on QTAs (Buildings A and B)

Introduction: LA Green A5.106.11.2 requires roof aged reflectance of 0.70 for low slope roofs, to achieve Tier 2 voluntary status. We currently propose to meet this through a membrane roof with the appropriate reflectance. Exception 1 to this requirement is given for “roof constructions that have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25lbs/sf”, so green roof is an alternate path.

Baseline: A membrane roof on QTAs.

Option: Green roofs on QTAs. Water to be recycled water.

Initial Costs and Benefits:

Costs:

Increased structure	$13,372,390
Bringing recycled water to site (see notes)	$1,360,000
Green roof	$8,680,526
CAPITAL COSTS OF OPTION	$23,412,916

Benefits:

Reduced rainwater cisterns (reduces 9 to 8)	$ 760,000
CAPITAL BENEFITS OF OPTION	$760,000

Net Capital Cost:

$22,652,916

Operating Costs and Benefits

Costs:

Water usage (recycled)	$13,400
Maintenance	$75,000
ANNUAL COSTS OF OPTION	$88,400

Benefits:

Reduced energy costs due to higher R value	Negligible
ANNUAL BENEFITS OF OPTION	Negligible

NET cost per year:

$88,400

Notes: Green roofs have some benefits which do not accrue to the owner. Examples include: increased habitat for insects and birds (though it should be noted that birds at an airport are not considered a benefit), increased O_2 and reduced CO_2 due to presence of plants, reduction of heat island effect. Irrigation is assumes at 2300 cubic feet/day. Green Roof: Based on o/a depth 6" comprising additional roof waterproofing, protection board, a drainage mat 3/4" with filter fabric on top, growing media (soil/compost mix) and sedum sod or drought resistant plantings. A drip irrigation system is also allowed and additional elevator stop at the roof level, but not roof top lighting. Note: Green roof capital costs are already included in the Base Building Estimate, but not structural or recycled pipeline. Also note that the cost of bringing recycled water to site could be shared between measures 3, 7, and 8 if selected.

Measure 4: Solar Panels on QTAs (Buildings A and B)

Introduction: LA Green A5.106.11.2 requires roof aged reflectance of 0.70 for low slope roofs, to achieve Tier 2 voluntary status. We currently propose to meet this through a membrane roof with the appropriate reflectance.

Exception 2 to this requirement is given for "Roof area covered by building integrated solar photovoltaic and building integrated solar thermal panels." The solar panels would be installed on concrete pedestals. A separate cost benefit analysis for the panels and canopies is currently being prepared by Lean Engineering, consultant to LAWA. Several procurement and operating options are being examined. The figures below represent *only* the estimated costs associated with the QTA buildings, e.g. concrete pedestals to support the panels and increased reinforcement in the roof beams to support the canopies.

Baseline: A membrane roof on QTAs.

Option: Solar panels on QTA roofs.

Initial Costs and Benefits:

Costs:

Concrete Pedestals and increased structure	$82,416
CAPITAL COSTS OF OPTION	$82,416

(Other capital costs TBD by Lean Engineering)

Equipment/Operating Costs and Benefits

Costs: TBD by Lean Engineering

Benefits: TBD by Lean Engineering

Notes:

Measure 5: Increased Energy Efficiency

Introduction: LA Green mandatory measure 5.201.1 requires that the "building meets or exceeds the requirements of the California Building Energy Efficiency Standards." (Title 24.)

A5.203.1.2.1 Tier 1. "For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 90% of the Title 24, Part 6 Energy Budget for the Proposed Design Building." This equates to a 10% reduction.

A5.203.1.2.2 Tier 2. "For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 85% of the Title 24, Part 6 Energy Budget for the Proposed Design Building." This equates to a 15% reduction.

Baseline: Meet mandatory Title 24 requirements.

Option 1: Meet Tier 1 increased efficiency requirements.

Option 2: Meet Tier 2 increased efficiency requirements.

Initial Costs and Benefits:

Costs:

	Tier 1	Tier 2
Increase in mechanical costs	$3,133,440	$3,697,459
Increase in electrical costs	$78,400	$78,400
CAPITAL COSTS OF OPTION	$3,211,840	$3,375,859

Operating Costs and Benefits, per year

Costs: negligible

Benefits:

	Tier 1	Tier 2
Energy Savings	$570,198	$821,949
ANNUAL BENEFITS OF OPTION	$570,198	$821,949

Notes: Reductions in annual energy usage in Tier 1 and Tier 2 options were achieved by utilizing a combination of higher-efficiency HVAC systems and reduced lighting fixture wattages. For the Base Case, standard efficiency HVAC equipment was modeled, in order to meet the minimum efficiency requirements in Title-24.

For the Base Case, 14.5-SEER mechanical equipment was modeled. For lighting, a combination of 54W and 81W fixtures was used.

For Tier-1, 16.5-SEER mechanical equipment was modeled, along with a combination of 40W and 60W LED lighting fixtures. For Tier-2, 17.8-SEER mechanical equipment, along with 34W and 52W LED lighting fixtures was assumed.

Measure 6: Use of Reverse Osmosis Reject Water as Rinse Water at Car Washes

Introduction: Car washes typically process potable water for the final (secondary) rinse to provide a "spot-free" finish. The permeate for this second rinse is generated by a reverse osmosis (RO) system. RO systems typically generate a quantity of concentrate (reject water) equal to 1 – 1.5 times the quantity of permeate. Typically, this reverse osmosis concentrate is rejected to the sanitary sewer as a part of the process overflow. Although this concentrate has higher levels of dissolved minerals than the input potable water, it is still useable for the first/primary rinse. To do so requires some capital investment.

Baseline: Use potable water for first rinse.

Option: Use R.O. reject water for first rinse.

Initial Costs and Benefits:

Costs:

Tanks, piping, valves, controls, pumps	$1,366,100
Filtration	$475,600
Add basement	$1,160,000
CAPITAL COSTS OF OPTION	$3,001,700

Operating Costs and Benefits

Costs:

Increased Electricity	$3000
Maintenance for additional Equipment	$5000
ANNUAL COSTS OF OPTION	$8000

Benefits:

Reduced water costs	$162,000
Reduced sewer costs	$95,000
ANNUAL BENEFITS OF OPTION	$256,000

NET SAVINGS per year:

$248,000

Notes: This measure would save 13.1 million gallons of water per year. See also 8.2.4 and 8.2.5 below for more detailed information.

Measure 7: Use of Recycled Water for Car Washes

Introduction: It is currently planned that the water supply for the car washes is to be potable water. The City of Los Angeles has recycled water available near the future ConRAC site, and has requested that we examine piping the recycled water to the site, and utilizing it as the water source for car washes.

Baseline: Utilize potable water for car washes.

Option: Utilize recycled water for car washes.

Initial Costs and Benefits:

Costs:

Pipeline to site for recycled water (see notes)	$1,360,000
Treatment facilities	$2,620,400
Add basement	$1,470,000
CAPITAL COSTS OF OPTION	$5,450,400

Operating Costs and Benefits per Year

Costs:

Electricity for Treatment and RO maintenance costs	$98,000
Sewer Fees Increased by 39.3M gallons	$286,000
ANNUAL COSTS OF OPTION	$384,000

Benefits:

Decrease in water costs 26.2M gallons	$324,881
ANNUAL BENEFITS OF OPTION	$324,881

NET COST per year:

$59,119

Notes: Though it is very much lower in cost compared to potable water, recycled water is not clean enough to use for the car washes without extensive treatment. In addition, a large portion of the recycled water is rejected in the treatment process. This means much more water is used than if potable water were used. The low price of recycled water makes this palatable, but the sewer fee on this larger quantity of water is significant. Cost of bringing recycled water to site could be shared between measures 3, 7, and 8 if selected. Pipe assumed as 12” diameter, 6900 LF. Assumed using RO reject water for rinse. See also 8.2.4 and 8.2.5 below for more detailed information.

Measure 8A: Use of Recycled Water for Irrigation

Introduction: The site design currently includes about 288,000 square feet of landscaping. The current baseline strategy includes utilizing cisterns to capture storm water for car washing and landscaping. The remainder is made up from potable water. Here we examine the option to utilize recycled water for irrigation

Baseline: Landscape irrigation is provided in part by potable water and rain water.

Option: Bring recycled water to site through a new pipeline, to provide landscape irrigation. Saves potable water.

Initial Costs and Benefits:

Costs:

Pipeline to site for recycled water	$1,360,000
Further 6" pipeline on site	$411,400
CAPITAL COSTS OF OPTION	$1,771,400

Operating Costs and Benefits

Benefits:

Decreased cost of water	$72,805
ANNUAL SAVINGS OF OPTION	$72,805

Notes:

Water cost savings is based on the following irrigation calculation:

Cu.Ft/year= ((Eto x Plant Factor x Sq.Ft. x .62)/Irrigation Efficiency) x 365/7.48gallons per cu.ft.

Cu.Ft/year= ((0.135 x 0.5 x 288,130 x .62)/0.75) x 365/7.48gallons per cu.ft.

Cu.Ft/year= 784,500

Cost of bringing recycled water to site could be shared between measures 3, 7, and 8 if selected.

Measure 8B: Use of Xeriscape

Introduction: The site design currently includes about 288,000 square feet of landscaping. The current baseline strategy includes utilizing cisterns to capture storm water for car washing and landscaping. The remainder is made up from potable water. Here we examine the option of utilizing xeriscape to eliminate use of irrigation water altogether.

Baseline: Landscape irrigation is provided in part by potable water and rain water.

Option: Utilize no irrigation water, by installing xeriscape, utilizing inorganic landscaping combined with plants that require no irrigation.

Initial Costs and Benefits:

Costs:

Increase in cost for xeriscape over standard landscaping (roughly equivalent)	$0
CAPITAL COSTS OF OPTION	$0

Benefits:

Remove irrigation system	$ 823,050
CAPITAL BENEFITS OF OPTION	$823,050

Net Capital Savings: $823,050

Operating Costs and Benefits

Benefits:

Decreased cost of water	$72,805
ANNUAL SAVINGS OF OPTION	$72,805

Elimination of irrigation would restrict the choice of plants to highly drought-tolerant species.

Notes:

See 8A for water cost savings calculation.

Measure 9: Thermal Comfort

Introduction: LA Green voluntary measure A5.507.1.1.2 Thermal comfort indicates: "Provide individual thermal comfort controls for at least 50% of the building occupants by Items 1 and 2 in Section A5.507.1.1.2."

Baseline: Thermal controls per typical design practice.

Option: Add thermal controls sufficient to give control to at least 50% of occupants.

Initial Costs and Benefits:

Costs:

Increased thermostats (approximately 118)	$18,290
Increased wiring and connections	$29,500
CAPITAL COSTS OF OPTION	$47,790

Operating Costs and Benefits

There should be no significant increase or decrease in operating costs due to the implementation of this measure. Increased employee satisfaction with work environment may result.

Notes:

Measure 10: No Added Formaldehyde

Introduction: LA Green mentions the criterion of no added formaldehyde in construction materials, in two measures:

- A5.504.4.5.1 Voluntary Tier 1 and 2: No added formaldehyde. Use composite wood products (Hardwood plywood, particleboard and medium density fiberboard composite wood products) approved by the ARB as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.
- A5.504.4.8.1 Thermal insulation, Tier 2 (required for Tier 2). Install thermal insulation which complies with Tier 1 plus does not contain any added formaldehyde.

Baseline: Typical casework.

Option: Utilize composite wood products with no added formaldehyde, in the construction of casework.

Initial Costs and Benefits:

Costs:

Increased casework costs	$170,000
Increased insulation costs (see below)	$0
CAPITAL COSTS OF OPTION	$170,000

Operating Costs and Benefits

There should be no increase or decrease in operating costs due to the implementation of this measure. Increased employee well-being and satisfaction with work environment may result.

Notes:

The only likely location for significant quantities of composite wood products is the casework in the CSBs. The casework costs noted above are based on an assumed approximate total 2000 LF of casework. This cost would be incurred as part of tenant improvement for the CSBs, rather than the building construction.

The project will likely contain batt insulation and rigid insulation. As regards batt insulation: products from major manufacturers such as Owens Corning (“Eco-Touch”), CertainTeed (“SmartBatt, Fiber Glass, Certa-Pro”), and Knauf (“Guardian, and Eco-Batt”) were reviewed. All their batt insulation is now produced with formaldehyde-free binders. And so it seems the batt insulation market has caught up with this sustainability measure.

Rigid Insulation is typically one of three types: extruded polystyrene (EPS), polyisocyanurate, and expanded polystyrene (XPS). Our research indicates than these products do not contain formaldehyde. It should be noted that some fiberglass boards (e.g. 700 series Owens Corning) contain formaldehyde. But it is unlikely that the project would use this sort of product.
(References: Polyisocyanurate Insulation Manufacturers Association, achfoam.com, Owenscorning.com, certainteed.com, knaufinsulation.us).

Measure 11: MERV 13 Filters

Introduction: LA Green A5.504.5.3 mandatory measure requires MERV 8 filters in the mechanical system. A504.5.3.1.1 Voluntary Tier 2 measure indicates MERV 13 filters.

Baseline: Provide MERV 8 filters in mechanical equipment.

Option: Provide MERV 13 filters in mechanical equipment.

Initial Costs and Benefits:

Costs:

Additional cost of MERV13 filters	$3,536
Increased Mechanical System Costs	$50,000
CAPITAL COSTS OF OPTION	$53,536

Operating Costs and Benefits

Costs:

Additional cost to replace filters twice a year	$7,072
ANNUAL COSTS OF OPTION	$7,072

Benefits: This option will result in higher indoor air quality. The benefit is difficult to quantify, but can include less lost time/sick days for employees, higher workplace satisfaction.

Notes: This measure and calculations apply only to mechanically ventilated areas. The garage portions of the project are not mechanically ventilated, they are naturally ventilated. Increased energy cost for use of MERV13 for increased static pressure is negligible.

8.2.4 DETAILED INFORMATION ON MEASURE 6:

This analysis looks at two options for the car wash at the planned ConRAC at the Los Angeles International Airport (LAX).

Option 1: Use of Reverse Osmosis (RO) Reject in the First Rinse

This option provides an opportunity to capture the concentrate water from the reverse osmosis purification process to be used in the first (primary) rinse in the car wash.

Car washes typically process potable water for the final (secondary) rinse to provide a “spot-free” finish. The permeate for this second rinse is generated by a reverse osmosis (RO) system. RO systems typically generate a quantity of concentrate (reject water) equal to 1 – 1.5 times the quantity of permeate. Typically, this reverse osmosis concentrate is rejected to the sanitary sewer as a part of the process overflow. Although this concentrate has higher levels of dissolved minerals than the input potable water, it is still useable for the first/primary rinse. A diagram showing a standard rinse setup and an RO reject capture rinse configuration (the proposed option) is shown in Attachment 1.

A RO reject capture scheme requires additional water storage tanks, pumps, and a control system to direct the source of input water to the first rinse arch. Although there is a moderate amount of equipment required for this option to work, it greatly reduces the water consumption of the car wash. An estimate of water consumed per car is shown on Attachment 1 – 13.5 Gallons per car without RO reject capture, and 9 gallons per car with RO reject capture. This proposed configuration setup would save an estimated 36,000 gallons per day at the LAX ConRAC facility, which equates to 13.1 million gallons per year.

Option 2: Recycled Water use as Car Wash Water Input:

This option provides for the use of recycled water as an input to the car wash. Based on our analysis of the water quality report (Attachment 4) and the requirements of Title 22 governing the use of this water, we concluded that the water input for any stage of the car wash would need to be treated to mitigate very high dissolved solids, corrosivity, odor, and bacteria (because of the storage of stagnant water in reclaim tanks). The high level of dissolved minerals in the water is the main concern, given its propensity to leave a residual film. Although a number of treatment options were investigated, it appears that only a primary RO treatment for all the car wash input water, combined with a disinfection regime, would be required (note that the secondary RO treatment for the spot free rinse would still be required). In this option (Attachment 2), all recycled water that would be input to the facility would undergo RO purification, where the concentrate from the first RO cycle would be discharged to the sanitary sewer, as the quality of this concentrate would not be otherwise usable. Anti-scalent would also be required prior to the first RO treatment to prevent fouling of RO membranes. The permeate water from the first RO treatment would be of sufficient quality to provide an input to the car wash rinse and also as an input to a secondary RO treatment for a spot-free rinse.

The recycled water input scheme requires additional RO purification systems, water storage tanks, booster pumps, and disinfection units. Additionally, if recycled water is used, the potable water input would require additional controls, tanks, and booster pumps in order to comply with the use of recycled water. An estimate of the water required for this setup is shown in Attachment 3. The recycled water increases the total gallons of water required per car from 9 gallons per car to 22.5 gallons per car, given the discharge of the RO concentrate. Additionally, this increase of water input also results in an increase of sanitary sewer discharge. This results in an increase of approximately 108,000 gallons per day, which equates to an increase of 39.4 million gallons per year. Although the cost of recycled water would still be less expensive than potable water even at this volume, the additional sewer costs would make this option more expensive to implement and maintain.

The recycled water is treated to Title 22 standards. Although Title 22 water is stated that is approved for use in car washes, there are many restrictions that would need to be considered for its use:

a) Per Title 17 CCR, Art. 2, §7604, on premises where the public water system is used to supplement the recycled water supply, an Air Gap separation is required. In the car wash, a method to bypass the recycled water system and provide potable water for redundancy is required. This would require the municipal water input to have an air gap from its supply. A method of doing this would be a process tank and booster pump on the municipal water supply input. Normally, municipal water input only has a backflow prevention device and booster pump which allows the car wash system to utilize pressure from the public water supply. This facility would require additional water storage tanks and a larger booster pump to provide this input.
b) Per Title 22 CR, Article 4, §60310, the use of disinfected tertiary recycled water has irrigation restrictions such as, "spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities." Additionally, signs must be posted that state "Recycled Water Do Not Drink," and hose bibs must be of a separate coupling than found on potable water systems. Although this does not preclude the use of recycled water, disinfection of the water would be required as to not create a hazard for employees working in the car wash facilities. In addition, chemical injection and monitoring may be required when recycled water is consistently reused due to potential odors in stagnant recycled water.

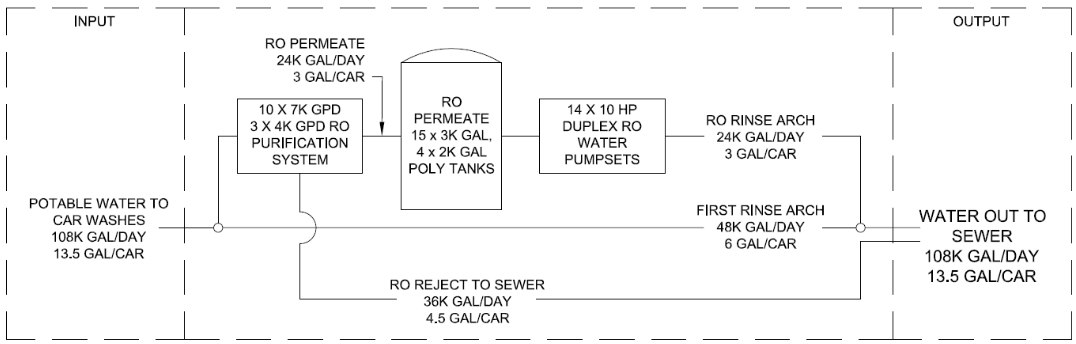
8.2.5 ATTACHMENTS 1 – 4 REGARDING CAR WASH

These attachments appear on the following pages.

Attachment 1: Use of Reverse Osmosis (RO) Reject Water for Car Wash Rinse

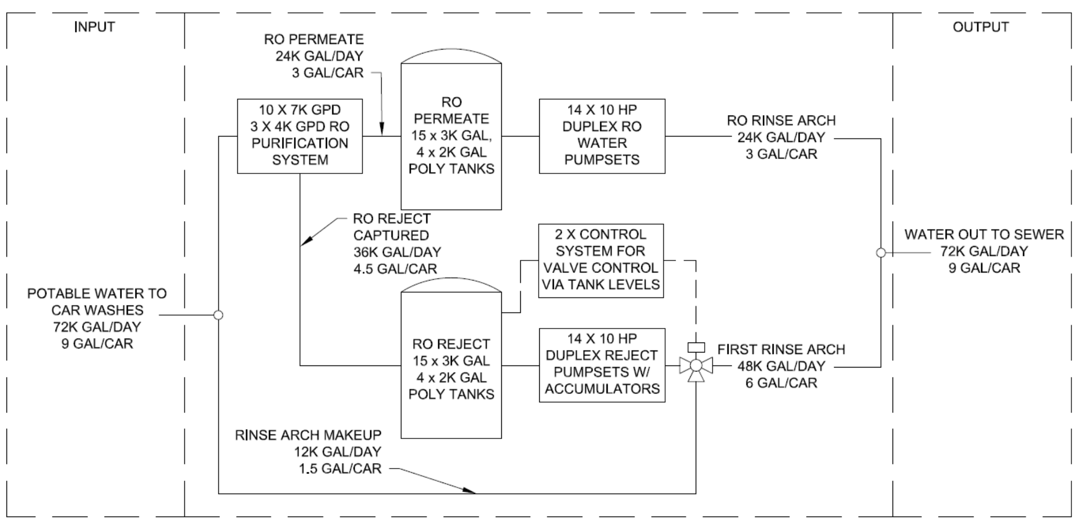
BASE OF EVALUATION (STANDARD CAR WASH):

POTABLE WATER USE: 108K GAL PER DAY (39.6M GAL PER YEAR)
SEWER DISCHARGE: 108K GAL PER DAY (39.6M GAL PER YEAR)
13.5 GAL/CAR



OPTION: USE OF REVERSE OSMOSIS REJECT WATER FOR CAR WASH RINSE:

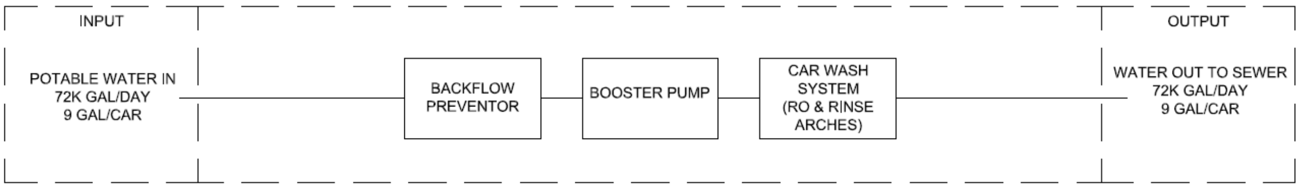
POTABLE WATER USE: 72K GAL PER DAY (26.2M GAL PER YEAR)
SEWER DISCHARGE: 72K GAL PER DAY (26.2M GAL PER YEAR)
9 GAL/CAR



Attachment 2: Use of Recycled Water for Car Wash

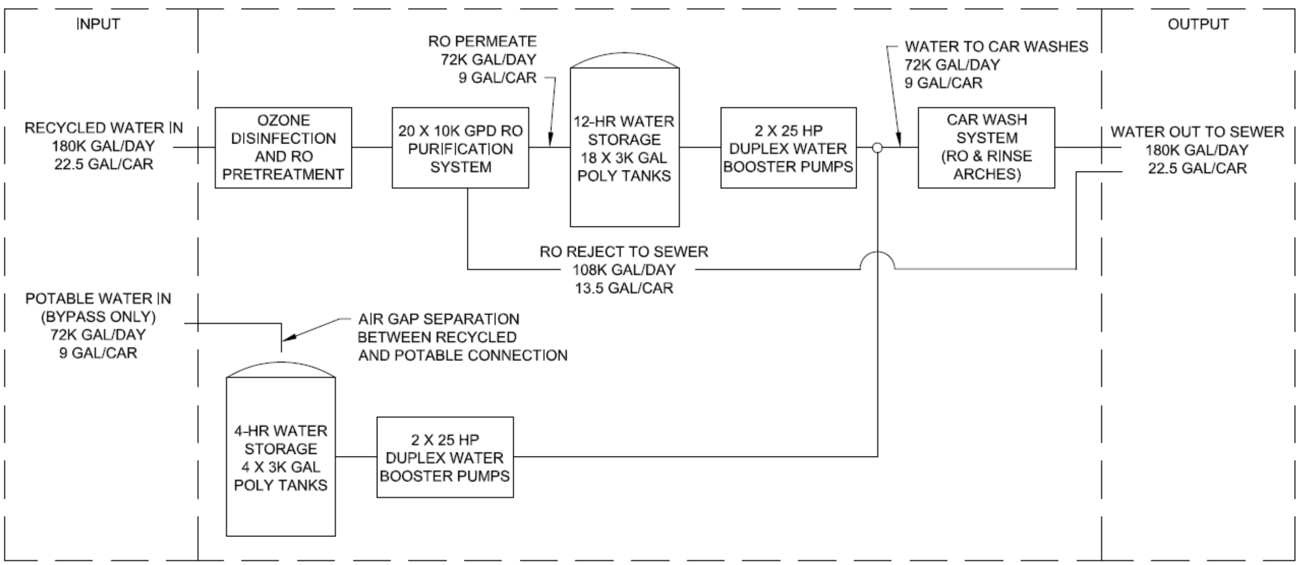
BASE OF EVALUATION (REVERSE OSMOSIS REJECT CAPTURE):

POTABLE WATER USE: 72K GAL PER DAY (26.2M GAL PER YEAR)
SEWER DISCHARGE: 72K GAL PER DAY (26.2M GAL PER YEAR)
9 GAL/CAR



OPTION: USE OF RECYCLED WATER FOR CAR WASH

POTABLE WATER USE: 0 GAL PER DAY
RECYCLED WATER USE: 180K GAL/DAY (65.5M GAL PER YEAR)
SEWER DISCHARGE: 108K GAL PER DAY (65.5M GAL PER YEAR)
22.5 GAL/CAR



Attachment 3: Standard Car Wash and Use of Reverse Osmosis (RO) Reject Water for Car Wash Rinse

	Additional Infrastructure (above baseline)	Annual Potable Water Use	Annual Recycled Water Use	Annual Sewer Use	Water Costs	Added Annual Costs	Estimated Savings
Standard Car Wash with Reverse Osmosis Spot-Free Rinse (13.5 Gallons/Car)	baseline	39.3M gallons	0 gallons	39.3M gallons	Potable water = $436K Sewer cost = $238K Total=$674K/year	N/A	N/A
Use of Reverse Osmosis Reject Water for Car Wash Rinse (9 Gallons/Car)	-15 x 3,000 gallon vertical cylindrical polyethlyene tanks -4 x 2,000 gallon vertical cylindrical polyethlyene tanks -allowance for 400 feet of interconnecting piping (3" sch 80 pvc), assume 100 elbows and fittings -allowance for 45 ball valves -allowance 14 automated 3-way valves -allowance for 2 x control systems capable of controling tank levels and valve positions -14 x 10HP duplex centrifugal water booster pump sets with 25 gal accumulators -4,000 square feet of additional basement space in building A -700 square feet of additional 1st floor equip room space in building B	26.2M gallons	0 gallons	26.2M gallons	Compared to Standard Car Wash: -Potable: Reduced by 13.1M Gal (-$145K)/year -Sewer: Reduced by 13.1M Gal (-$79K)/year -**Overall water costs decreased by $224K/year**	Compared to Standard Car Wash: -Electricity increased by $2.7K/year	**Reduction in operating costs of $217K/year as compared to a standard car wash**
Use of Recycled Water for Car Wash - assumes RO Reject Water is Used (9 Gallons/Car)	-20 x 10,000 GPD RO Purification Systems -Ozone Disinfection Unit capabale of treating up to 100 GPM -22 x 3,000 gallon vertical cylindrical polyethlyene tanks -allowance for 400 feet of interconnecting piping (3" sch 80 pvc), assume 100 elbows and fittings -allowance for 50 ball valves -4 x 25HP duplex centrifugal water booster pump sets -5,100 square feet of additional basement space in building A -800 square feet of additional 1st floor equip room space in building B	0 gallons	65.5M gallons	65.5M gallons	Compared to Reverse Osmosis Reject Capture Option: -Potable: Reduced by 26.2M (-$290K)/year -Recycled: Increased by 65.5M gal (+$116K)/year -Sewer: Increased by 39.3M gal (+$238K)/year -**Overall water costs increased by $64K/year**	Compared to Reverse Osmosis Reject Capture Option: -Electricity increased by $58K/year -RO maintenance increased by $25K/year -**Total increase of $83K/year**	**Net increse in operating costs of $147K/year as compared to RO reject capture alone.**

Attachment 4: Edward C. Little Title 22 Recycled Water Quality Report

MONTHLY REPORT OF RECYCLED WATER QUALITY
for
LANDSCAPE AND INDUSTRIAL WATER USERS
EDWARD C. LITTLE WATER RECYCLING FACILITY TITLE 22 PRODUCT WATER
Period Covered: 2015

Constituent	Unit	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	Annual Average
T.D.S.	mg/L	930	960	900	930	770	1100	1100	1100					974
pH	pH units	7.1	7.0	7.2	7.0	7.1	7.1	7.0	7.1					7.1
SODIUM	mg/L	214	206	199	207	167	244	236	256					216
CALCIUM	mg/L	60	62	64	59	49	64	67	68					62
MAGNESIUM	mg/L	28	26	24	23	21	33	31	33					27
SAR	meq/L	5.7	5.5	5.4	5.8	5.0	6.2	6.0	6.4					5.8
EC_W (TDS/640)	mmho/cm	1.5	1.5	1.4	1.5	1.2	1.7	1.7	1.7	0.0	0.0	0.0	0.0	1.5
CHLORIDE	mg/L	312	320	281	316	244	371	394	383					328
BORON	mg/L	0.37	0.40	0.42	0.40	0.38	0.41	0.41						0.40
NITRATE (as N)	mg/L as N	2.6	1.7	2.3	1.56	1.4	1.0	1.2	1.7					1.7
AMMONIA (as N)	mg/L as N	43	51	41	44	42	44	36	40					42
TOTAL PHOSPHATE	mg/L as PO4	0.99	1.05	1.14	1.54	1.82	0.68	1.17	1.60	0.71	0.00	0.00	0.00	1.2
O-PHOSPHATE	mg/L as PO4	0.29	0.47	0.58	0.96	1.4	0.26	0.69	1.0					0.7
POTASSIUM	mg/L	20	20	20	20	16	20	20	21					20
TOT. ALKALINITY	mg/L as CaCO3	279	308	299	283	272	288	245	286					283
BICARBONATE	mg/L as CaCO3	279	308	299	283	271	288	245	286					282
BOD	mg/L	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	<	<	<	<	<
C.O.D.	mg/L	40	33	41	41	24	33	32	37					35
IRON	mg/L	0.33	0.54	0.31	1.2	0.26	0.48	0.49						0.51
HARDNESS	mg/L as CaCO3	263	262	259	242	210	297	294	305					267
MANGANESE	mg/L	0.17	0.17	0.13	0.18	0.10	0.15	0.19	0.12					0.15
SULFIDE	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<	<	<		<
SILICA	mg/L	18	19	17	18	15	7.3	17	19					16
SULFATE	mg/L	149	163	139	137	124	167	179	182					155
T.O.C.	mg/L	11	11	11	11	9.3	9.9	9.6	10					11
T.S.S.	mg/L	2	3	2	4	2	3	2	2					3

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printed 1/14/2016

Appendix 8.3 Vertical Transportation Preliminary Schematic Design Report

LAX ConRAC
Los Angeles, California

Preliminary Schematic Design Report

Revised April 6, 2016

Prepared For:

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LB Project Number 0100006317-001/002

TABLE OF CONTENTS

SECTION I
EXECUTIVE SUMMARY

A. INTRODUCTION

Lerch Bates Inc. has been retained by TranSystems to study the vertical transport requirements for the proposed LAX ConRAC located in Los Angeles, California.

As Lerch Bates understands this building project consists of a four level rental car facility, adjacent to LAX East Intermodal LAWA transit facility (ITF) public parking structure. This analysis will consider the incoming and outgoing people flow associated with a 70,000 vehicle rental fleet, 253 rental car agencies, two ITF private public parking structures in the vicinity, connected by a three station automated people mover (APM) system which also connects the central terminal area (CTA) to the ConRAC and two new Metro stations. Other considerations are a 42% growth rate by 2035.

The evaluation of the vertical transportation requirements detailed in this report are based on the Core building only, per the preliminary schematic drawings supplied by TranSystems design team dated May 5, 2015, revised February 16, 2006 and revised March 21, 2016, along with the core populations revised on March 21, 2016. The main building contains four central cores with a fifth core adjacent outside the structure. The Traffic Analyses generated are included in this report.

This report provides a discussion and recommendations of the anticipated vertical transport systems planned for LAX ConRAC's core building. All vertical transportation planning is based on providing "good" performance from an overall vertical transport system perspective. Two distinct criteria are used to measure the effectiveness of the vertical transport systems: average interval and handling capacity. All recommendations in this report are based on meeting these two criteria, as well as answering the functional needs of the proposed facility.

B. RECOMMENDATIONS

Based on the preliminary architectural schematics, the design criteria assumed, and the analysis performed by Lerch Bates, the following elevator configurations and groups are recommended for the proposed LAX ConRAC:

1. Core 1

   a. One group of two (2) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54' rise. Elevators will have front opening only at all landings.

   b. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54' rise, one up and one down.

   c. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20' rise, one up and one down.

d. One set of two (2) escalators, 48” (step width 40”) operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37’ rise, one up and one down.

e. Each of the levels served by the escalators will have one “Up” unit and one “Down unit”. Each escalator is based on a 40” wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a “low deck” design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

2. Core 2

a. One group of two (2) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54’ rise. Elevator will have front opening only at all landings.

b. One (1) escalator, 48” (step width 40”) operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54’ rise. This unit will run in the down direction.

c. One (1) escalator, 48” (step width 40”) operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20’ rise. This unit will run in the down direction.

d. One (1) escalator, 48” (step width 40”) operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37’ rise. This unit will run in the down direction.

e. Each escalator is based on a 40” wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a “low deck” design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

3. Core 3

a. One group of three (3) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54’ rise. Elevator will have front opening only all landings.

b. One set of two (2) escalators, 48” (step width 40”) operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54’ rise, one up and one down.

c. One set of two (2) escalators, 48” (step width 40”) operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20’ rise, one up and one down.

d. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37' rise, one up and one down.

e. Each of the levels served by the escalators will have one "Up" unit and one "Down unit". Each escalator is based on a 40" wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a "low deck" design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

4. Core 4

a. One group of three (3) overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. serving levels Grade – 4, 54' rise. Elevator will have front opening only.

b. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels Grade to 4, 54' rise, one up and one down.

c. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 3 to 4, 20' rise, one up and one down.

d. One set of two (2) escalators, 48" (step width 40") operating at 100 FPM. LAWA transit duty. Indoor conditions. Glass balustrade. 4-flat steps. Serving levels 2 to 4, 37' rise, one up and one down.

e. Each of the levels served by the escalators will have one "Up" unit and one "Down unit". Each escalator is based on a 40" wide step for maximum movement of passengers. The proposed escalators would have glass balustrades to achieve a "low deck" design and the deck finish would be #4 brushed stainless steel. All escalators will have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

5. Core West

a. Two groups of three (3) cars in each group, overhead traction passenger elevators, operating at 350 FPM with a rated a capacity of 5,000 lbs. The North Core serving levels Grade & 4. The Grade will have a front opening and the 4th level will have a rear opening. The South Core servings levels, Grade, 3 & 4, with a front opening on Grade and rear opening on levels 3 and 4. All have 54' rise.

These systems in the configuration detailed will provide "Good" to "Excellent" service for the public, staff, and visitors to this building. Service will be balanced between groups with projected average intervals of 40 seconds for all Cores excluding Core West, which will have a 30 second average interval. Available handling capacity will support the estimated transitional occupancy, luggage, strollers, along with staff, no luggage carts where included in the analysis. Elevator speeds required are common to the industry utilizing well- proven designs and technology. Escalator calculations are based on airport passenger transportation 2013, Lerch Bates survey of Terminal B.

SECTION II
VERTICAL TRANSPORT PLANNING CRITERIA

A. STATEMENT OF UNDERSTANDING

TranSystems is currently planning a new four level car rental facility complex ConRAC, which will include 253 car rental agencies in a mini-mall configuration, approximately 1.7 miles from LAX International Airport CTA. The Concept Design includes three levels of RAC ready/return stalls accommodating a total of 8,000 ready/return vehicles. Three levels of idle vehicle storage accommodating over 12,000 vehicles. There will be two ITF private public parking structures, (the East ITF adjacent to ConRAC) and a three station automated people mover (APM) system connecting the central terminal area CTA to the ConRAC and two new Metro stations. The vertical transportation analysis must also take into consideration an increase in the facilities capacity of 42% by the year 2035. Elevator groups are being planned to serve the leisure and business traveler, building staff, and service transports. Calculations are based on the combination of actual 2103 peak hour customer demand, factoring in the anticipated 2035, 42% increase in capacity. The assumed average party size for leisure is 2.5 and 1.5 per business passenger transaction.

B. METHODOLOGY

All planning has been based on preliminary information and architectural drawings provided by TranSystems and Lerch Bates' knowledge of similar facilities. This information has been used as the basis of the analysis, planning, and design. All of the assumptions made by Lerch Bates for the required vertical transport analyses have been documented within this report.

To perform an accurate analysis of the vertical transport needs of the proposed LAX ConRAC, Lerch Bates based analysis upon information and architectural schematics provided by the TranSystems design team. Primary emphasis was placed on determining the appropriate number, size, and configuration of elevators and escalators, required for the LAX ConRAC core building.

ConRAC Peak:

Analysis began with understanding the peak hour transaction, as well as an estimation of the population that will require elevator and escalator service. Handling capacity was determined based upon peak hour performance. The population was segmented into a peak period, based on the assumption that the facility is projected to function at 40% capacity per core per hour. The performance criteria, in terms of average interval and handling capacity, were established based on LB's knowledge of similar type rental car structures. After the population and system requirements were established, various elevator system configurations were analyzed.

C. ELEVATOR PERFORMANCE

The performance criteria used by Lerch Bates for this study are based on the peak noon transactions for business and leisure travelers and on LAX ConRAC staff, public traffic, peak traffic, and projections provided by TranSystems. Lerch Bates based analysis on estimated projected building activity provided by TranSystems and industry knowledge. This estimate has been correlated with other industry and airport/rental car structure elevatoring standards to establish valid criteria for this study.

Once elevator traffic loading requirements were established the proposed system can be evaluated by calculating its theoretical performance and then comparing this potential with the established criteria.

Since some segments of the proposed building activity are still changing or undefined, Lerch Bates estimated the elevator activity based on conservative assumptions.

All vertical transport systems have been designed to provide “Good” or “Excellent” service. The summary of calculated performance for concurrent arrival and departure of each elevator group is provided in this report. The summaries assume the elevator industry “pre-engineered overhead traction” equipment currently available in the elevator industry.

Average Interval Performance Standards 5 Minutes of Heavy Two-Way Traffic - Airport	
	Passenger Elevators (in Seconds)
Excellent	< 40
Good	40 to 45
Average	45 to 50
Poor	50 to 55
Unacceptable	>55

Maximum and Nominal Capacities

The average car loadings used in the calculations will be based upon the estimated core populations, the anticipated population arrival/departure rates and the average interval required. These elevator car loads do not normally exceed the nominal elevator car load (about 80% of the full load) for a given capacity based on about 2 square feet/person. Escalator nominal capacities are based upon 75% of maximum loading.

- The following nominal capacity standards will be applied to the design:

Capacity	Maximum Car Capacity (Persons)	Traffic Analysis Nominal Car Load
5,000 lbs.	26 Persons	18-20 Persons

Escalator Capacities

Escalator Width at Handrail	Escalator Width at Tread	Escalator Speed (FPM)	Maximum Theoretical Capacity *(Persons/ Hour)	Nominal Capacity **(Persons /Hour)	Airport Nominal Capacity ***(Persons/ Hour)	Total Maximum Traffic - (Persons/ Minute)
48	40	100	9,000	4,500	2,250	37.5

*Maximum Theoretical capacity reflects two (2) persons per step.

**Nominal Capacity reflects the use of one (1) person per step.

***In an airport environment where travelers are carrying bags, nominal capacity is reduced. Lerch Bates recommends an average of one (1) person per every two (2) steps in airport car rental facilities.

D. DEFINITIONS

The criteria recommended for service hereafter assumes an understanding of several elevatoring terms and concepts. The adequacy of elevator service is related to the length of time passengers wait for service and the ability of the elevator system to handle people and "vehicles" as they require service. Coordination with materials handling needs is necessary to ensure all movements are covered with adequate, but not excessive, backup capabilities. Standards for the comparison and evaluation of these two basic measures of elevator service have been developed. They are termed average interval and handling capacity.

Average Interval — Average interval is the "quality" measure and is defined as the elapsed time in seconds between elevator departures from a terminal floor averaged over a specific time period. Average interval is not a direct measure of how long prospective passengers wait for service. However, it is a value which can be calculated relatively easily and the accuracy of such calculations has been verified by countless tests. Such tests indicate average system response time for service at a typical intermediate floor approximates 65% to 80% of the calculated average interval during heavy incoming traffic periods.

Handling Capacity — The "quantity" measure of elevator service is called handling capacity. This is defined as the number of persons and/or vehicles which can be transported by the elevator system in a given length of time.
Average interval and handling capacity must be measured or calculated for the same designated time period to be meaningful. Lerch Bates uses five-minute peak periods for evaluation. This time period is long enough to provide meaningful, measurable information, but not so long as to allow peak activity to be disguised by average activity levels

Traffic Types	Generally, “passenger” and “vehicular” traffic is significant because traffic in these broad categories is best served by elevators of different configuration. Passengers are best served by elevators which are wide and shallow with center opening doors to allow passengers to stand near the doors for expeditious transfer at elevator stops. Vehicular traffic is best served by elevators which are narrow and deep. This shape provides the configuration required for luggage cart and baggage loading with space allowed for passenger or airport staff beside the vehicle. The design proposed provides proper separation of passenger and service types.

SECTION III
ELEVATOR TRAFFIC ANALYSIS AND RECOMMENDATIONS

A. DISCUSSION AND RECOMMENDATIONS

ConRAC Facility Core Elevators: These passenger elevators and escalator system will be used for the transport of car rental facility patrons and service levels Ground through 4. The projected passenger activity of each core was used within a five-minute peak period to determine the number, size, and speed of the elevators required in order to provide good service.

1. Per Core - Overhead Traction Passenger Elevators:

Capacity:	5,000 lbs.
Speed:	350 fpm
Platform Size:	9'-4" Wide X 6'-2" Deep
Minimum Inside Cab Dimensions:	9' Wide X 5'-5" Deep
Clear Hoistway Dimensions:	22′-9″ Wide X 8′- 0″ Deep (Core 1 & 2)
Clear Hoistway Dimensions:	34′-4″ Wide X 8′-0″ Deep (Core 3 & 4)
Clear Hoistway Dimensions:	37′-4″ W X 7′-71/2″ D (Core West N&S)
Doors:	5'-0" Wide X 8'-0" High

2. Per Core - One Up and one Down Escalator express per landing, except Core 2 where all escalators run in the down:

Capacity:	Two steps per passenger
Speed:	100 fpm
Step Size:	40" (four flat on each end)
Threshold:	Four flat steps

Core 1	
	Two Overhead Traction Passenger
Floors Served:	L1, L2, L3, L4
Number, Capacity, and Speed:	1 & 2, 5,000 LB., 350 FPM
Average Interval:	38.9 Seconds
Five - Minute Handling Capacity % of Population (persons / 5 Min.)	31 Persons / 8.4% of the Total Population / 5 min.
Meets Criteria/Evaluation:	Yes/Excellent
Escalators	1 up/1 down express per landing
Escalators Level 1	245/hr.
Escalators Level 2	625/hr.
Escalators Level 3	237/hr.
Meets Criteria/Evaluation:	Yes/Excellent

Core 2	
	Two Overhead Traction Passenger
Floors Served:	L1, L2, L3, L4
Number, Capacity, and Speed:	3 &4, 5,000 LB., 350 FPM
Average Interval:	40.0 Seconds
Five - Minute Handling Capacity % of Population (persons / 5 Min.)	37 Persons / 8% of the Total Population / 5 min.
Meets Criteria/Evaluation:	Yes/Good
Escalators	1 down express per landing
Escalators Level 1	365/hr.
Escalators Level 2	314/hr.
Escalators Level 3	356/hr.
Meets Criteria/Evaluation:	Yes/Excellent

Core 3	
	Three Overhead Traction Passenger
Floors Served:	L1, L2, L3, L4
Number, Capacity, and Speed:	5, 6 & 7, 5,000 LB., 350 FPM
Average Interval:	29.0 Seconds
Five - Minute Handling Capacity % of Population (persons / 5 Min.)	29 Persons / 4% of the Total Population / 5 min.
Meets Criteria/Evaluation:	Yes/Excellent
Escalators	1 up/1 down express per landing
Escalators Level 1	860/hr.
Escalators Level 2	1,079/hr.
Escalators Level 3	212/hr.
Meets Criteria/Evaluation:	Yes/Excellent

Core 4	
	Three Overhead Traction Passenger
Floors Served:	L1, L2, L3, L4
Number, Capacity, and Speed:	8, 9 & 10, 5,000 LB, 350 FPM
Average Interval:	29.7 Seconds
Five - Minute Handling Capacity % of Population (persons / 5 Min.)	30 Persons / 4% of the Total Population / 5 min.
Meets Criteria/Evaluation:	Yes/Excellent
Escalators	1 up/1 down express per landing
Escalators Level 1	836/hr.
Escalators Level 2	150/hr.
Escalators Level 3	1,403/hr.
Meets Criteria/Evaluation:	Yes/Excellent

Calculations based on 100% elevators, with 50% using North bank and 50% using South Bank.

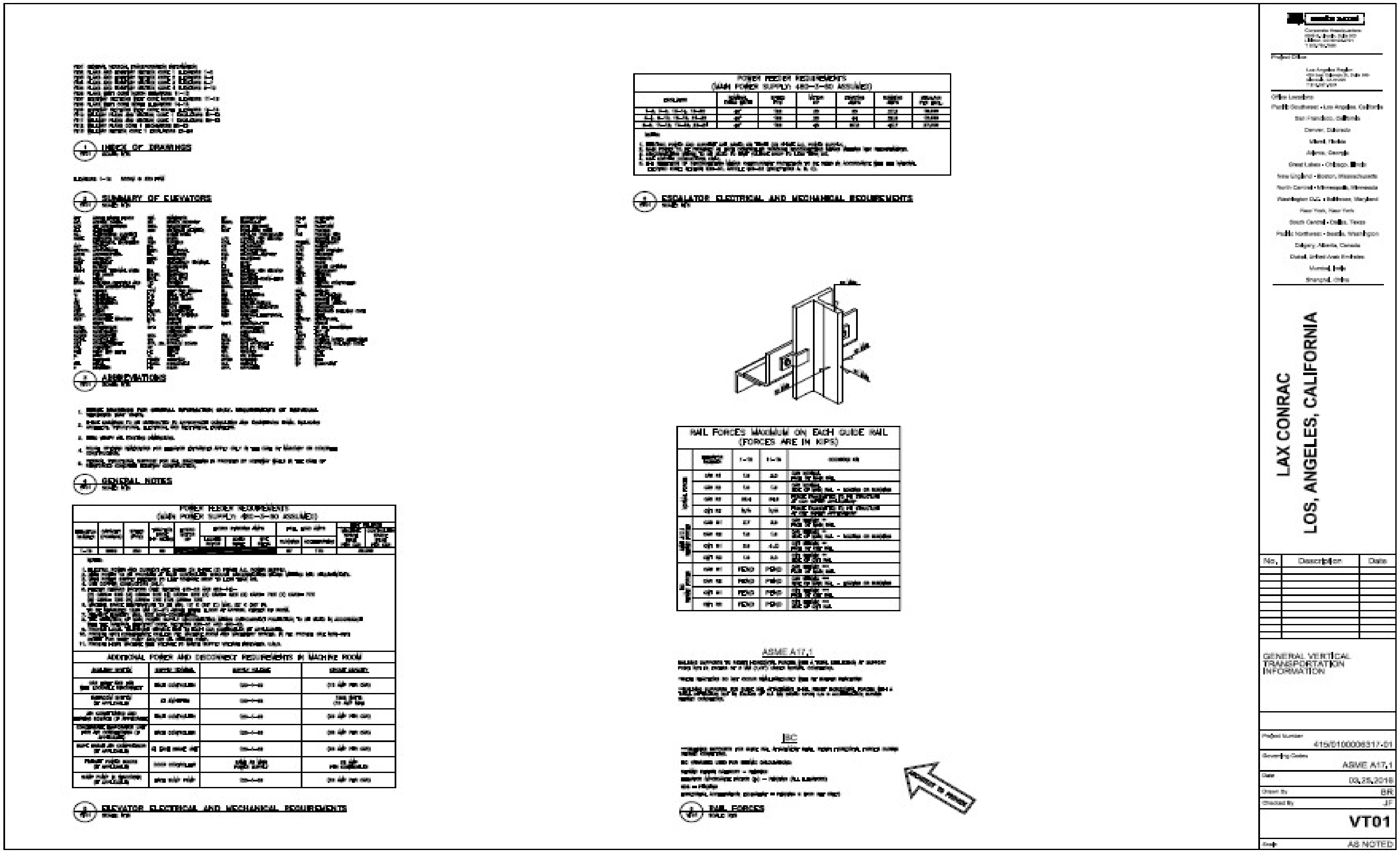
Core West	
Serving Traffic in and out of ConRAC	Six Overhead Traction Passenger
Floors Served:	South Core: L1F, L3R, L4R North Core: L1F & L4R
Number, Capacity, and Speed:	11-16, 5,000 LB., 350 FPM
Average Interval:	32.4 Seconds
Five - Minute Handling Capacity % of Population (persons / 5 Min.)	27 Persons per Core/ 8.5% of the Total Population / 5 min.
Meets Criteria/Evaluation:	Yes/Excellent

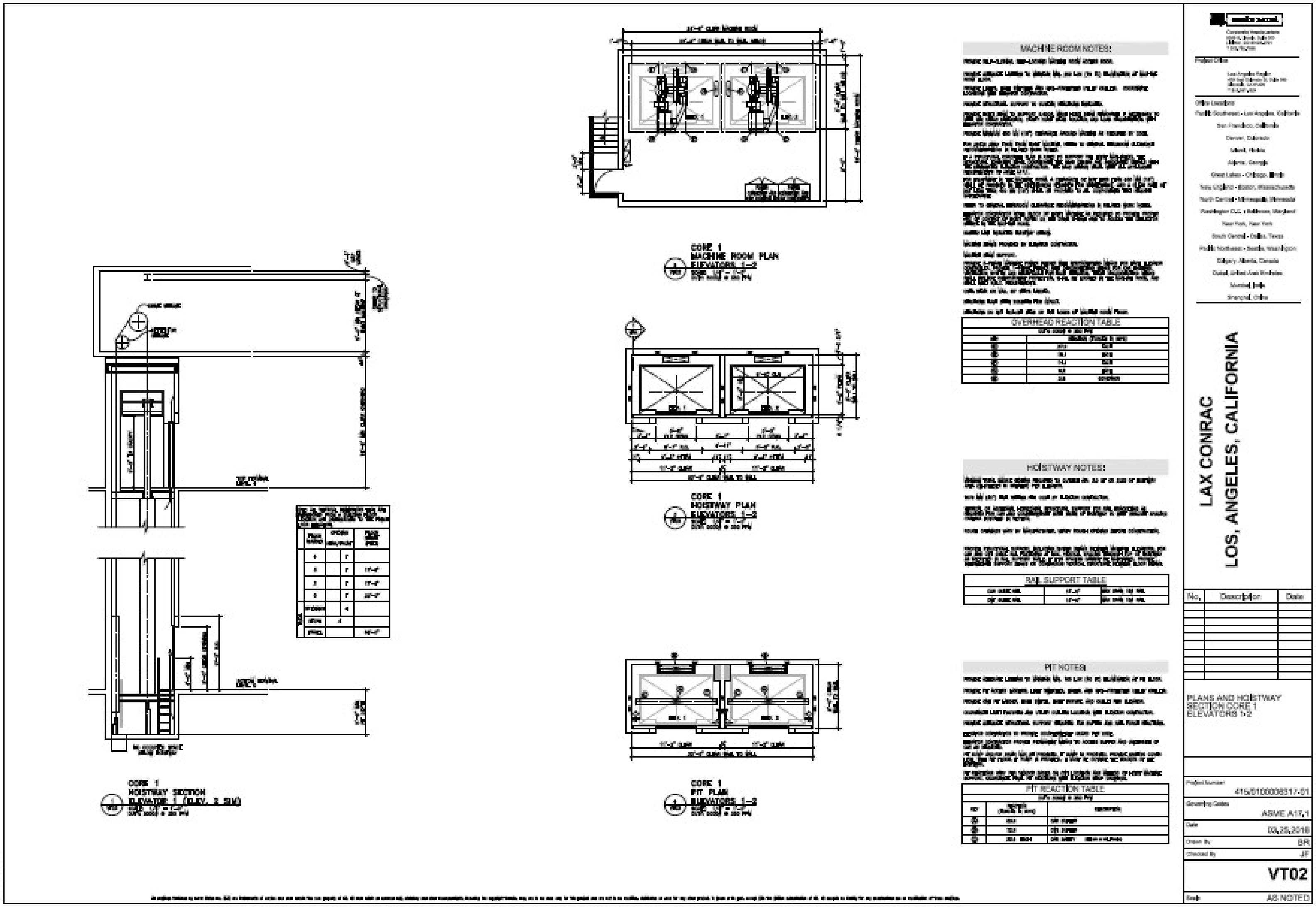
Using the previously established criteria, a group configuration in each core, five (5) cores total, 5,000-pound capacity passenger shaped, overhead traction elevators operating at 350 fpm will provide very good service from an average interval perspective and excellent service from a five-minute handling capacity perspective. These elevators will provide good to excellent service from an average interval perspective. Elevators should be arranged inline.

ConRAC Facility Cores 1, 3 & 4 Escalators: In addition to the proposed elevators noted above for the new rental car facility, Lerch Bates recommends a total of one set of escalators to move in the up and the down to serve levels 1 to 4 in each Core. Each escalator in each Core will serve individual landings, Ground to 4, 2-4 and 3-4. Each of the levels served by the escalators will have one express “Up” unit and one express “Down unit”. ConRAC Facility Core 2 will have an express escalator run in the down direction from 4-3, 4-2 and 4-ground. Each escalator is based on a 40” wide step for maximum movement of passengers, with four flat steps at each landing. The proposed escalators would have glass balustrades to achieve a “low deck” design and the deck finish would be #4 brushed stainless steel. All escalators would be designed for transit duty, have a contract speed of 100 fpm and no escalators would operate below the levels indicated above.

APPENDIX A -
DRAWINGS

LERCH BATES
Building Insight

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CORE 1
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ELEVATORS 1-2
CORE 1
PIT PLAN
ELEVATORS 1-2
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LOS ANGELES, CALIFORNIA
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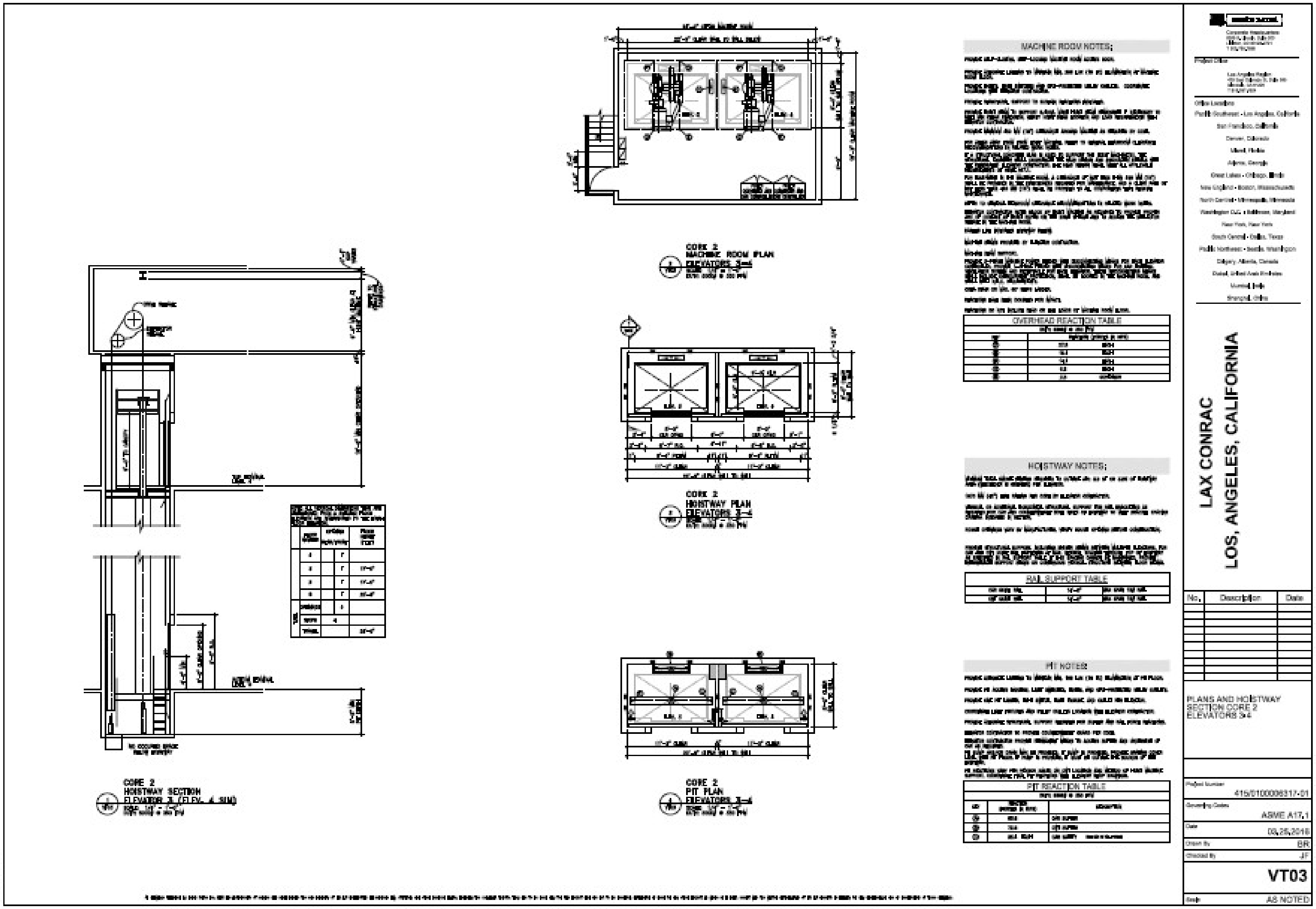
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CORE 2
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LOS, ANGELES, CALIFORNIA
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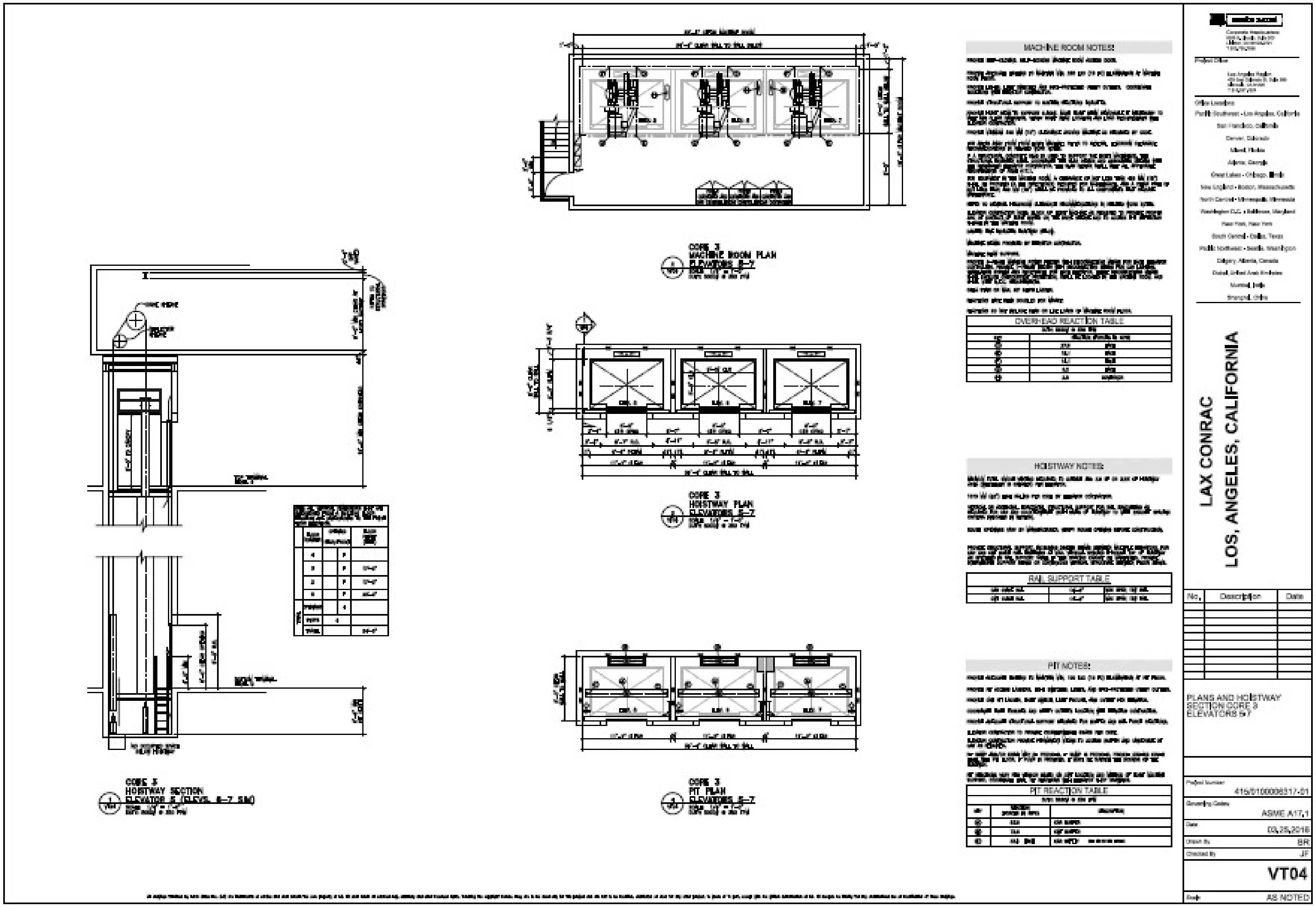
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LOS ANGELES, CALIFORNIA
No.
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Date
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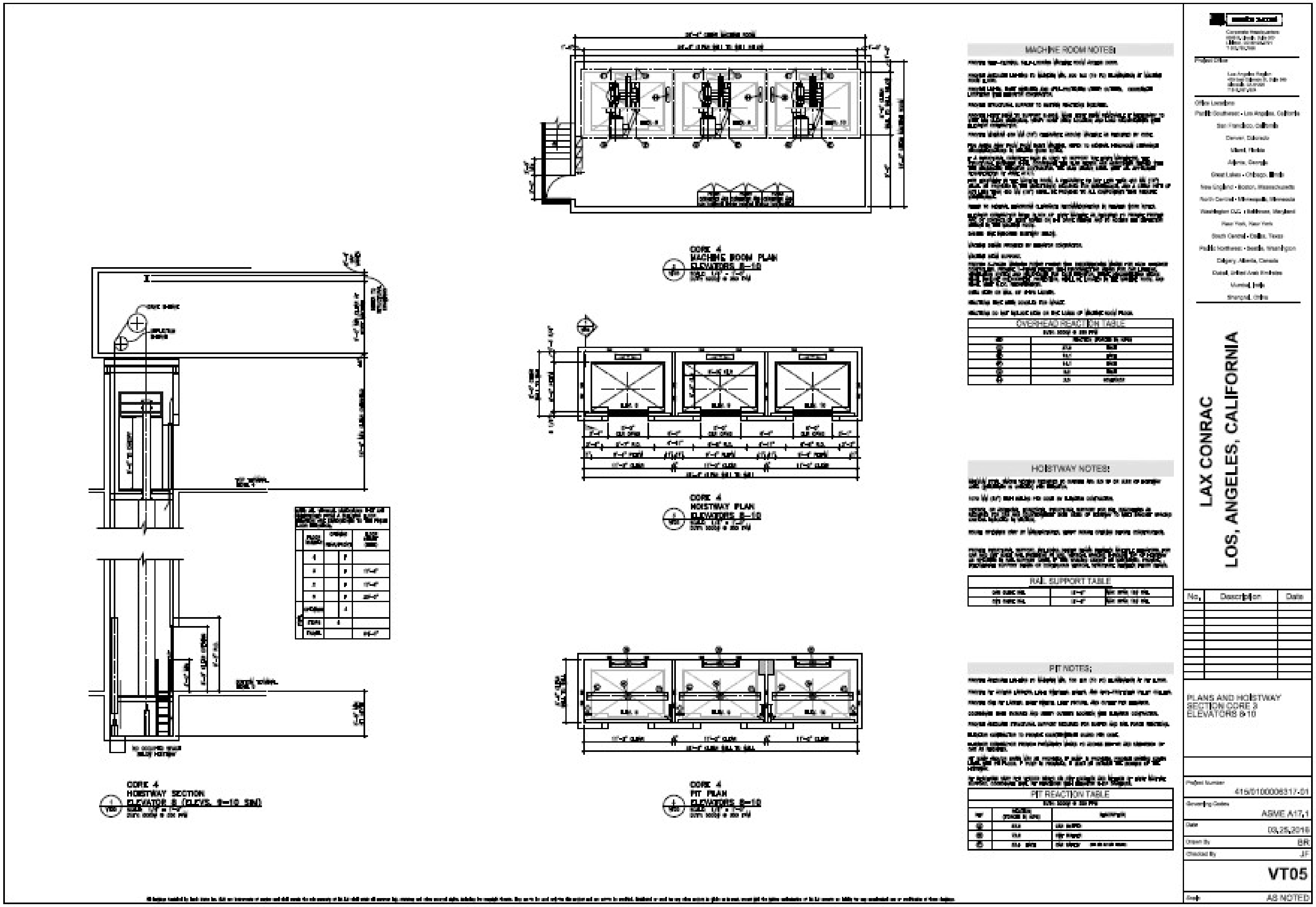
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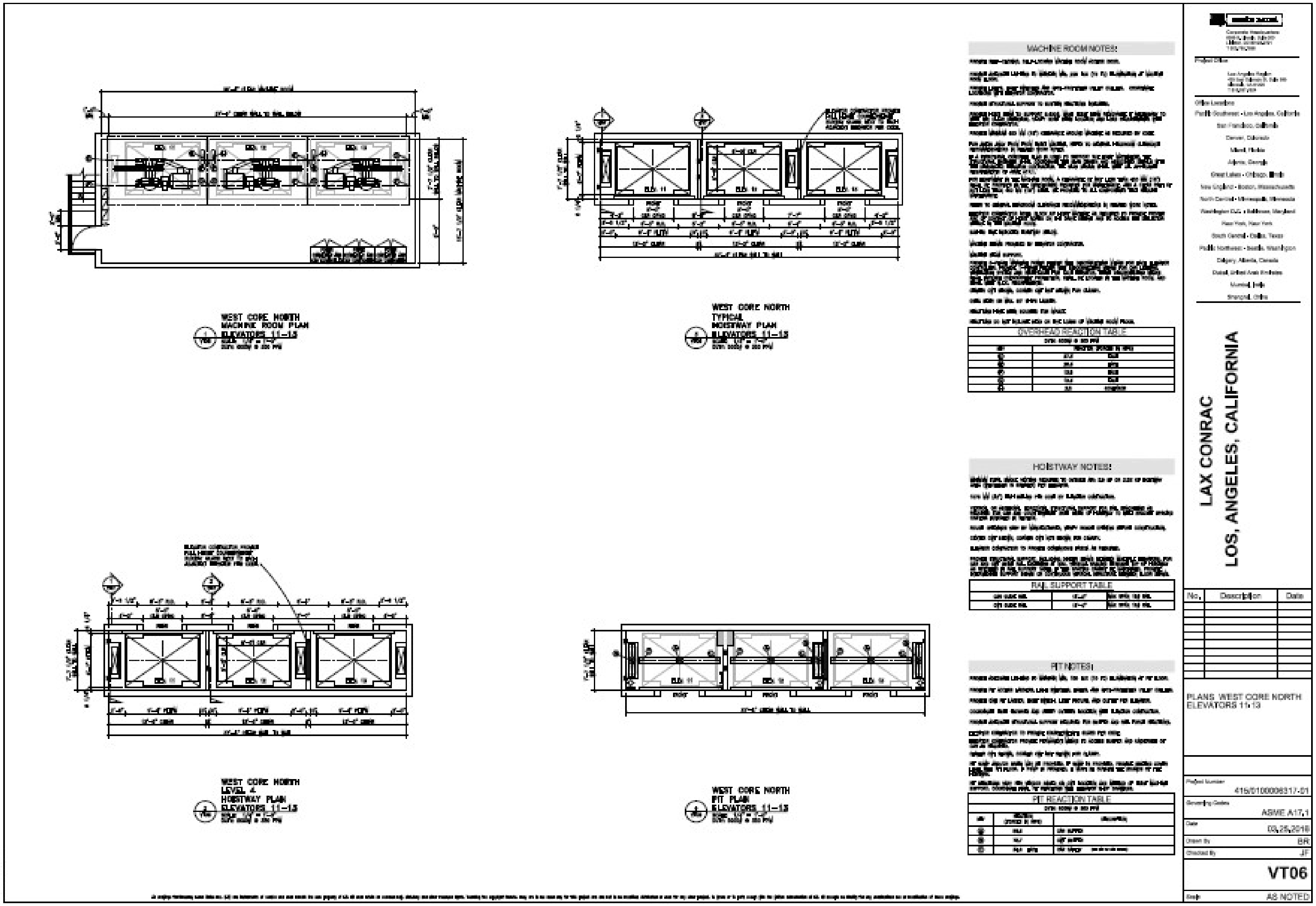
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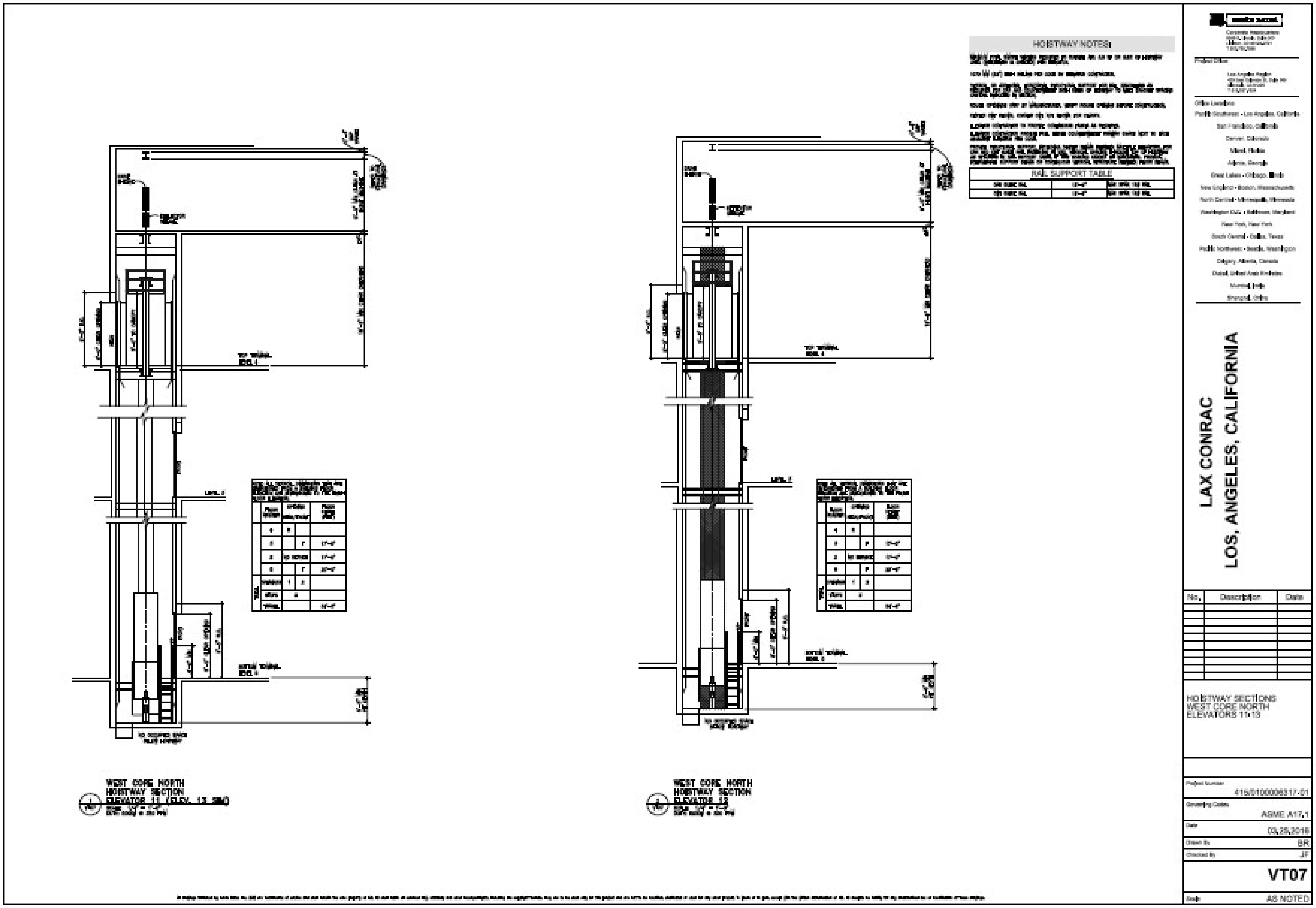
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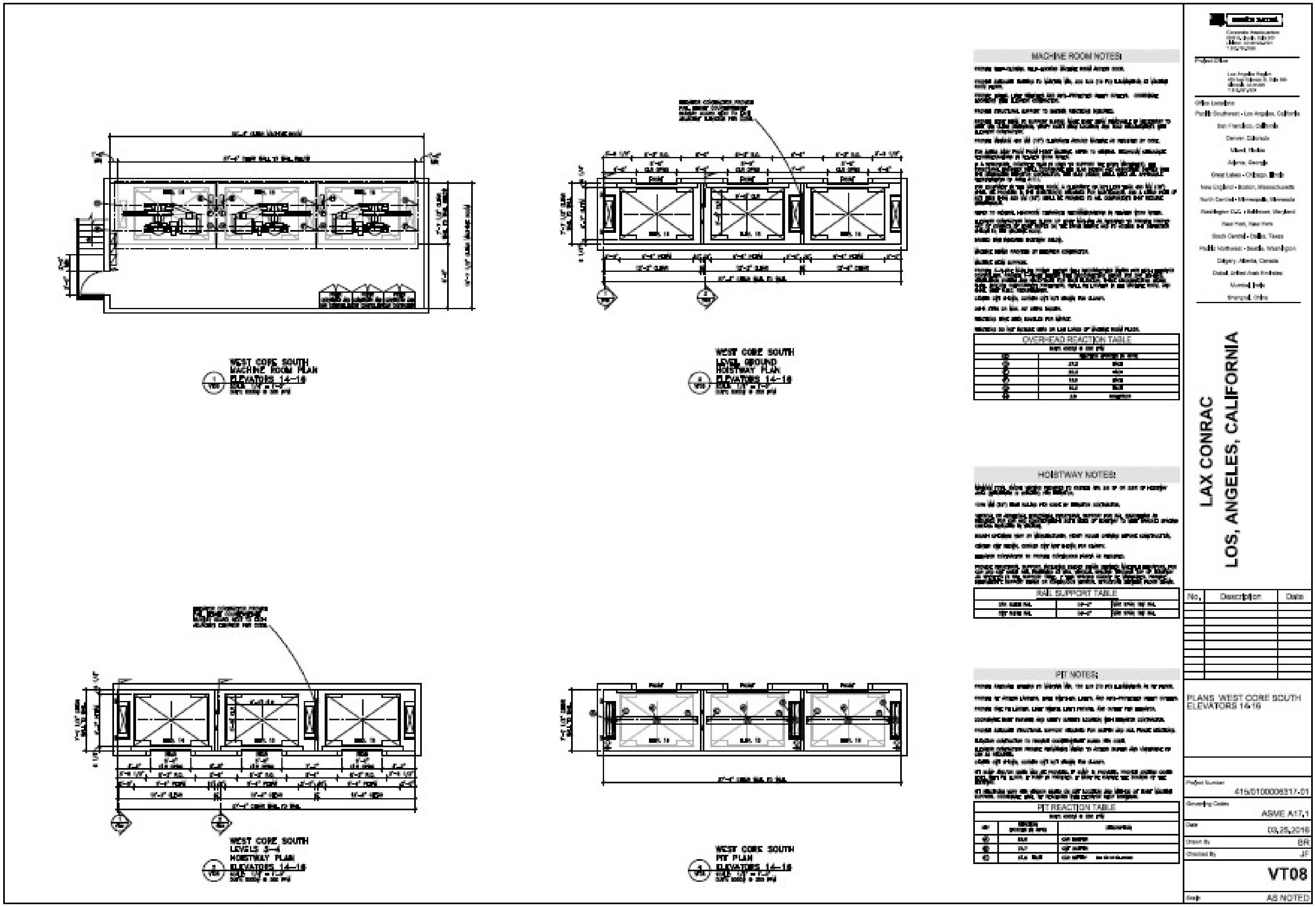
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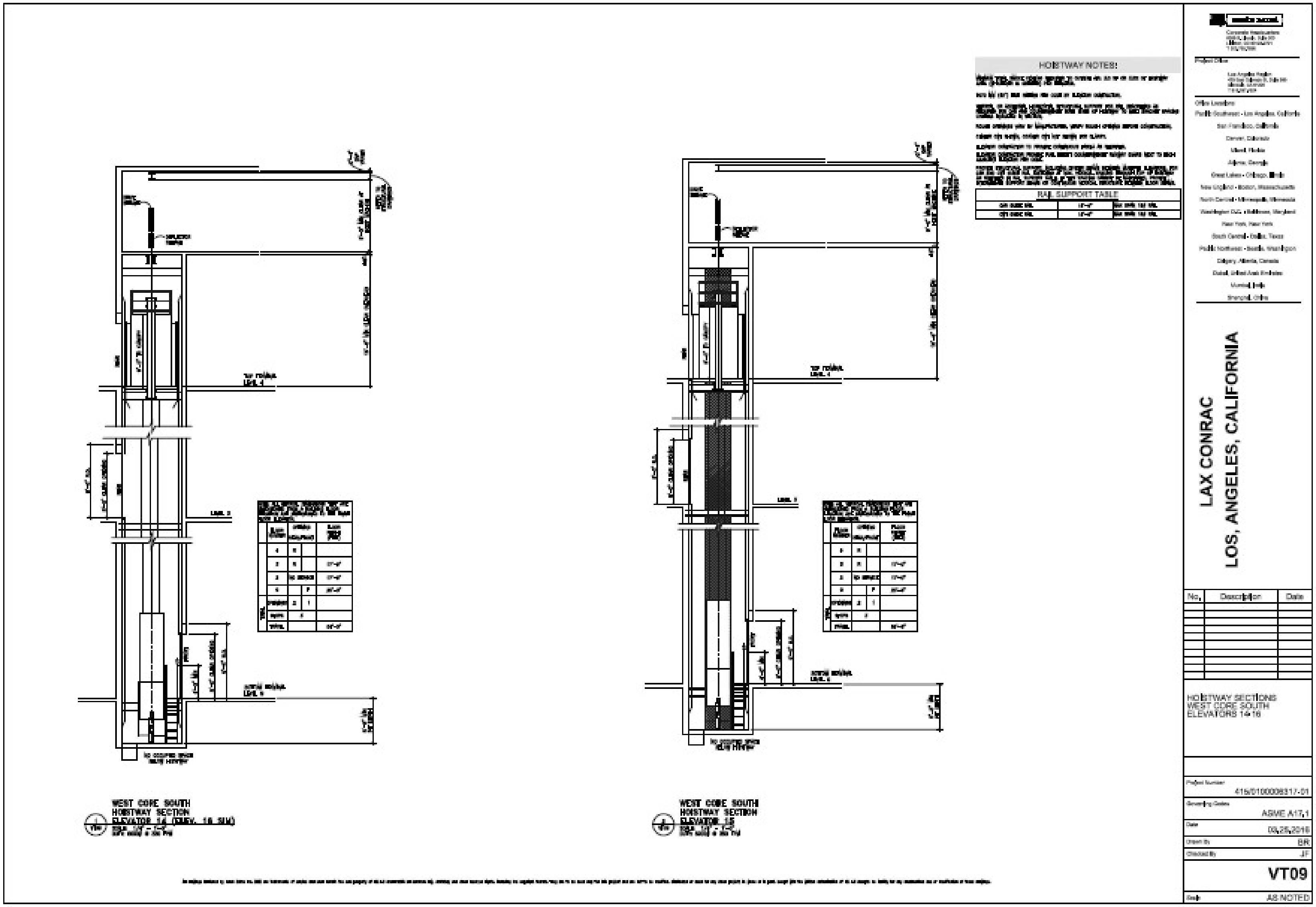
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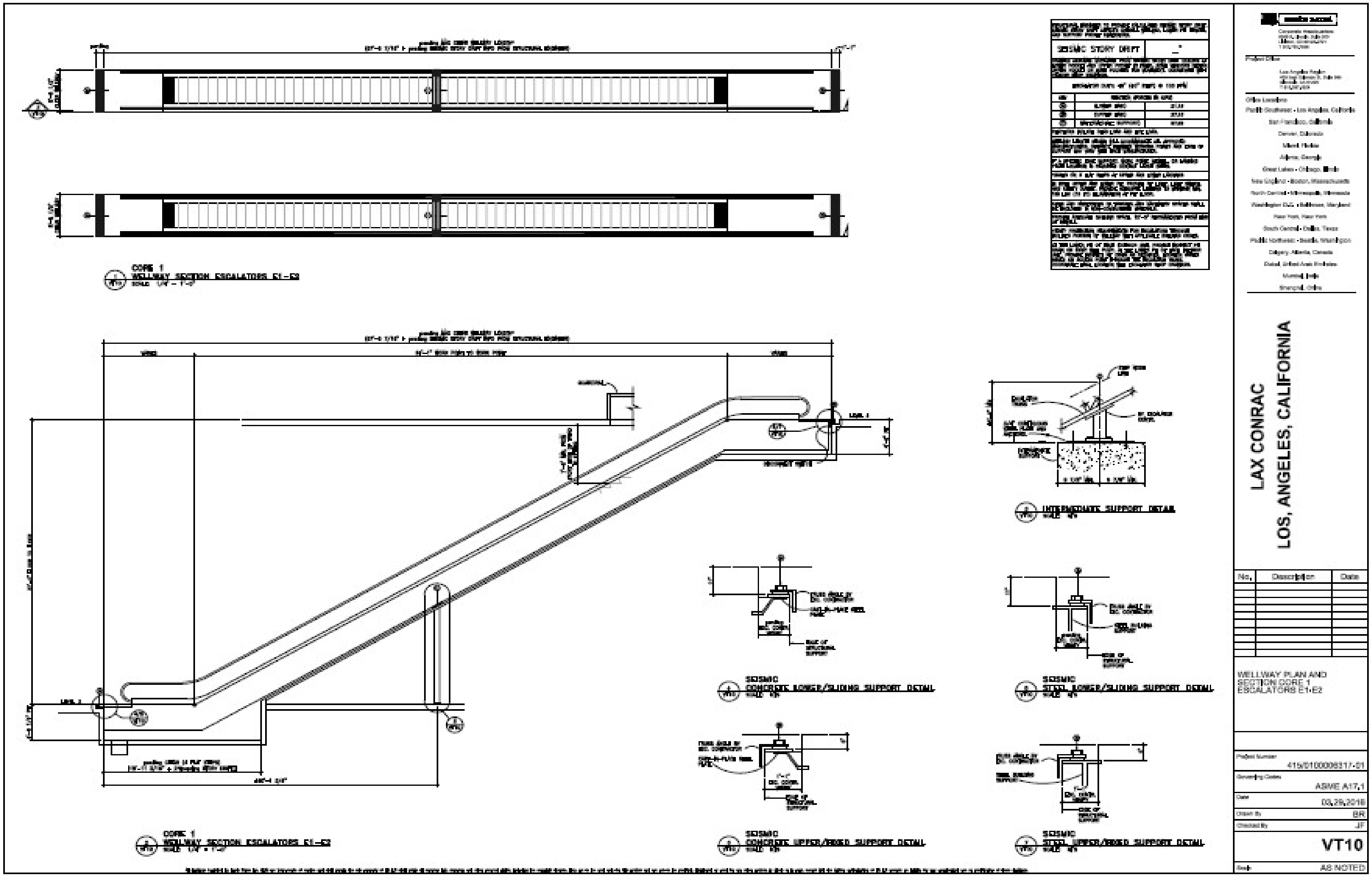
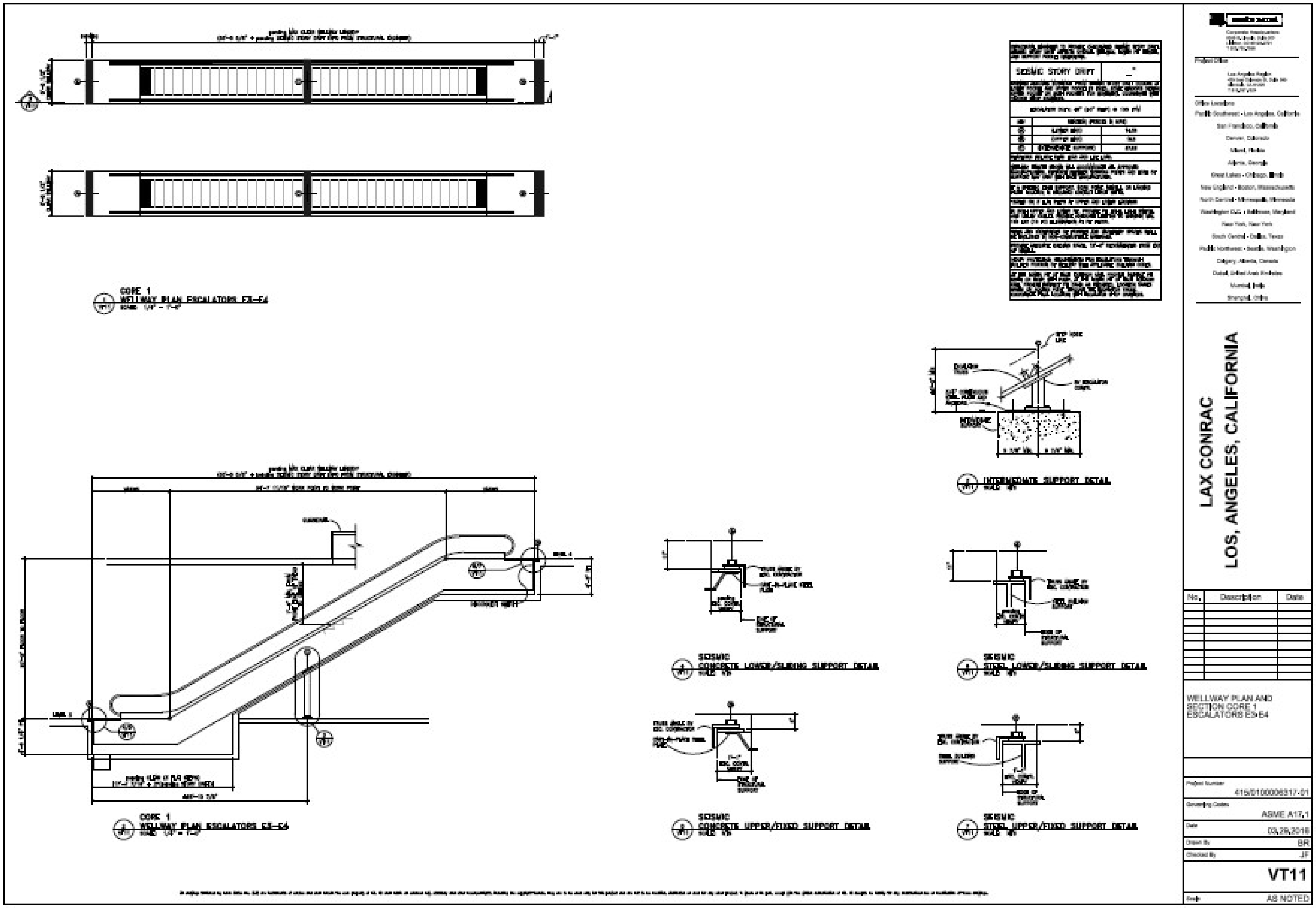
LERCH BATES
Building Insight

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LAX CONRAC
LOS ANGELES, CALIFORNIA
No.
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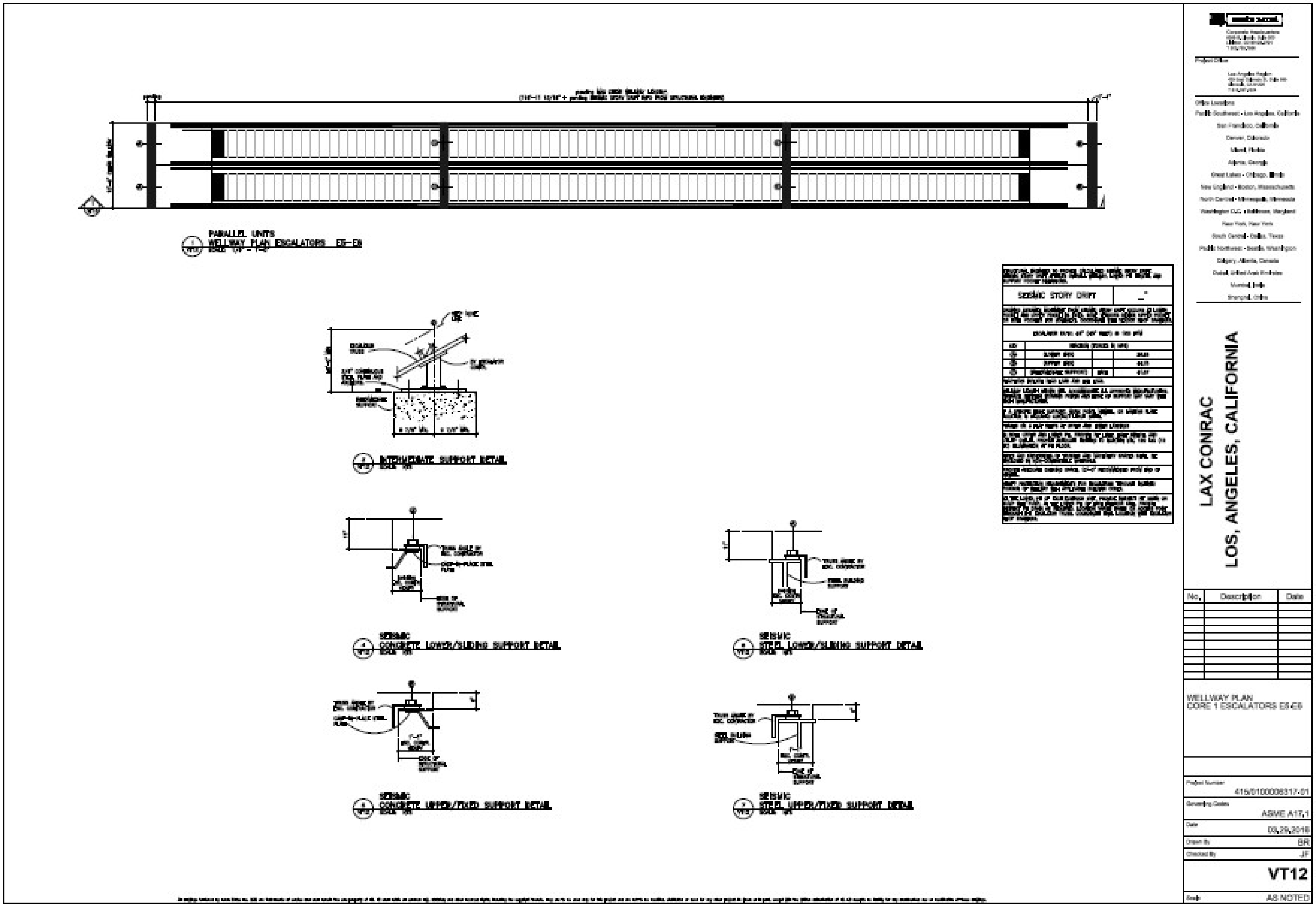

SEISMIC STORY DRIFT
INTERMEDIATE SUPPORT DETAIL
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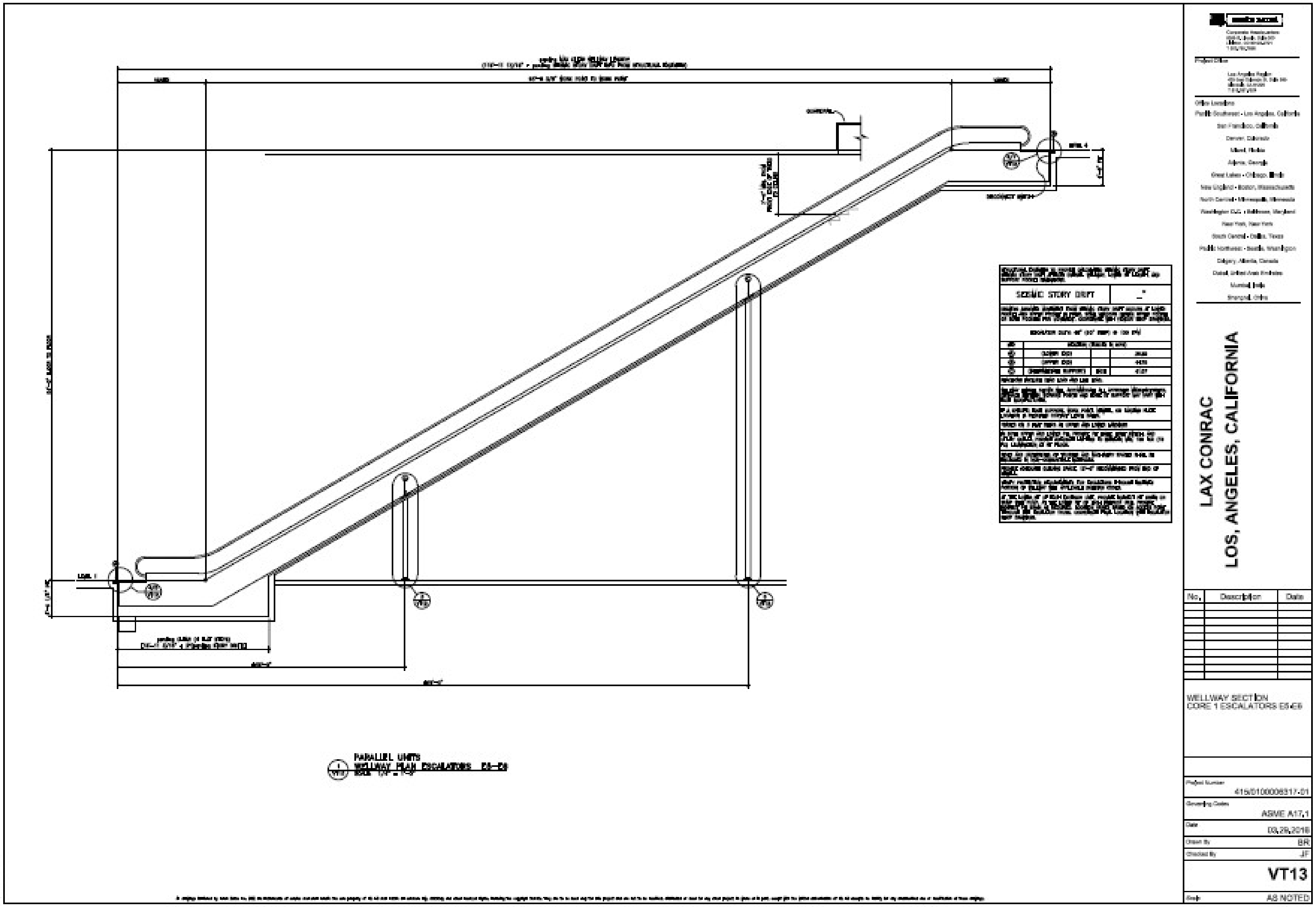
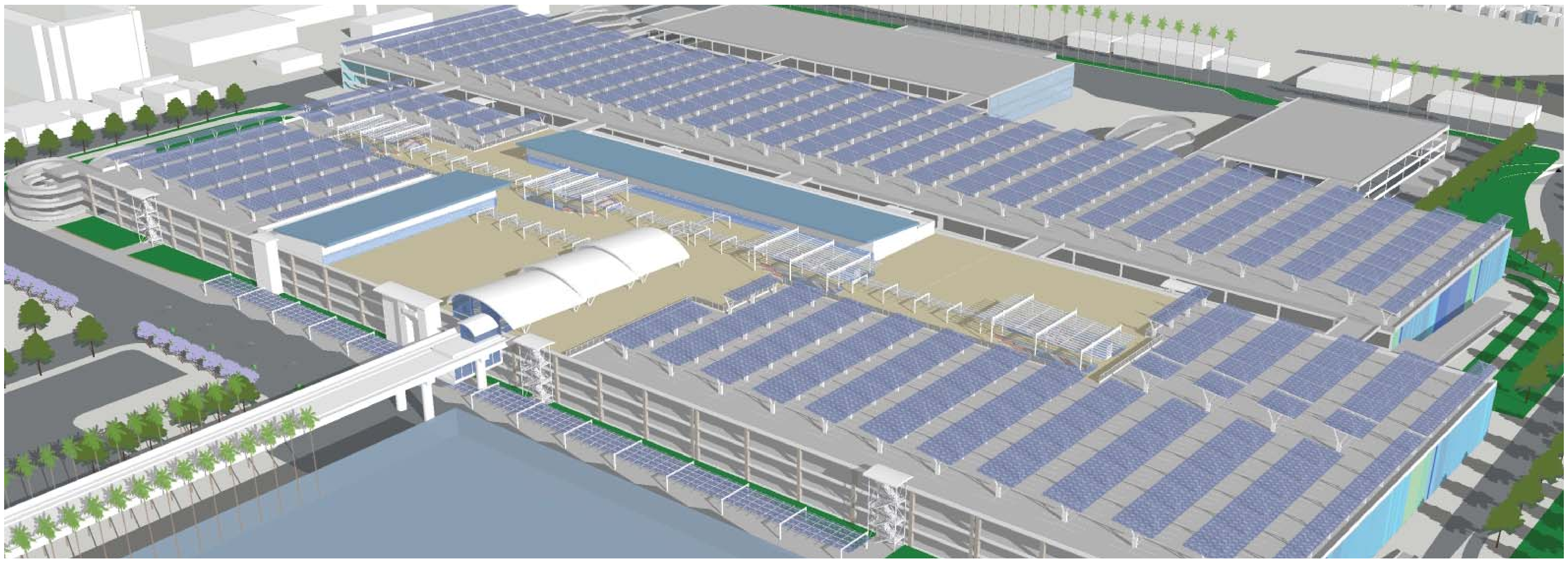
SEISMIC STEEL LOWER/SLIDING SUPPORT DETAIL
SEISMIC CONCRETE UPPER/FIXED SUPPORT DETAIL
SEISMIC STEEL UPPER/FIXED SUPPORT DETAIL
LAX CONRAC
LOS ANGELES, CALIFORNIA
No. Description Date
WELLWAY PLAN
CORE 1 ESCALATORS E5-E6
415/0100006317-01
ASME A17.1
03.29.2016
BR
JF
VT12
AS NOTED


SEISMIC STORY DRIFT
PARALLEL UNITS
LAX CONRAC
LOS, ANGELES, CALIFORNIA
No.
Description
Date
WELLWAY SECTION
CORE 1 ESCALATORS E5-E6
415/0100006317-01
ASME A17.1
03.29.2016
BR
JF
VT13
AS NOTED

Appendix 8.4 Customer Service Building Design Development



LAX CONSOLIDATED RENTAL CAR FACILITY

VOLUME 6

FEBRUARY 26, 2016

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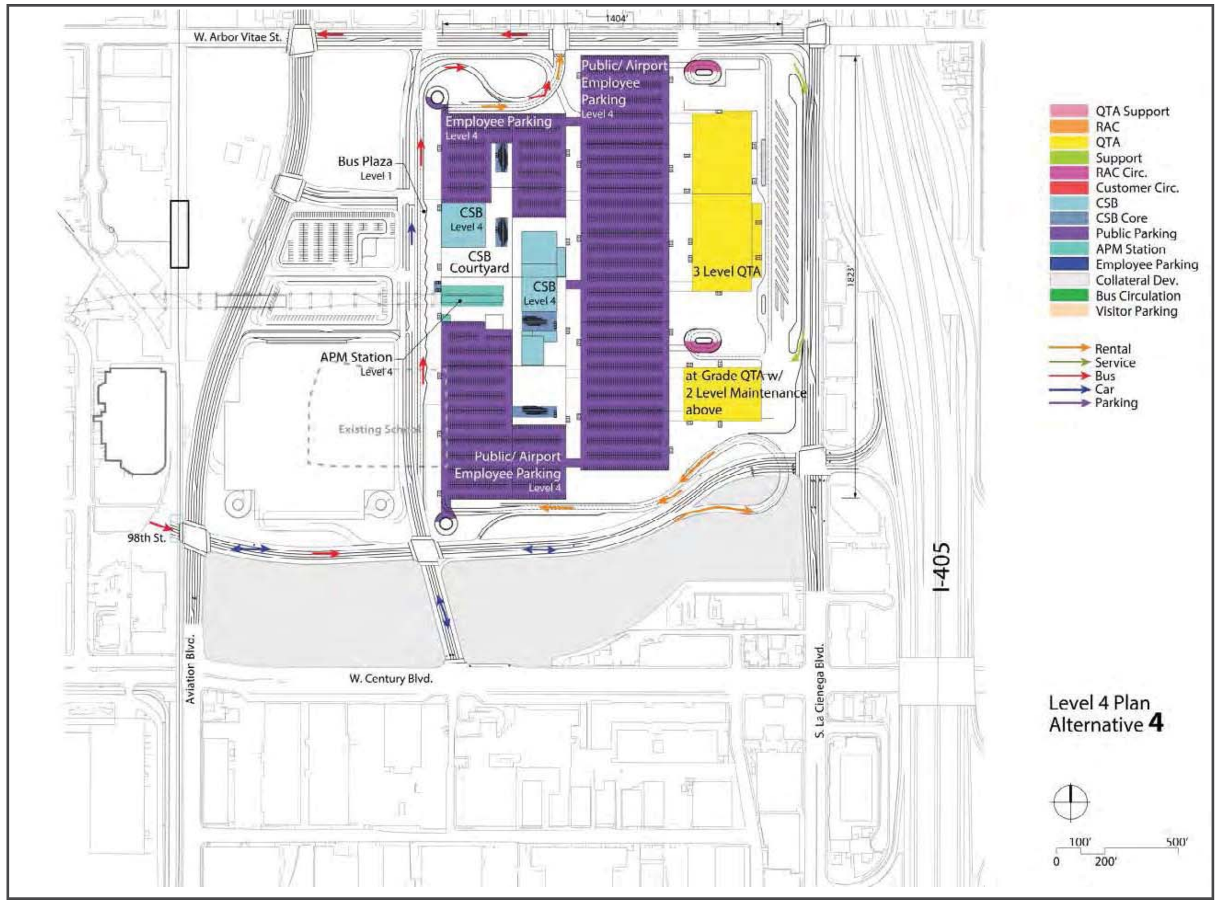
1. INTRODUCTION



Preferred ConRAC Concept

Through a series of planning workshops facilitated by TranSystems with LAWA and the rental car industry, a preferred ConRAC layout was selected in April, 2015. Between May and December 2015, the Design Team refined development of the functional requirements, customer service needs, architectural character, customer experience and overall mass and shape of the ConRAC.

The functional values which the preferred scheme reflects include:

- Customer Service – quick and easy to use
- Operational Efficiency – minimize labor and process time
- Efficient Use of Money - optimize the utilization of all facilities
- Flexibility - accommodate growth and industry changes
- Level Competitive Playing Field - all users have an equal opportunity for efficient and profitable operations

The characteristics of the preferred layout, as shown in the adjacent figure are as follows:

- Three levels for Ready/Return, QTA and Idle Storage
- Idle Storage located in the Center of the Site - Between the Ready/Return and the QTA Buildings
- Ground Level QTA Areas for Independent Operators
- CSB and APM Station at Level 4
- Bus Plaza at Ground Level - with vertical transportation core providing access to the CSB for interim consolidated shuttle bus operations prior to the start of operation of the APM
- A centralized QTA Support Area
- Employee and Visitor Parking on a Portion of Level 4 of the RAC Building

At LAWA's request, the Design Team studied the feasibility of incorporating between 2,000 and 2,400 airport employee or public parking spaces on the Level 4 of the storage building.

The preferred layout for the CSB for the LAX ConRAC was studied during this initial design phase and is captured in this volume of work.

2. CUSTOMER SERVICE BUILDING (CSB) DEVELOPMENT

The Customer Service Building (CSB) is the public hub of the ConRAC. Similar to the airport passenger terminal the CSB is the area in which arriving passengers pick-up their rental contracts from the various companies, are provided a range of amenities such as restrooms, food and beverage services, internet access and seating areas. Recent CSB's have also provided business centers adjacent to the lobby area.

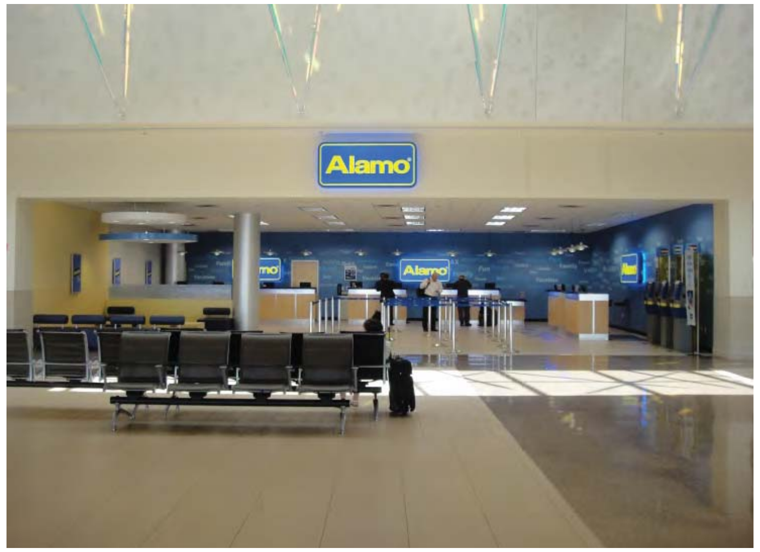
There are a variety of configurations in which the customer service counters may be accommodated. They can be arranged in a linear layout, similar to most airport passenger check-in areas, or they can be arranged in a "mini-mall" arrangement in which the customer service counters are positioned within their own distinct module that may also contain seating areas and customer travel services.

The CSB will be designed to provide a direct connection to the ConRAC APM station. There will be two separate platforms – the north platform will be used by arriving customers on their way to pick-up a vehicle; and the center platform will be used by departing customers on their way to the terminal, or the Metro station at 96th St. There will be no level changes between the CSB and the APM platforms. Customers will be able to transition, easily and intuitively, from the CSB to the various ready/return levels in the rental car garage via multiple vertical transportation cores, containing both escalators and elevators.

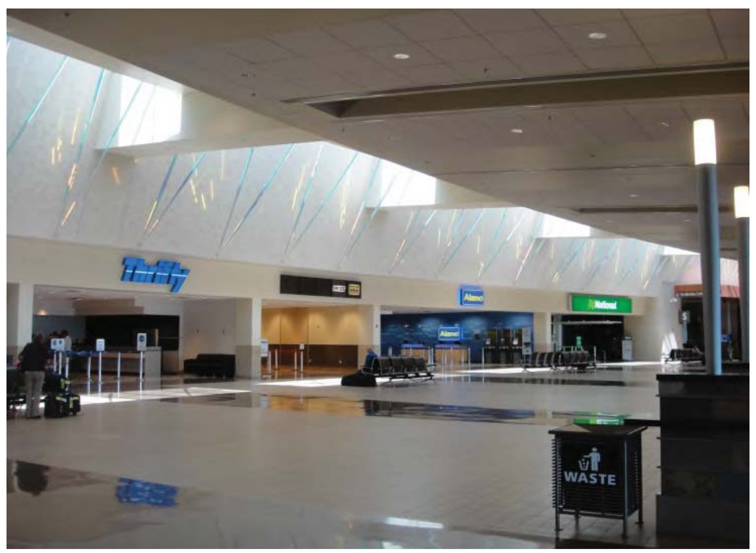
For the initial opening of the ConRAC, a grade level Bus Plaza will be developed to accommodate an interim shuttle bus operation. A centralized vertical circulation core with elevators will be constructed to provide a convenient connection between the Bus Plaza and the CSB.

Below is a timeline of the study and development of the CSB:

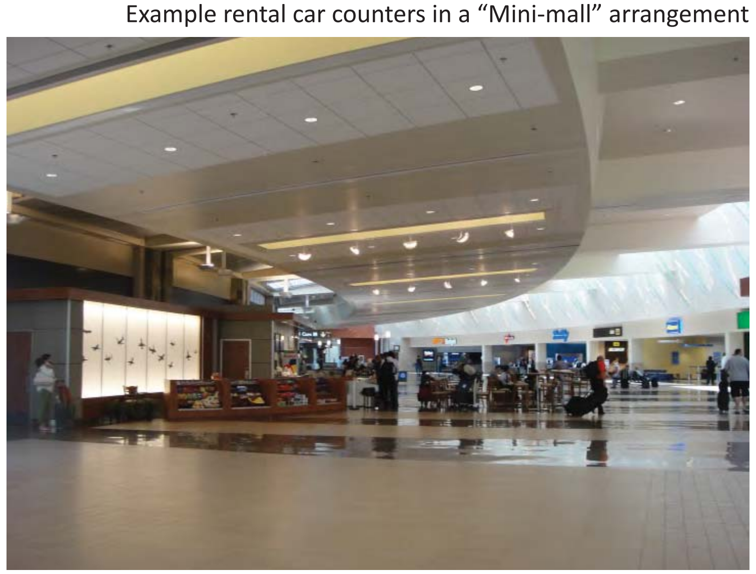
A.	B.	C.	D.	E.	F.	G.	H.	I.	J.
pg 4	*pg 17*	*pg 23*	*pg 38*	*pg 52*	*pg 56*	*pg 61*	*pg 67*	*pg 72*	*pg 75*
-Keep brands within Family -Design to enhance safety & security -Equal opportunity -No level change from CSB to APM	-55' height limit -Group B occupancy -Outdoor lobbies -CSB floor area = 155,000 sq. ft.	-Multi-story CSB -CSB north of APM -Direct access from RAC to rental -Single vantage	-CSB with view vista of Downtown Los Angeles -3 east cores -2 west cores -Unconditioned lobbies -Offices on RAC levels	-Moving sidewalks -Accessible by bus and APM -Access moving towards destination -Consolidated brand family operation	-5 cores -Reduce CSB to 90,000 sq. ft. -West cores accessible from APM mezzanine -South cores for returns only	-Brand family positioning based on south main QTA and north main QTA -4 cores	-Organize CSB and brand allocation based on cores	-4 cores -3 separate CSB	-4 cores -2 seperate CSB -Two southern cores rotated 90 degrees



Example of typical customer service counter and waiting area

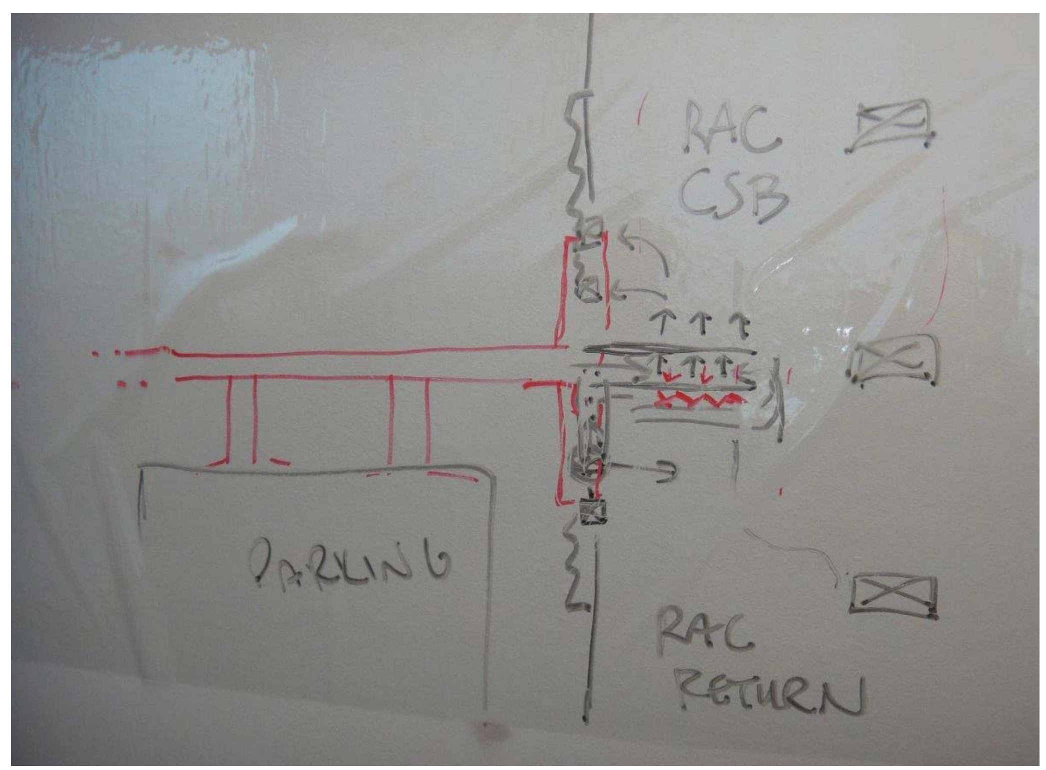


Example rental car counters in a “Mini-mall” arrangement


Typical CSB Lobby with retail services

Program for Preferred Alternative Layout:

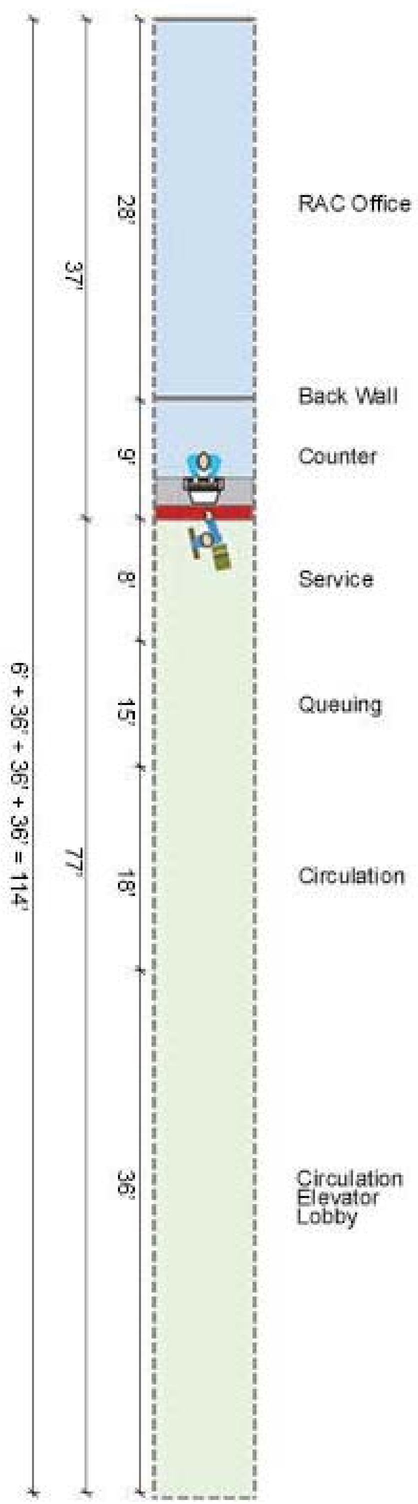
Customer Service Counter Requirements	
2013 peak hour rentals (sum of all current operators' peak hour)	1,313 transactions
Future capacity required to accommodate 42% growth	1,862 transactions
Process rate – transactions per hour	
Leisure Customers – 10 minutes per transaction	6 per hour
Premium Customers – 3 minutes per transaction	20 per hour
Number of Customer Service Counters	
Leisure Customers	208 counter positions
Premium Customers	31 counter positions
Allowance for small operators (5%)	15 counter positions
Total number of Customer Service Counters	**254 counter positions**
Subtotal CSB Area for all Operators	**100,000 sq. ft.**
Number of Vertical Cores for Escalators/Elevators/Exit Stairs	4 cores
Area Per Vertical Core	13,000 sq. ft./core
Vertical Core Area in CSB	52,000 sq. ft.
Support Space (14% of CSB Area + Vertical Cores for mechanical, electrical, fire protection and communication equipment rooms)	22,000 sq. ft.
Enclosed CSB Area for All Operators 174,000 sq. ft.	**174,000 sq. ft.**
Unenclosed Courtyard (between APM Station/Bus Plaza Core and RAC Lobby)	100,000 sq. ft.
Gross Area for the Customer Service Building	**274,000 sq. ft.**
RAC Back Offices at the Ready-Return Levels (3,500 sq. ft. per level x 3 levels for ready/return)	10,500 sq. ft.



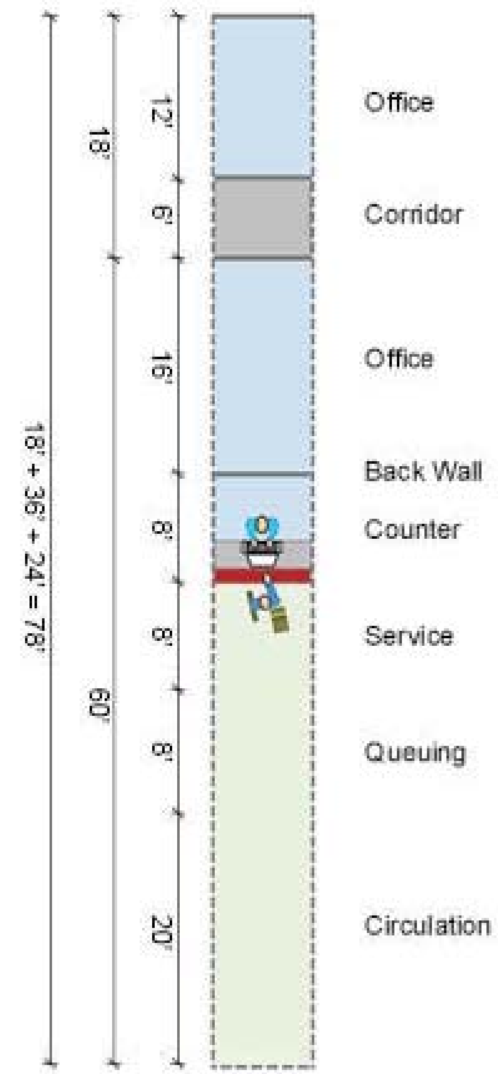
White-board diagram of passenger access to CSB from the roof- level APM

A. CSB DESIGN CONSIDERATIONS:

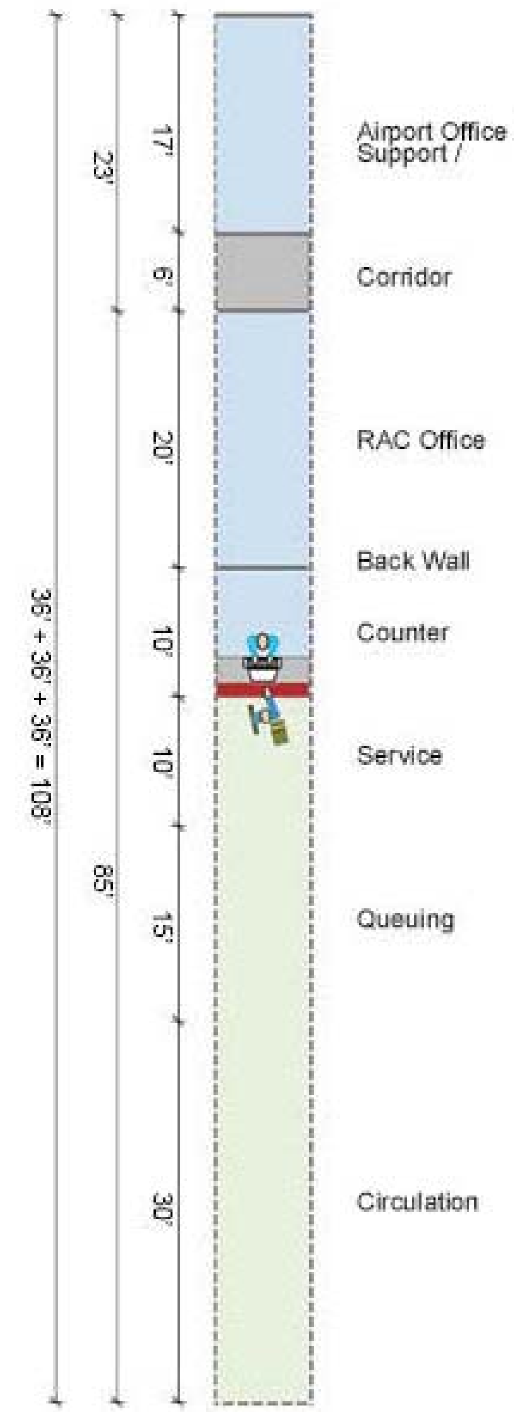
-Refine CSB layout based on Preferred Alternative layout and counter and area requirements selected in April, 2015
-Keep brands within Family
-Design to enhance safety and security
-Equalize the Ready/Return area available on all three levels
-Provide maximum flexibility for future reallocation of facilities
-No level change from CSB to APM
-Independent APM station for the ConRAC



Example of customer service counter from SJC CSB

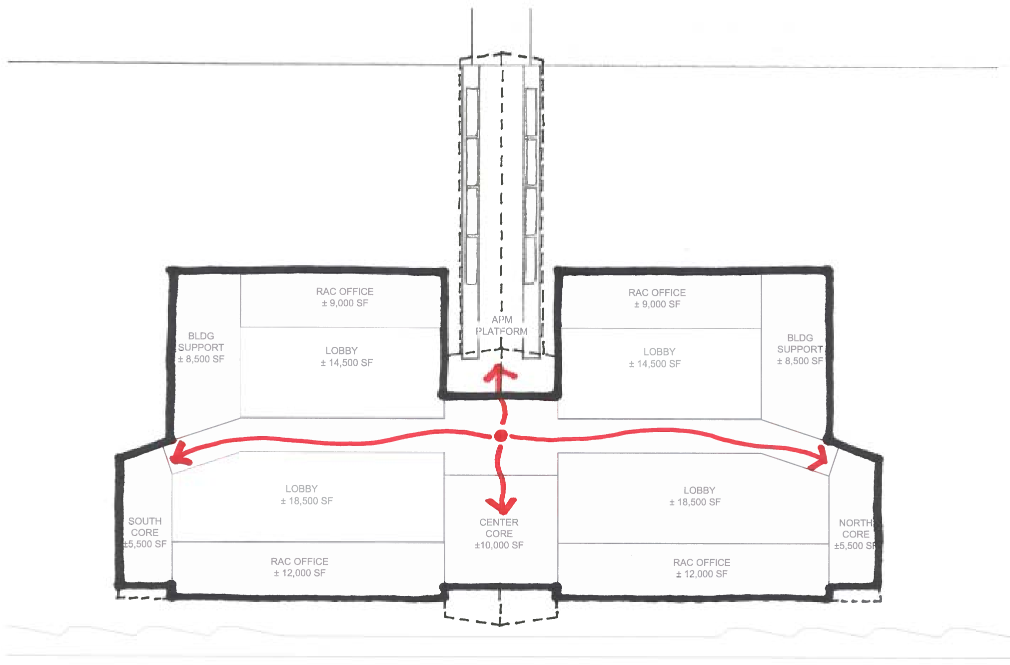


Example of customer service counter from MDW CSB

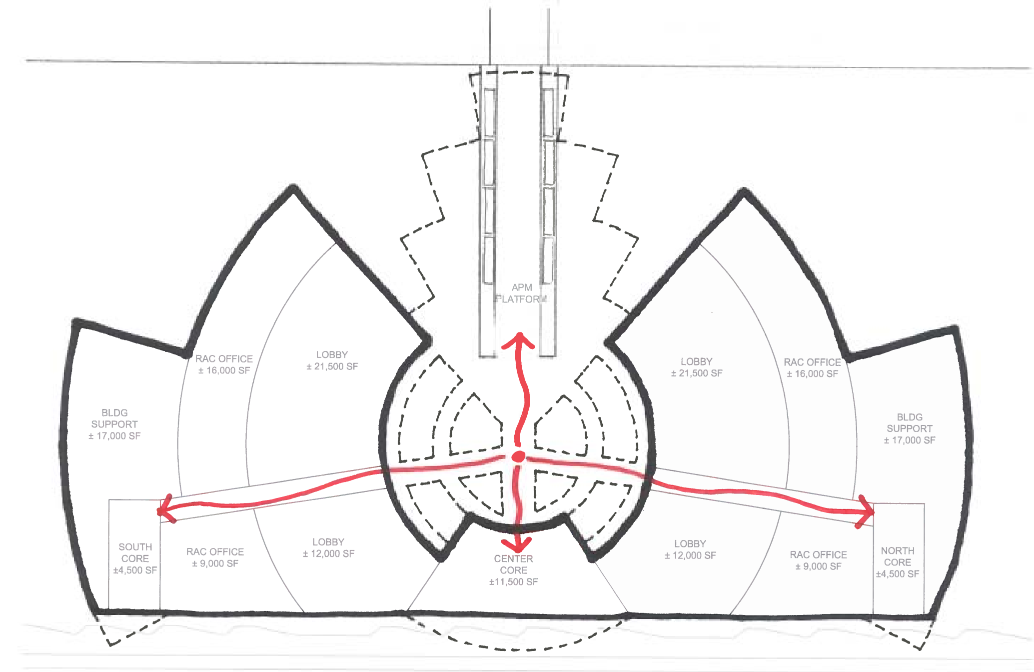


Example of customer service counter from ORD CSB

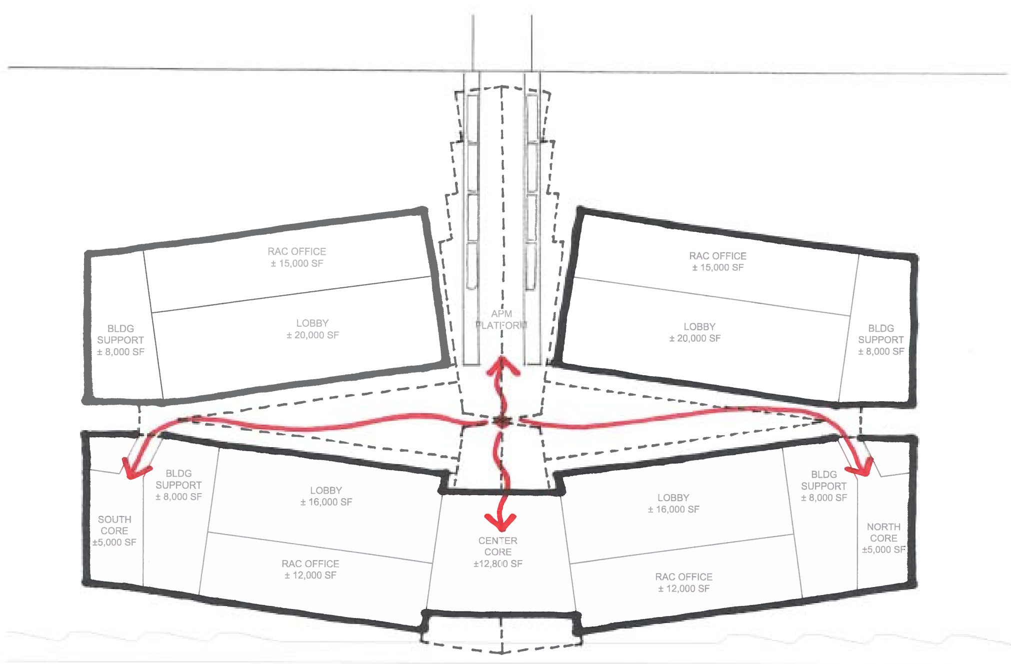
- Lobby, counter and office areas were studied along with passenger flow in considering appropriate areas for successful CSB functionality.



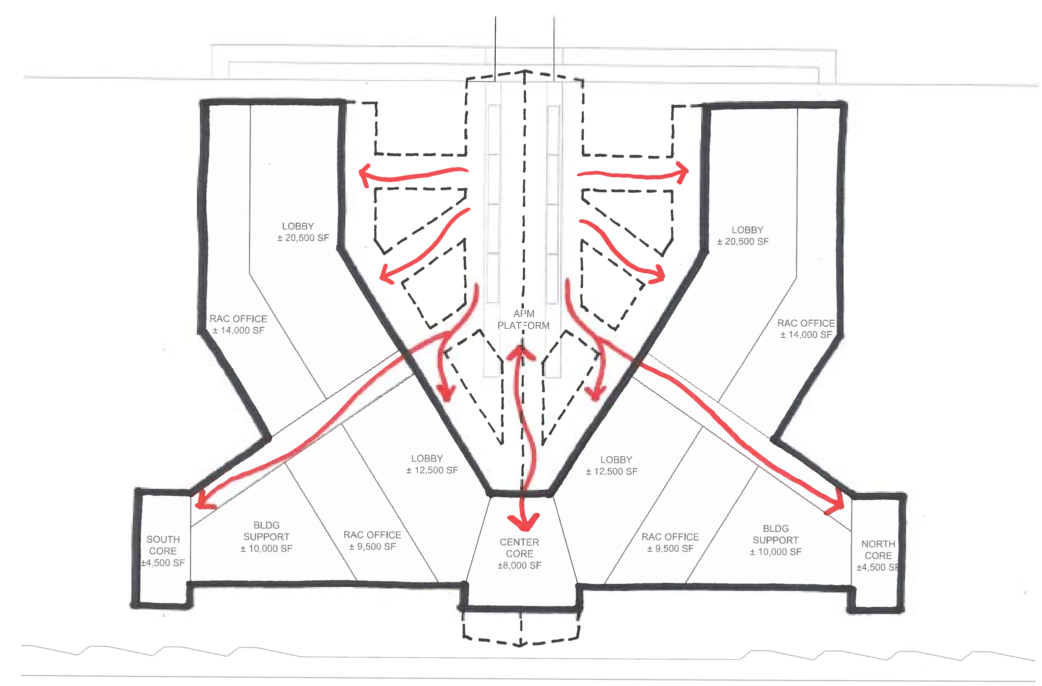
LAX CONRAC
CSB - BIG BOX 5/30/15



LAX CONRAC
CSB - SUN RAY 5/30/15

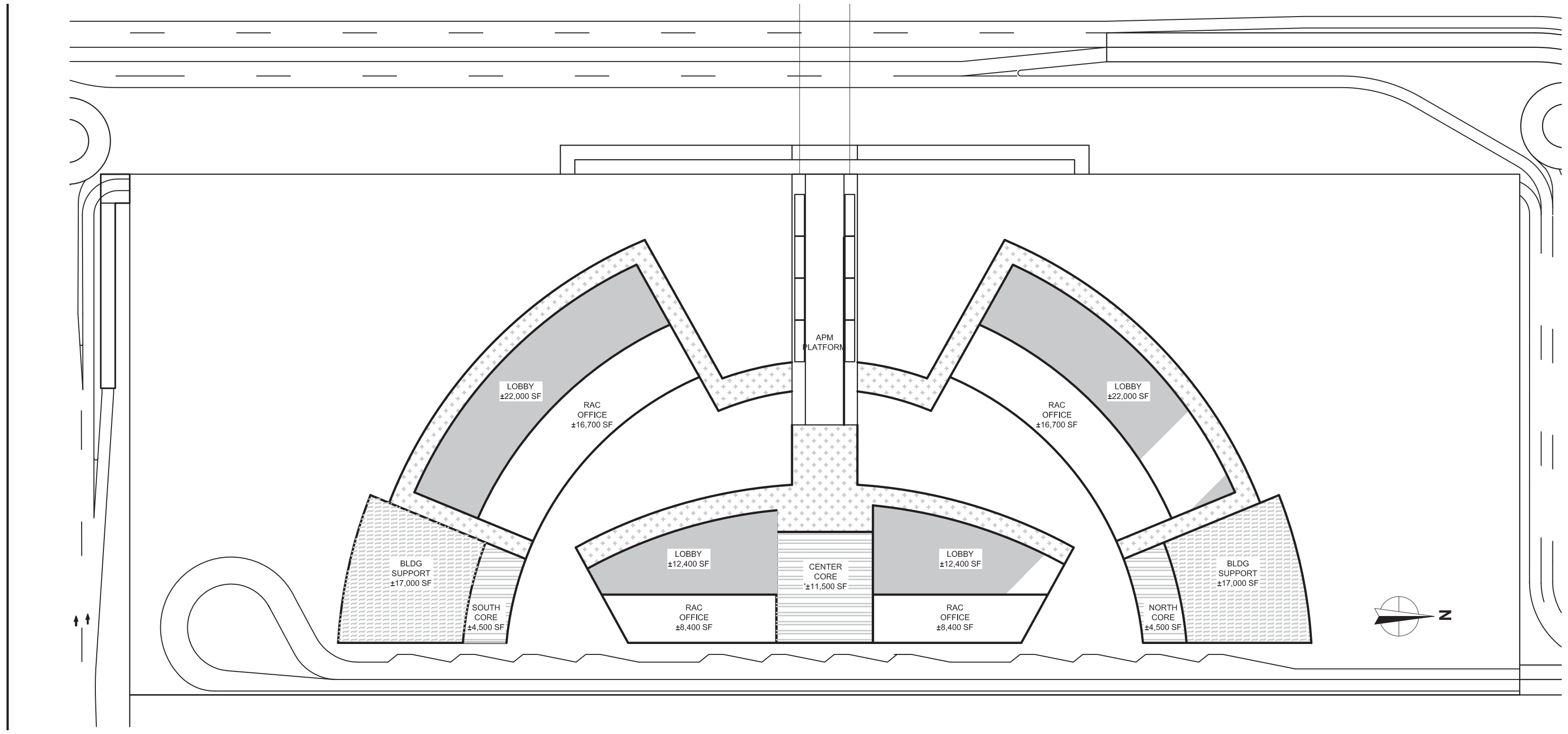


LAX CONRAC
CSB - PROMENADE 5/30/15

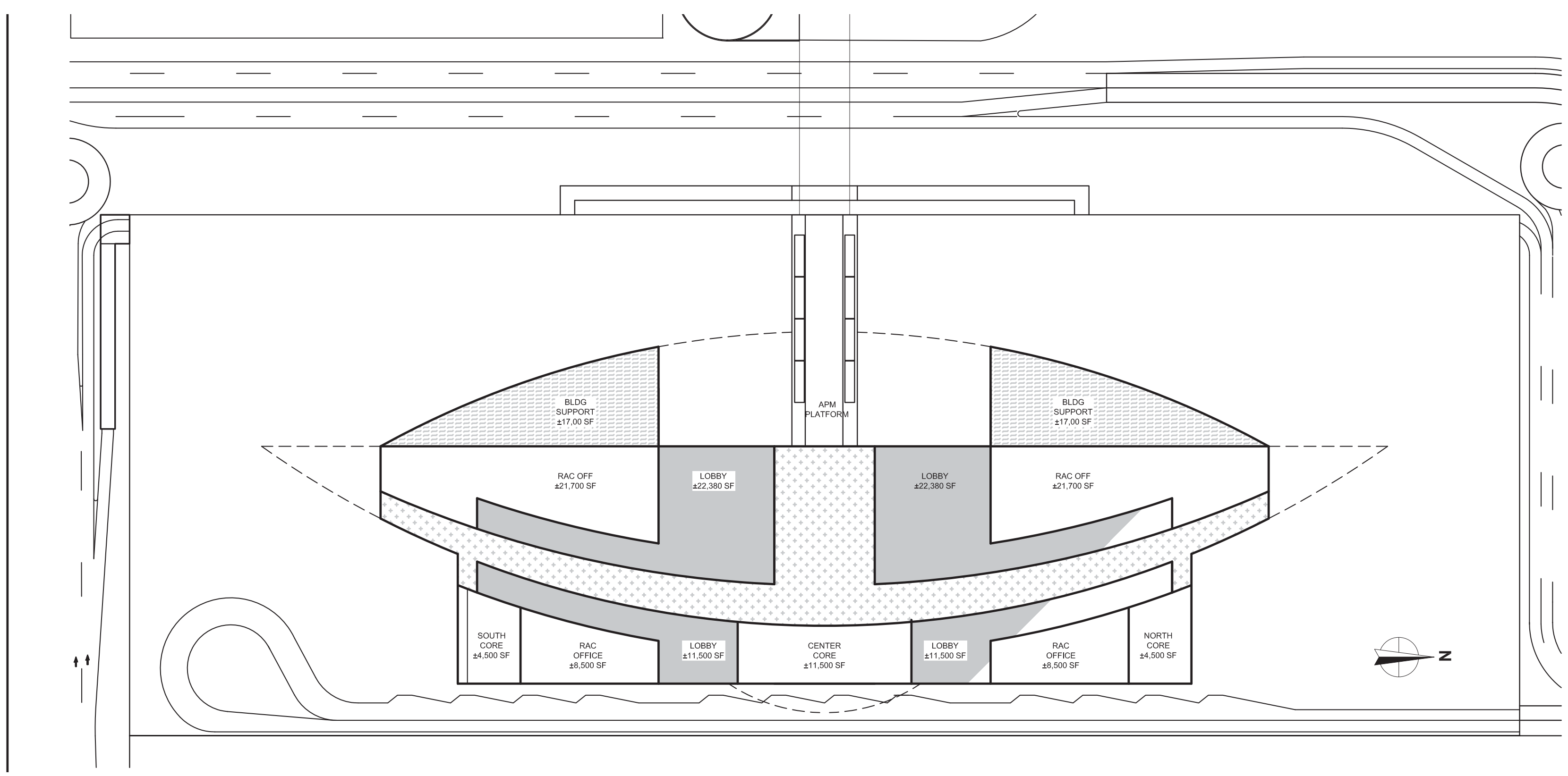


LAX CONRAC
CSB - WRAP AROUND 6/2/15

- Passenger flow diagrams with different concepts considering arrival, initial view for equal opportunity, and access to the lobbies and vertical circulation cores.

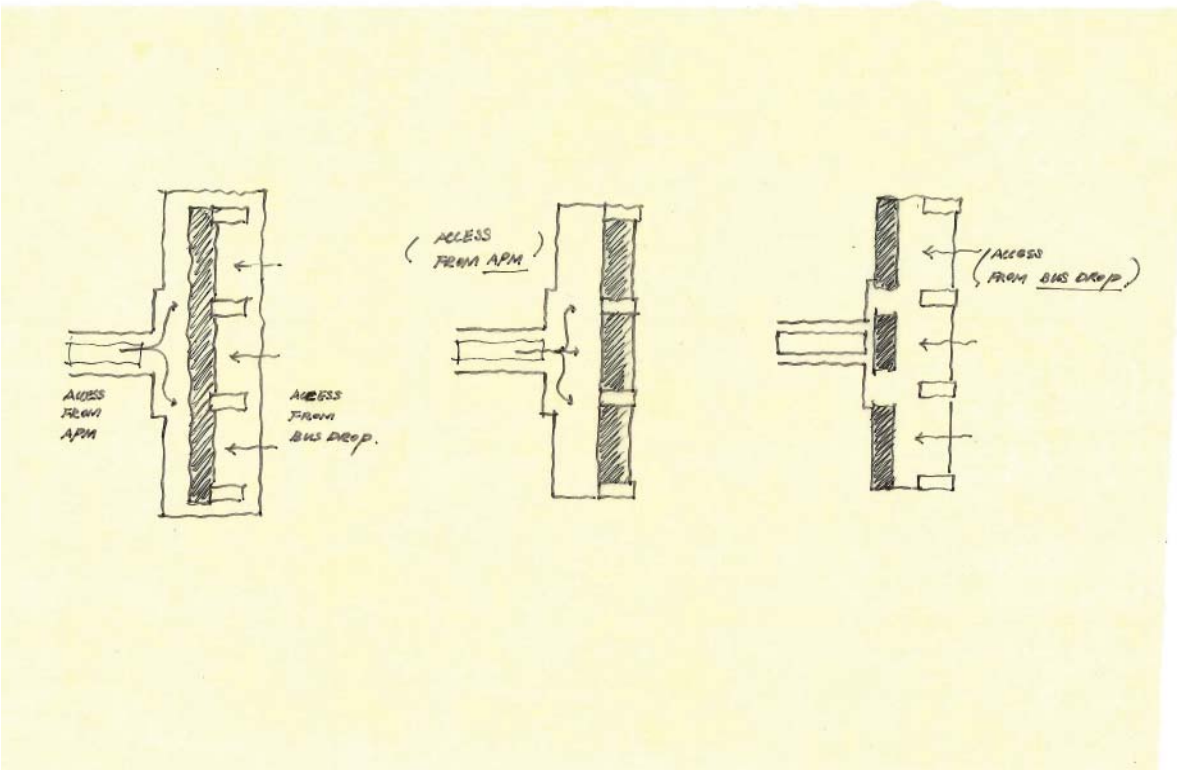


"Sun ray" scheme with exterior corridors accessible from central area

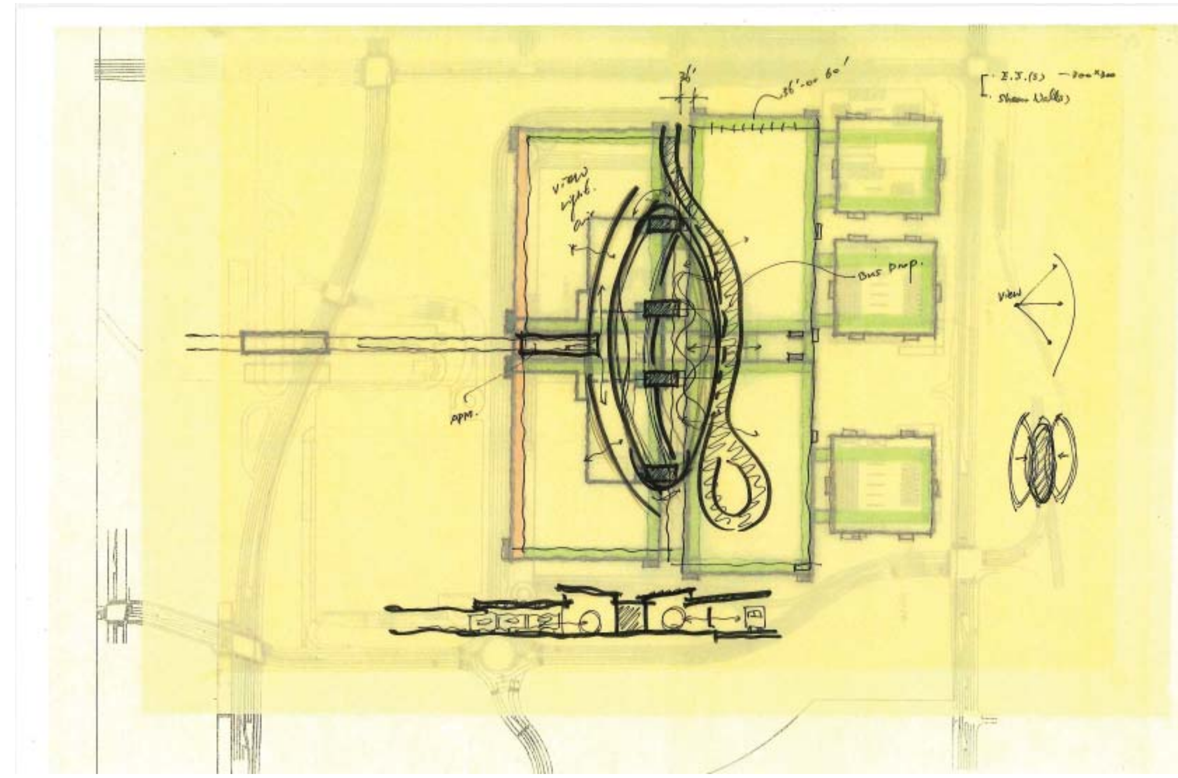


"Promenade" scheme with interior corridor

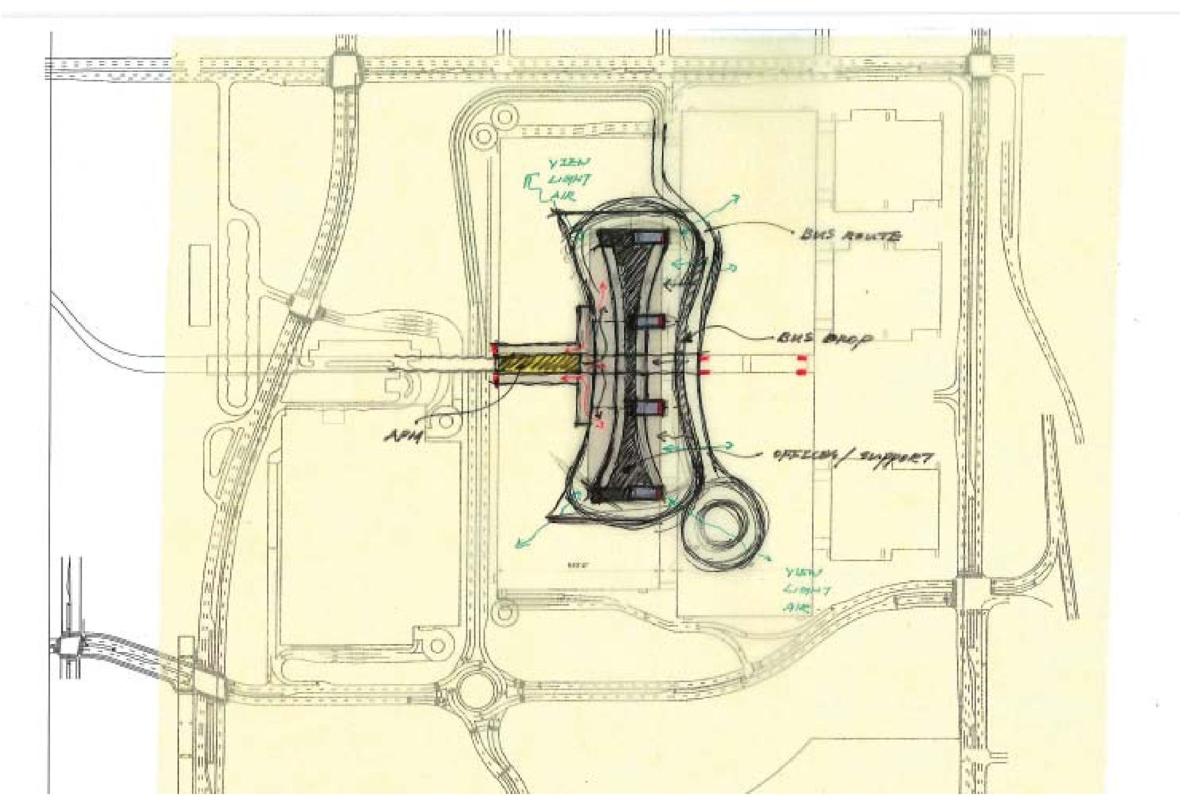
- Internal and exterior corridor designs with access from the APM, Bus access to the CSB located on the east side of the building at the roof level.



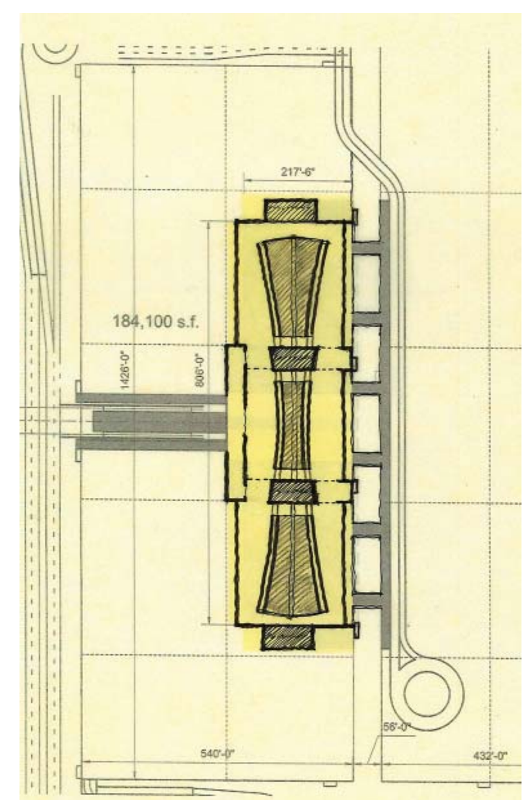
APM and bus passenger flow diagram



APM and bus circulation diagram

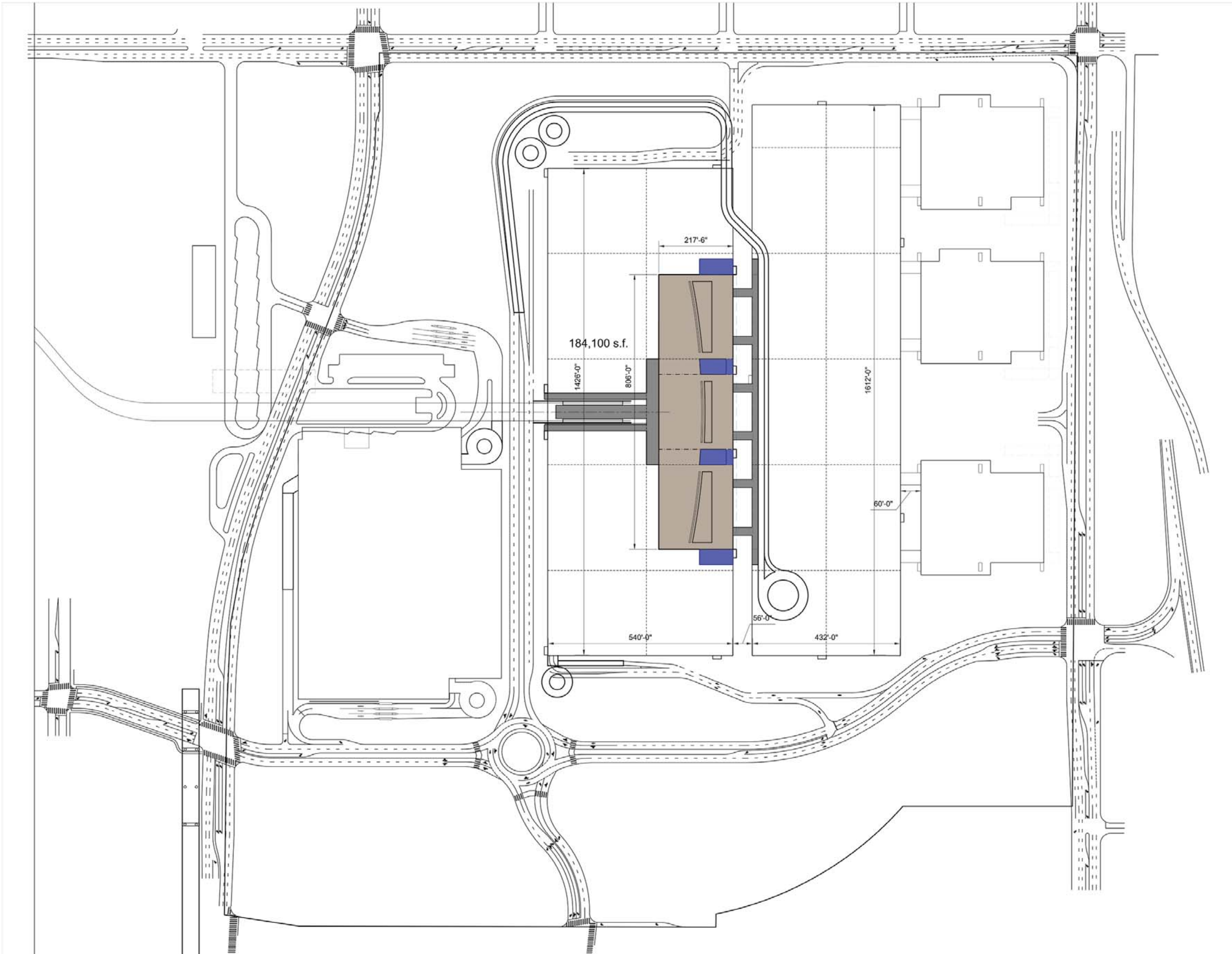


APM and bus passenger flow diagram

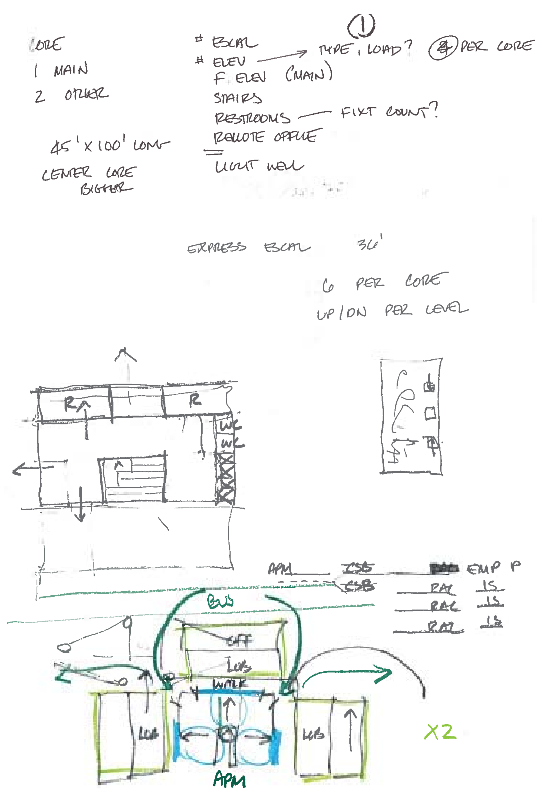


Internal office/counter areas facing east-west for APM and Bus access

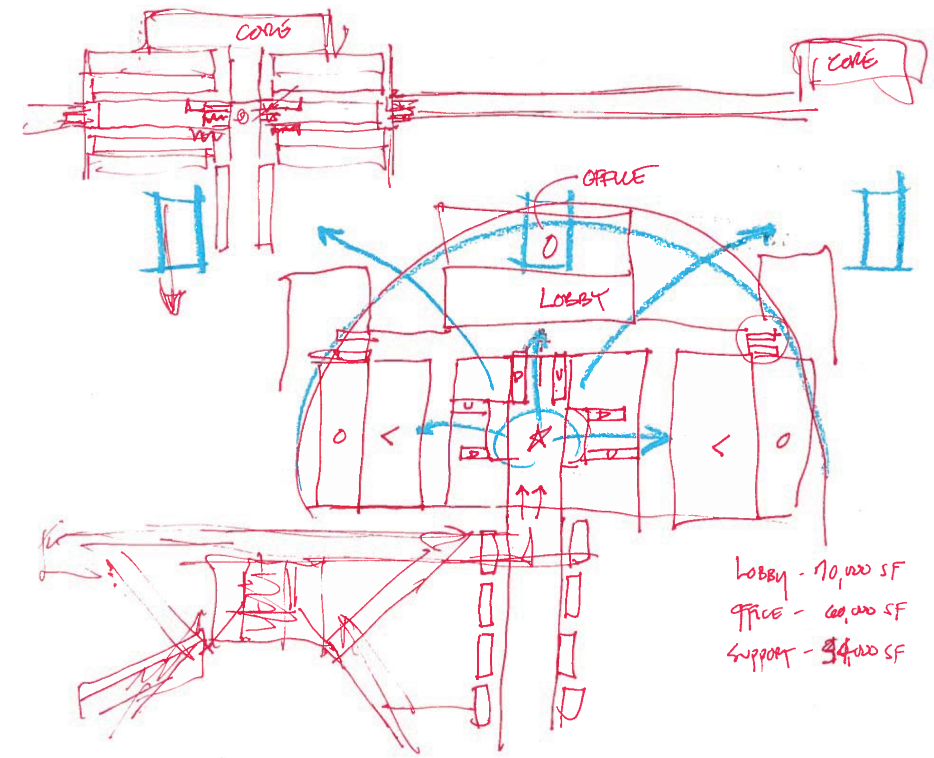
- 4 core study diagrams with APM access at RAC east, and Bus access to the west atop the Idle Storage Garage.



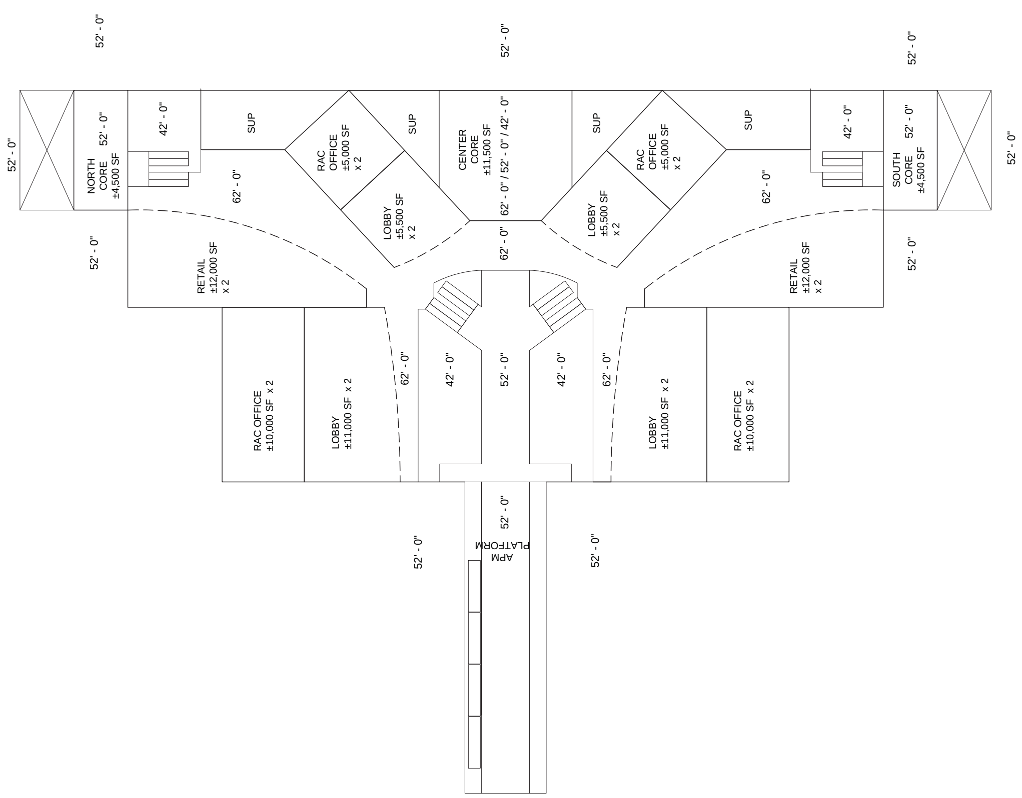
- 4 core draft diagram with west-facing lobbies. Concave, inward focusing plan to collect arriving passengers and enhance visibility.



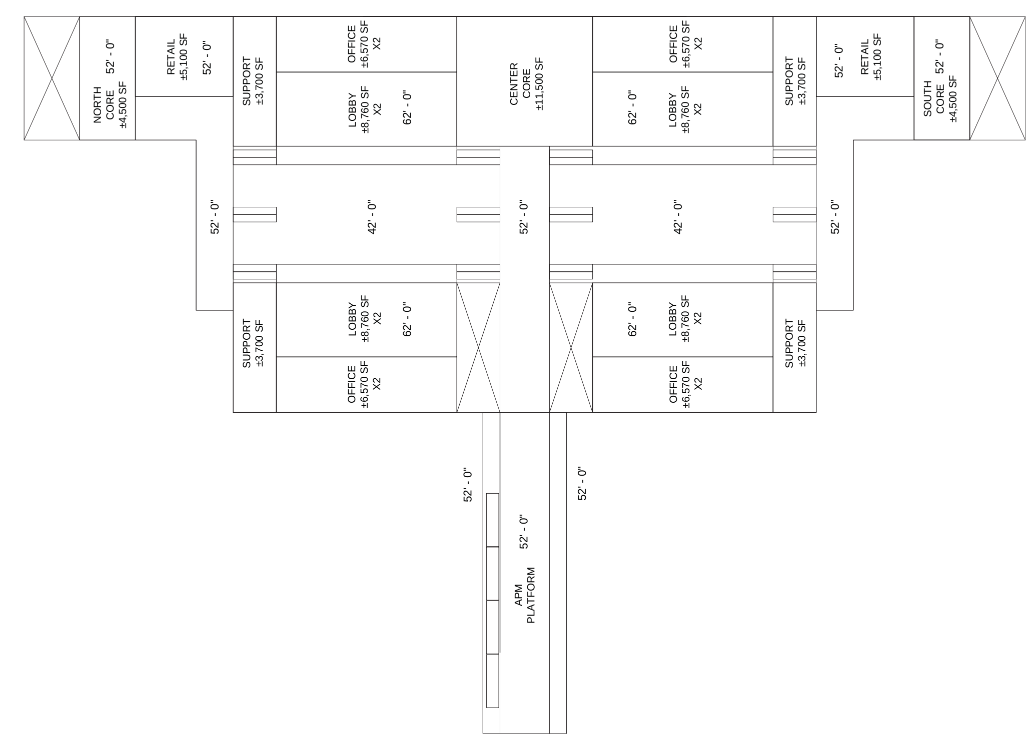
Diagramming for a CSB to be 1/2 story up and 1/2 story down from the APM arrival level



Two story CSB view and core access diagrams

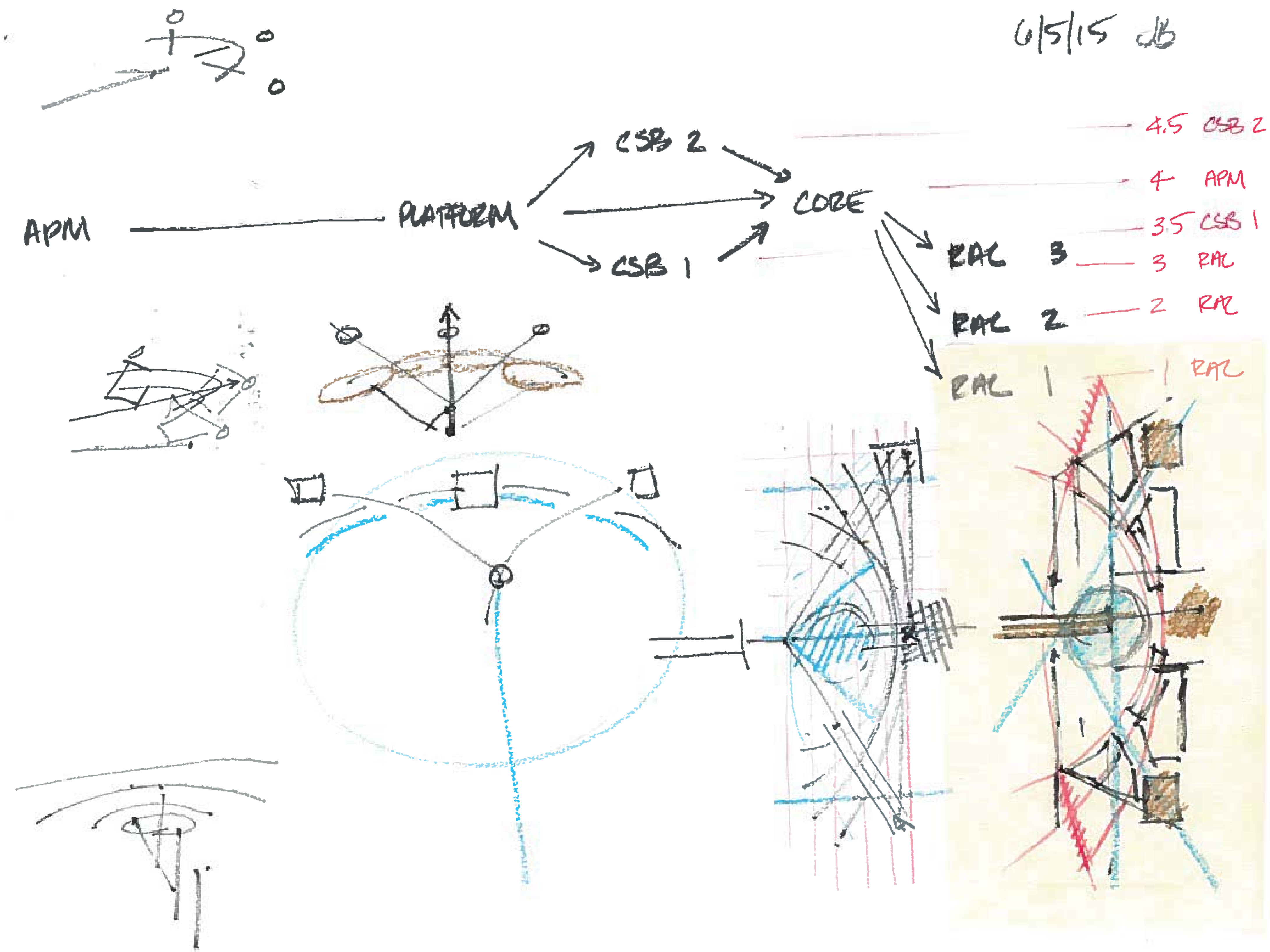


Preliminary two story study

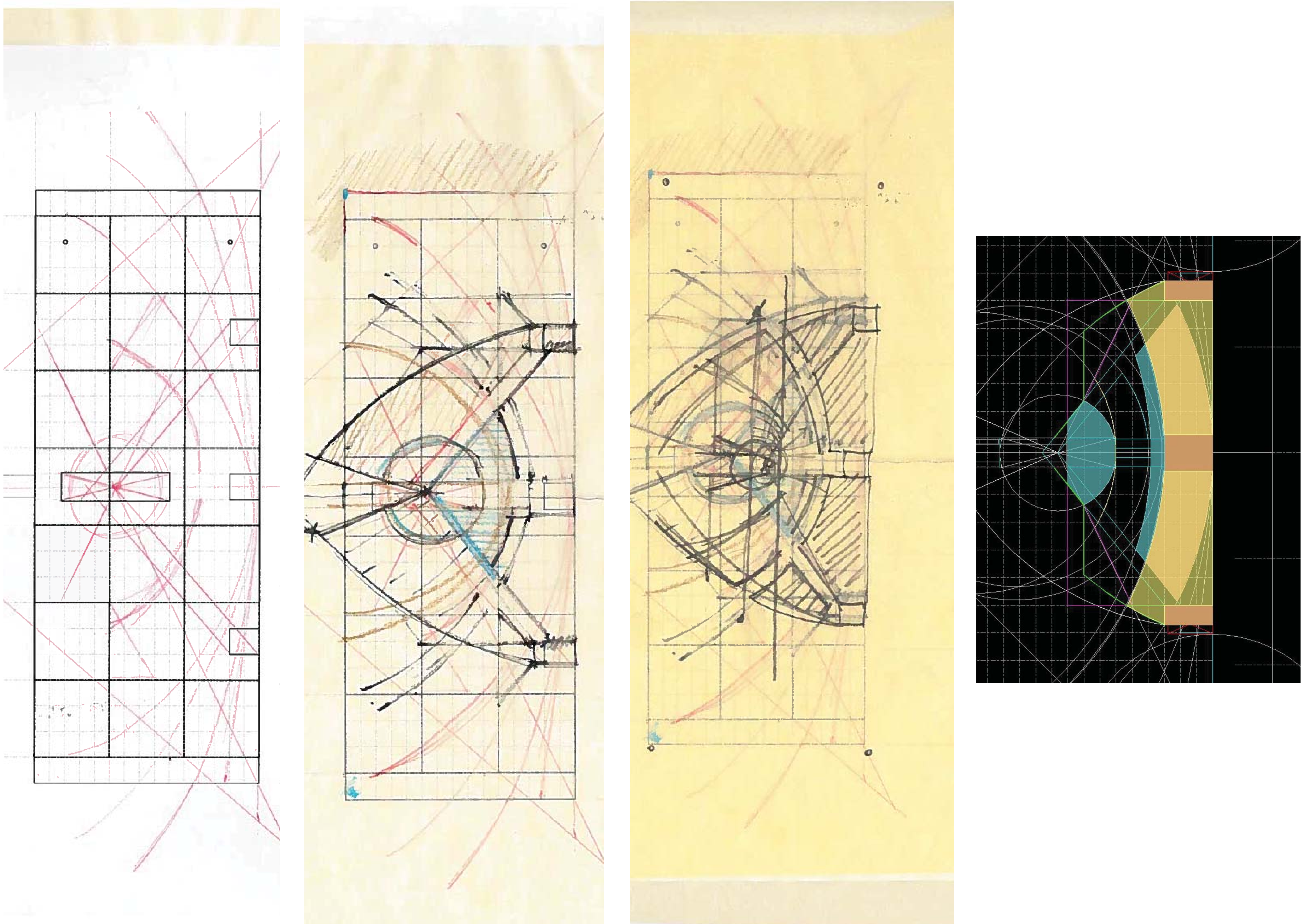


Preliminary two story study

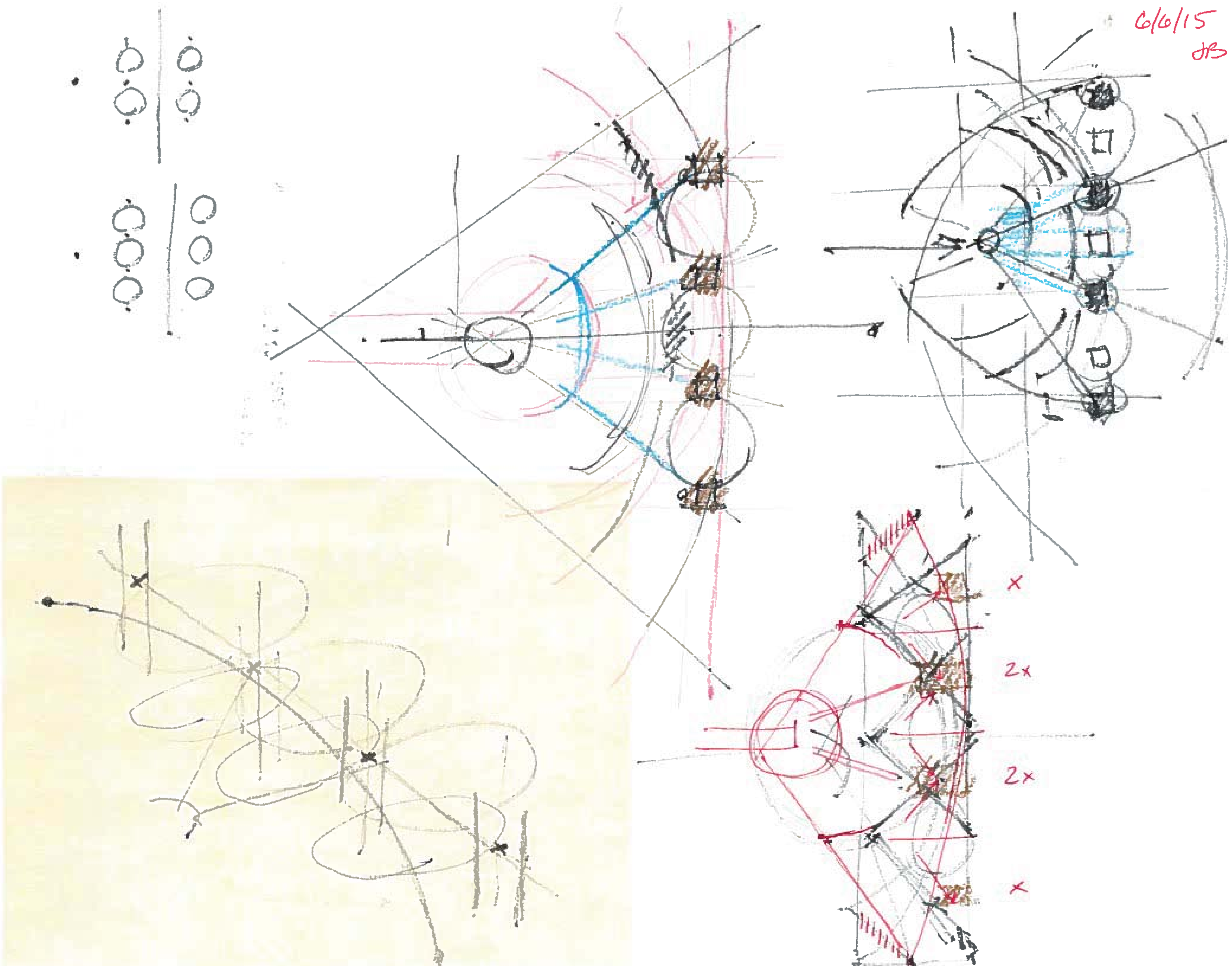
- Preliminary two-story CSB studies developed to centralize lobbies, reduce initial walking distances, improve visibility and reduce CSB footprint.



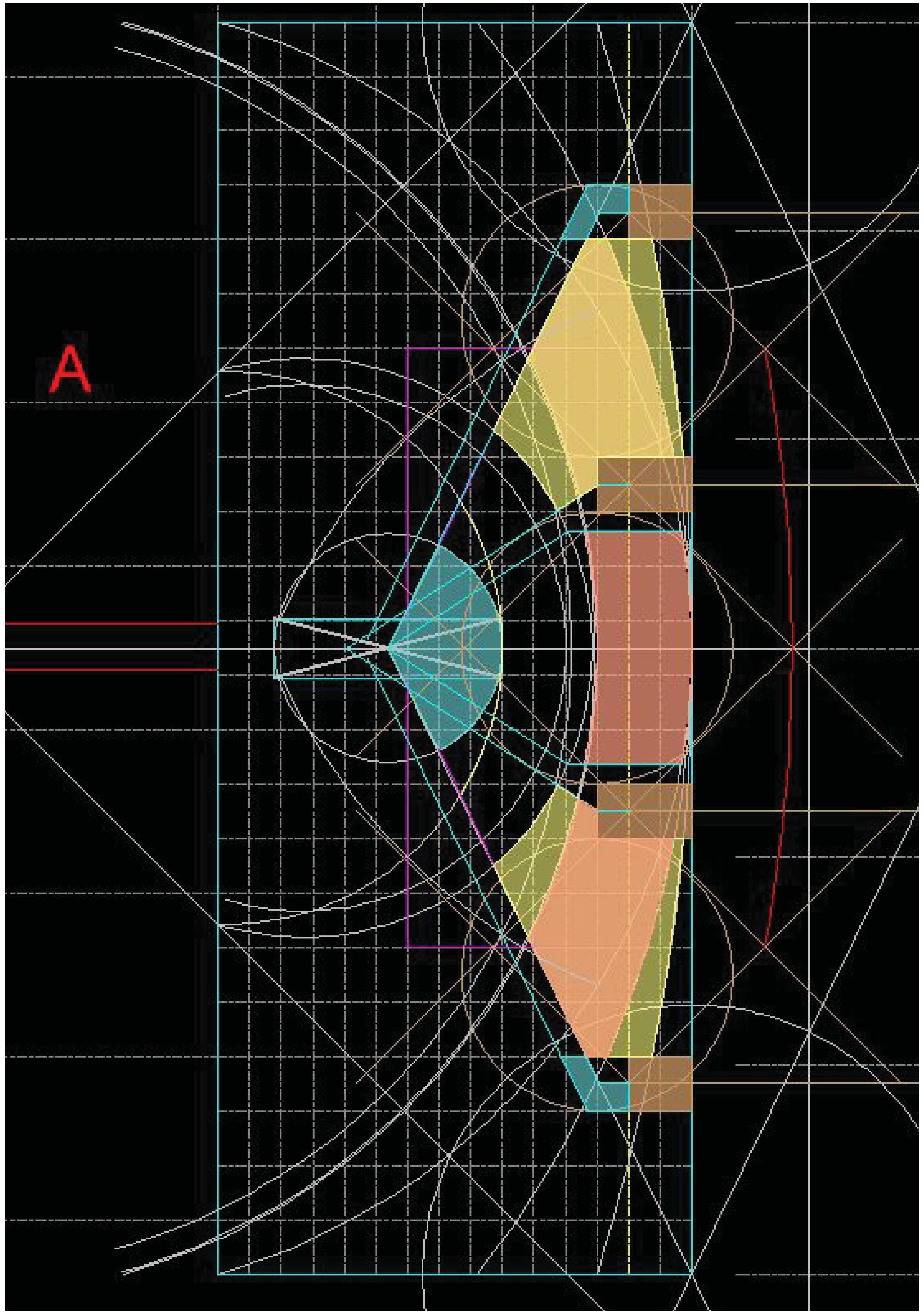
- Study sketches for development of a 3 core, two-story CSB considering arrival, views, access and potential geometries for design.



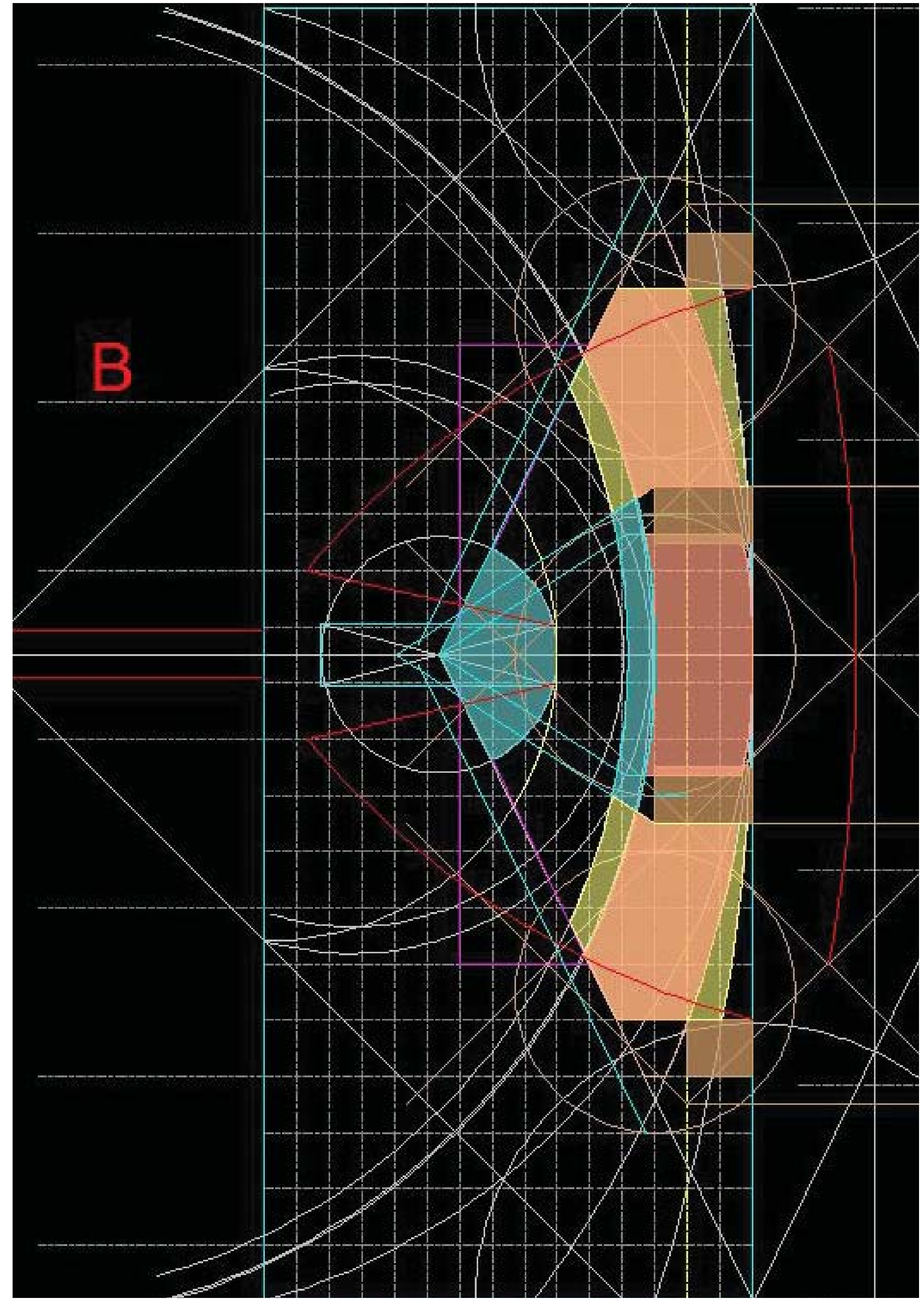
- Study sketches for development of a 3 core, two-story CSB considering arrival, views, access and potential geometries for design.



- Study sketches for development of a 4 core, two-story CSB considering arrival, views, access, passenger volume at vertical circulation cores and potential geometries for design.

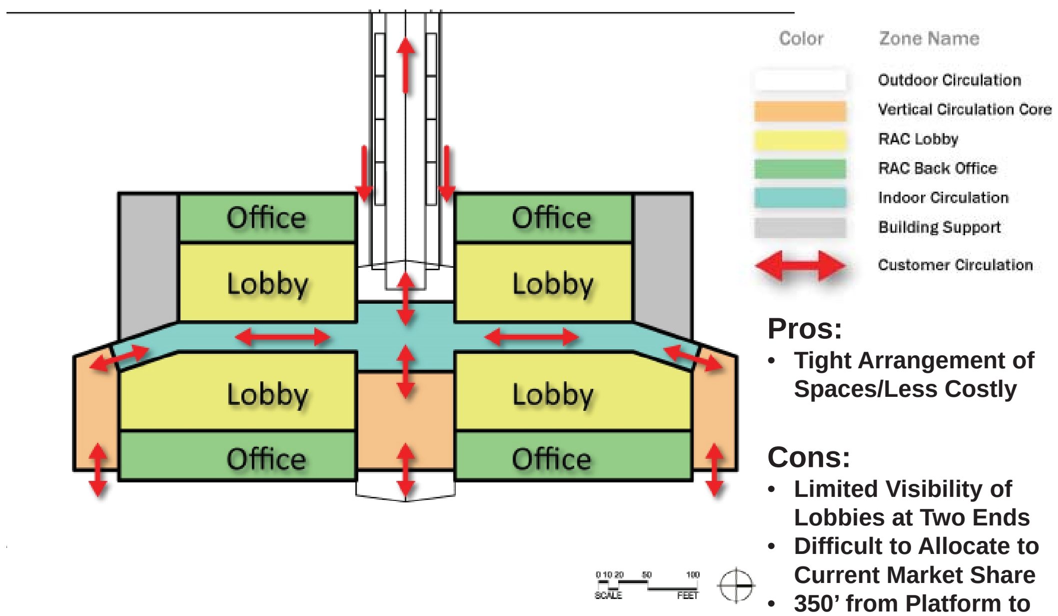


CSB upper level (level 4.5 - 1/2 story above APM level)



CSB upper level (level 3.5 - 1/2 story below APM level)

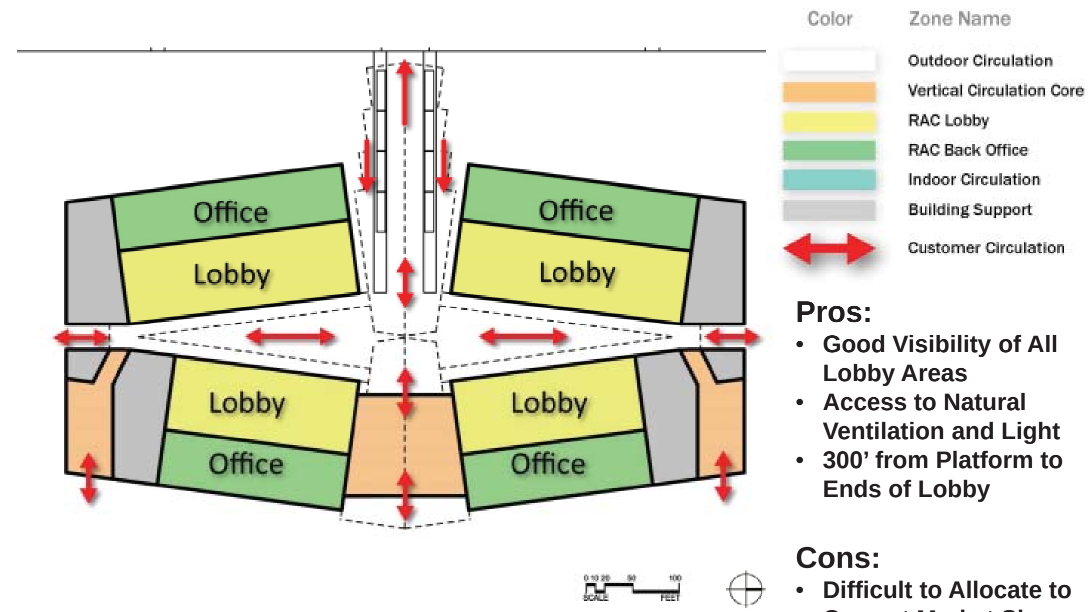
- Two-story, 4 core CSB draft diagram with arrival view terrace.



Pros:
- Tight Arrangement of Spaces/Less Costly

Cons:
- Limited Visibility of Lobbies at Two Ends
- Difficult to Allocate to Current Market Share
- 350' from Platform to Ends of Lobby

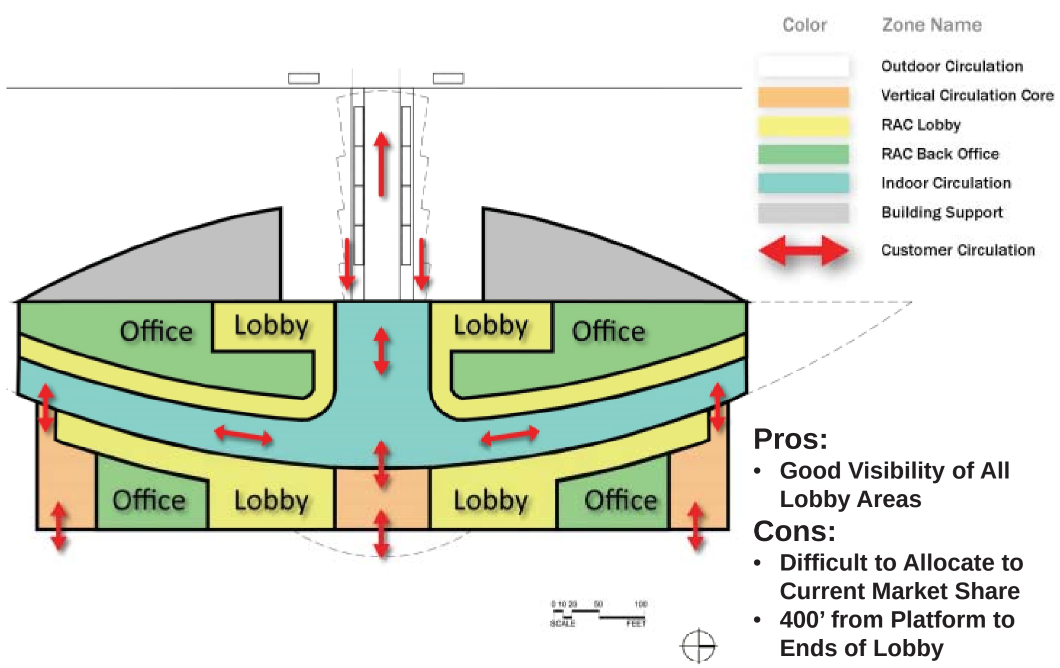
Option A



Pros:
- Good Visibility of All Lobby Areas
- Access to Natural Ventilation and Light
- 300' from Platform to Ends of Lobby

Cons:
- Difficult to Allocate to Current Market Share

Option B



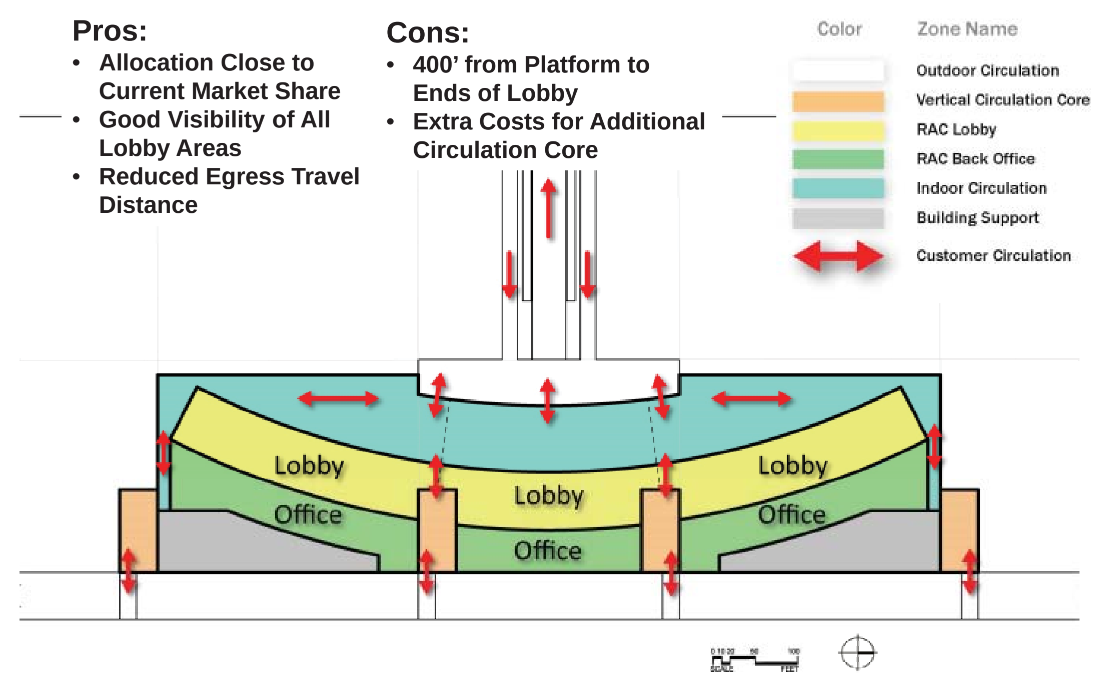
Pros:
- Good Visibility of All Lobby Areas

Cons:
- Difficult to Allocate to Current Market Share
- 400' from Platform to Ends of Lobby

Option C

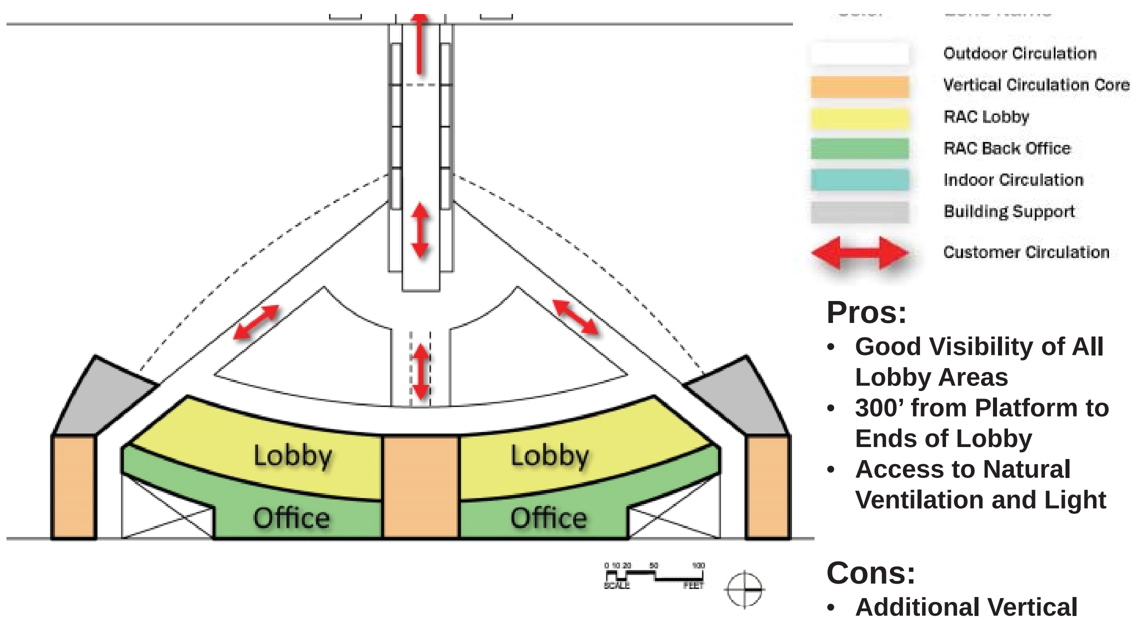
Pros:
- Allocation Close to Current Market Share
- Good Visibility of All Lobby Areas
- Reduced Egress Travel Distance

Cons:
- 400' from Platform to Ends of Lobby
- Extra Costs for Additional Circulation Core



Option D

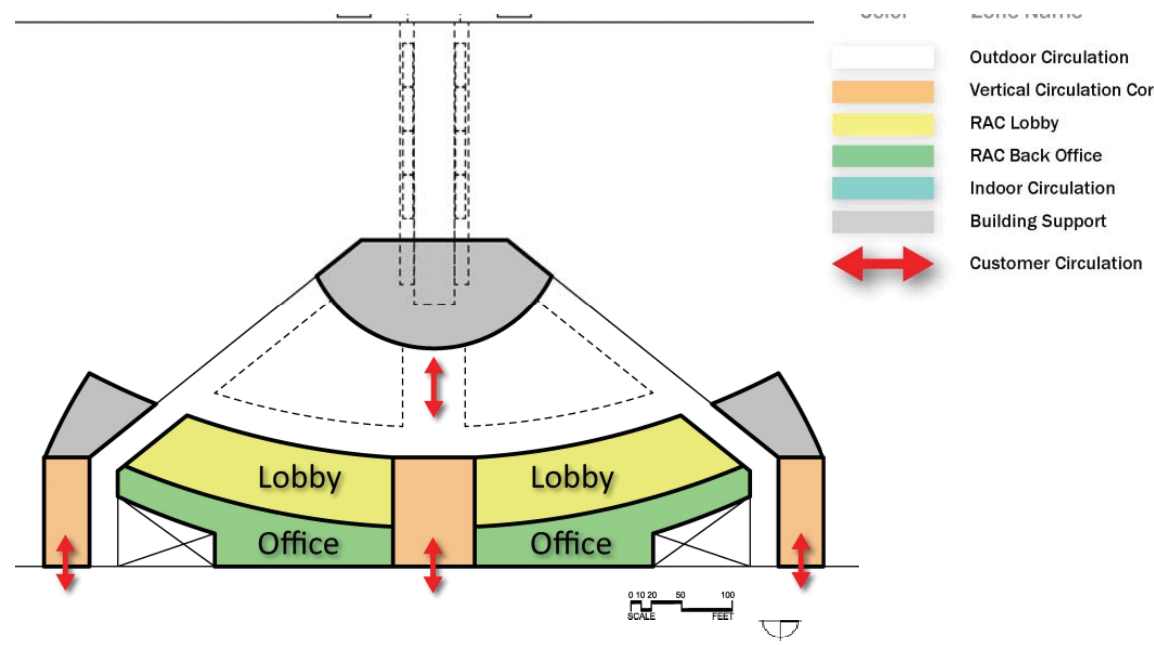
- Diagrams indicating one story CSB options with 3 cores and 4 cores, indoor conditioned circulation and outdoor open circulation. Options based on immediate access and visibility from APM platform between tracks.



Pros:
- Good Visibility of All Lobby Areas
- 300' from Platform to Ends of Lobby
- Access to Natural Ventilation and Light

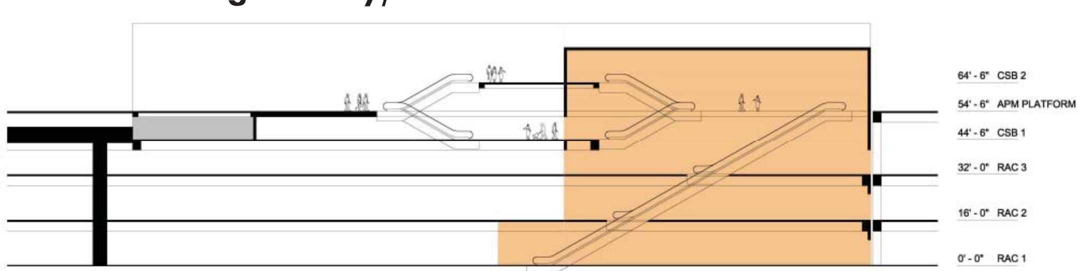
Cons:
- Additional Vertical Transition
- Reduced Height Clearance at RAC

Option E-Upper level



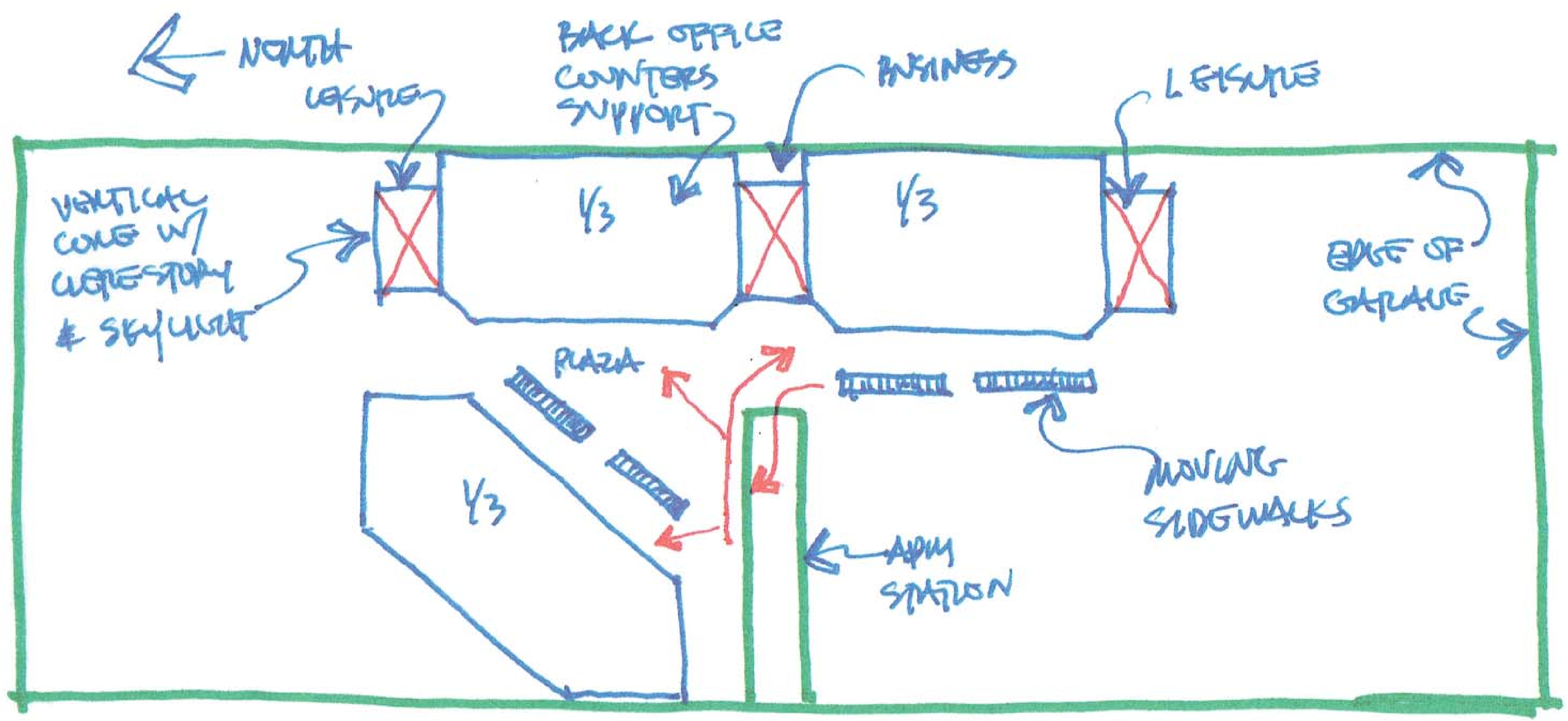
Option E-Lower level

Section Through Lobby/Office



Section thru circulation core

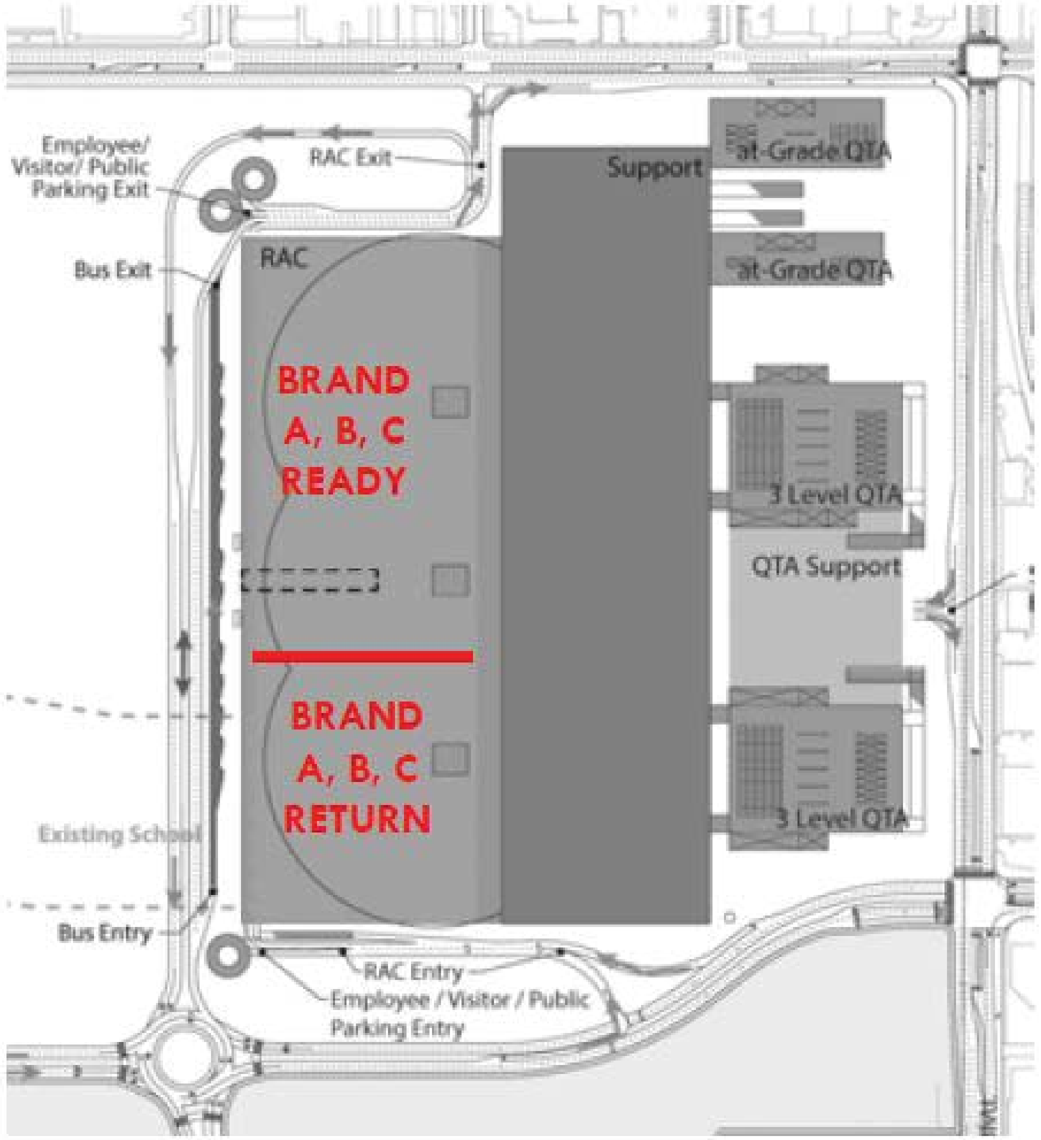
- Diagrams indicating two-story CSB option with 3 core and radial access from APM. Section through vertical core for multi-level CSB and ready/return garage.

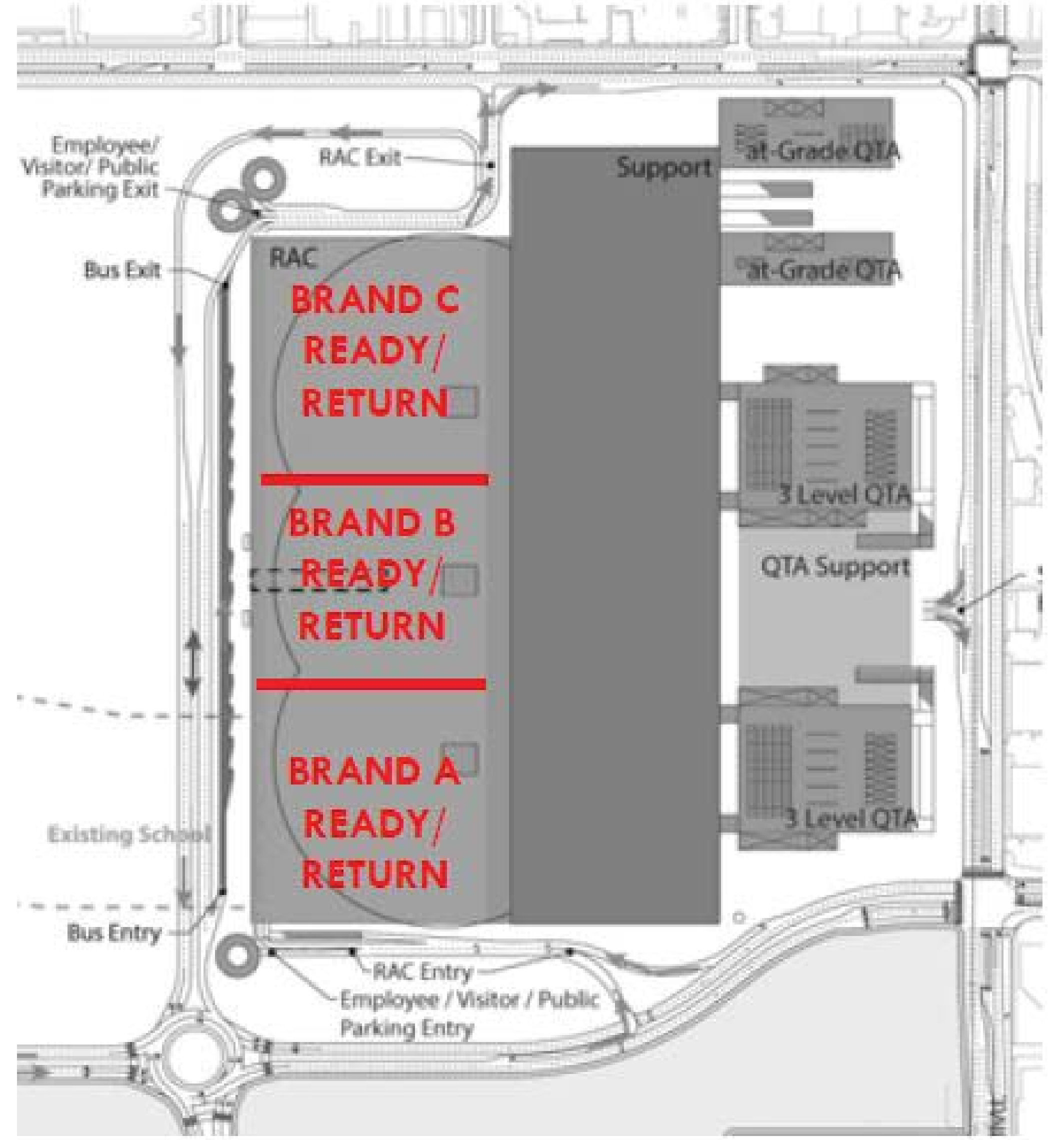


B. CSB DESIGN CONSIDERATIONS:

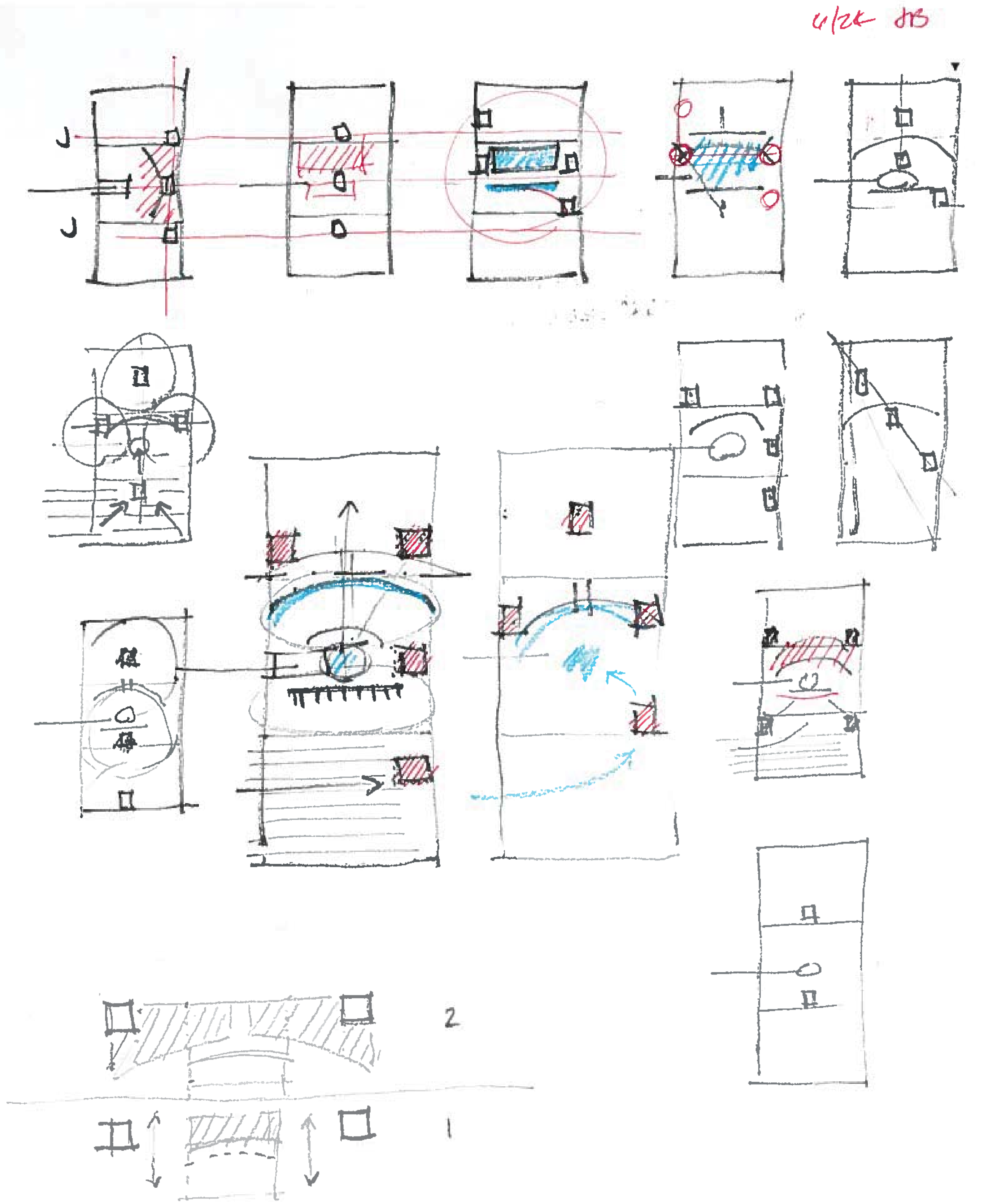
-55'-0" maximum height limit
-Group B occupancy
-Outdoor environment at main lobby
-Enclosed CSB floor area= 155,000 SF (not including circulation courtyards)
  -60,000 SF lobby
  -50,000 SF office
  -36,000 SF support

- Sketch indicating allocation breakdown into 3 industry groups, passengers arriving on the APM north track, exiting the APM to the north with circulation supporting ready cars to the RAC north and return cars to the RAC south.

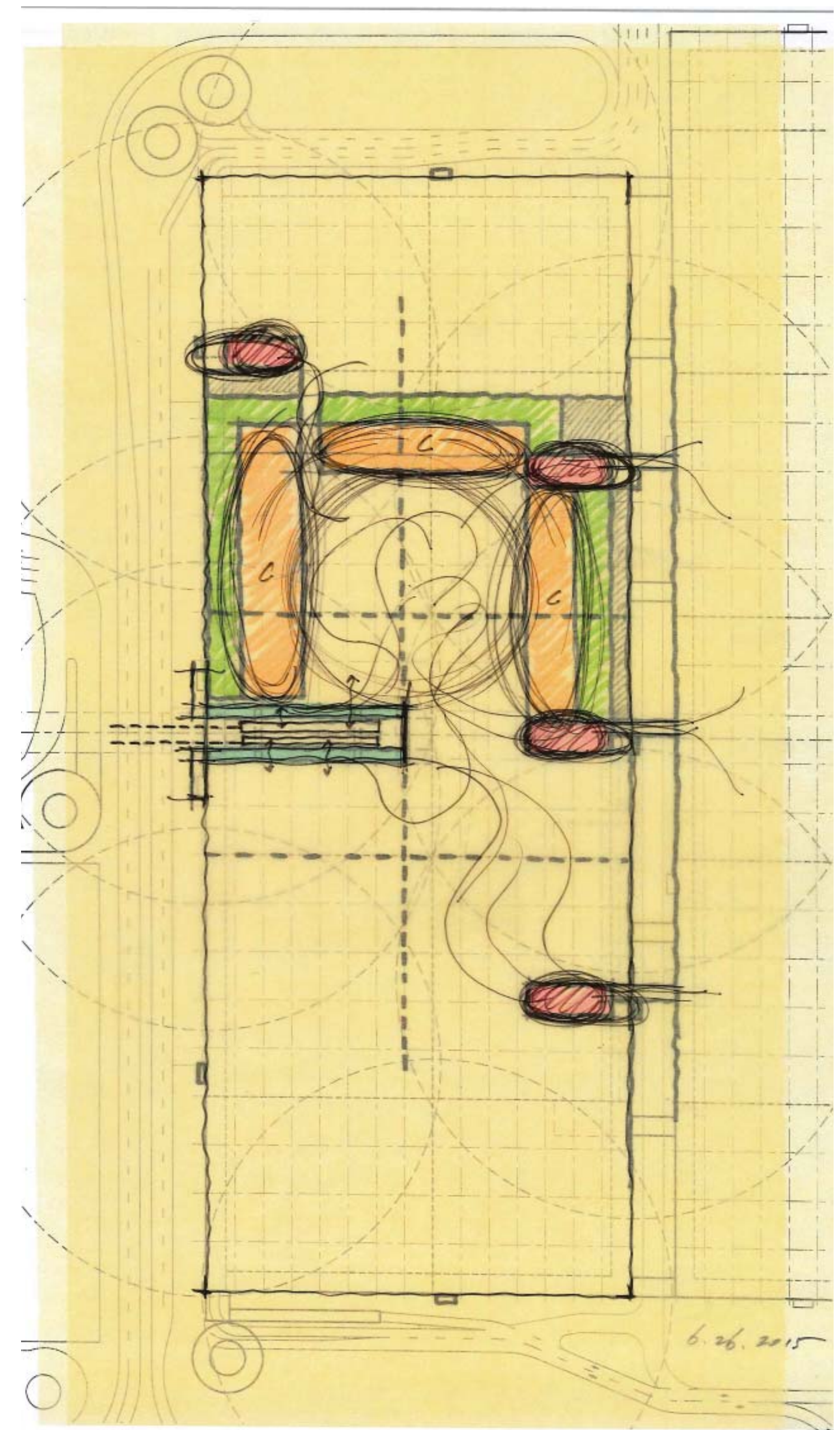




- Brand allocation along with ready and return distribution for consideration of how RAC garage will be used and accessed from CSB level.

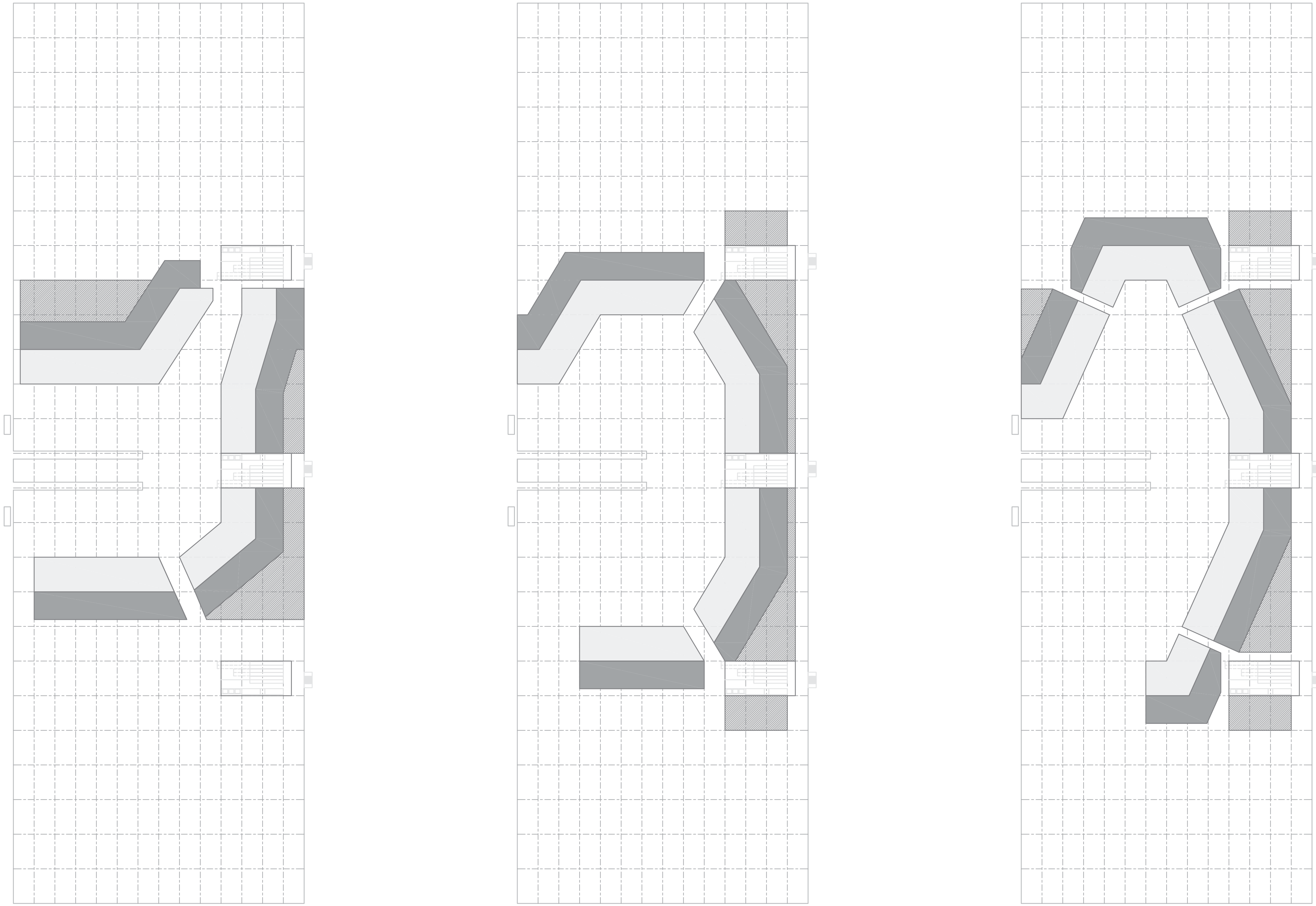


Thumbnail studies for core locations and CSB north of APM

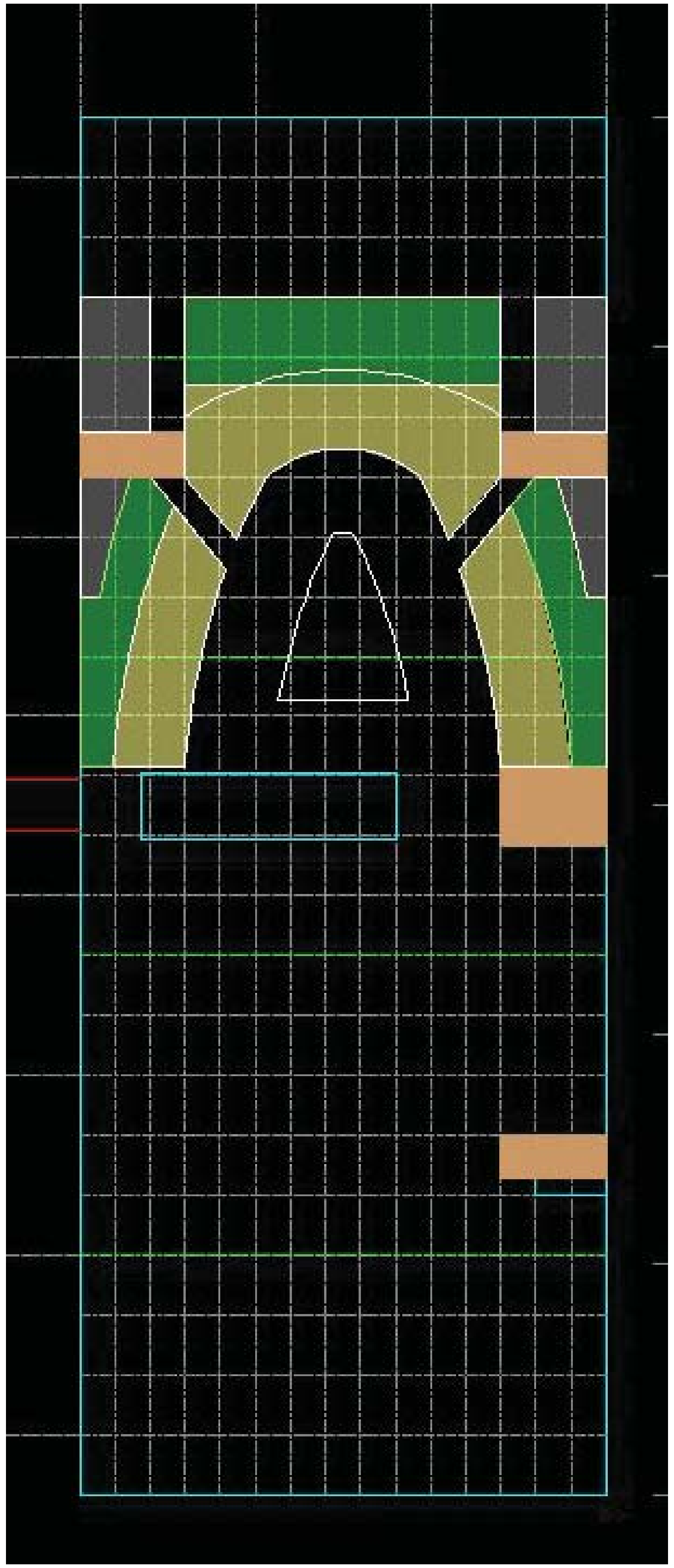


CSB diagram indicating north CSB and courtyard and access to remote west core

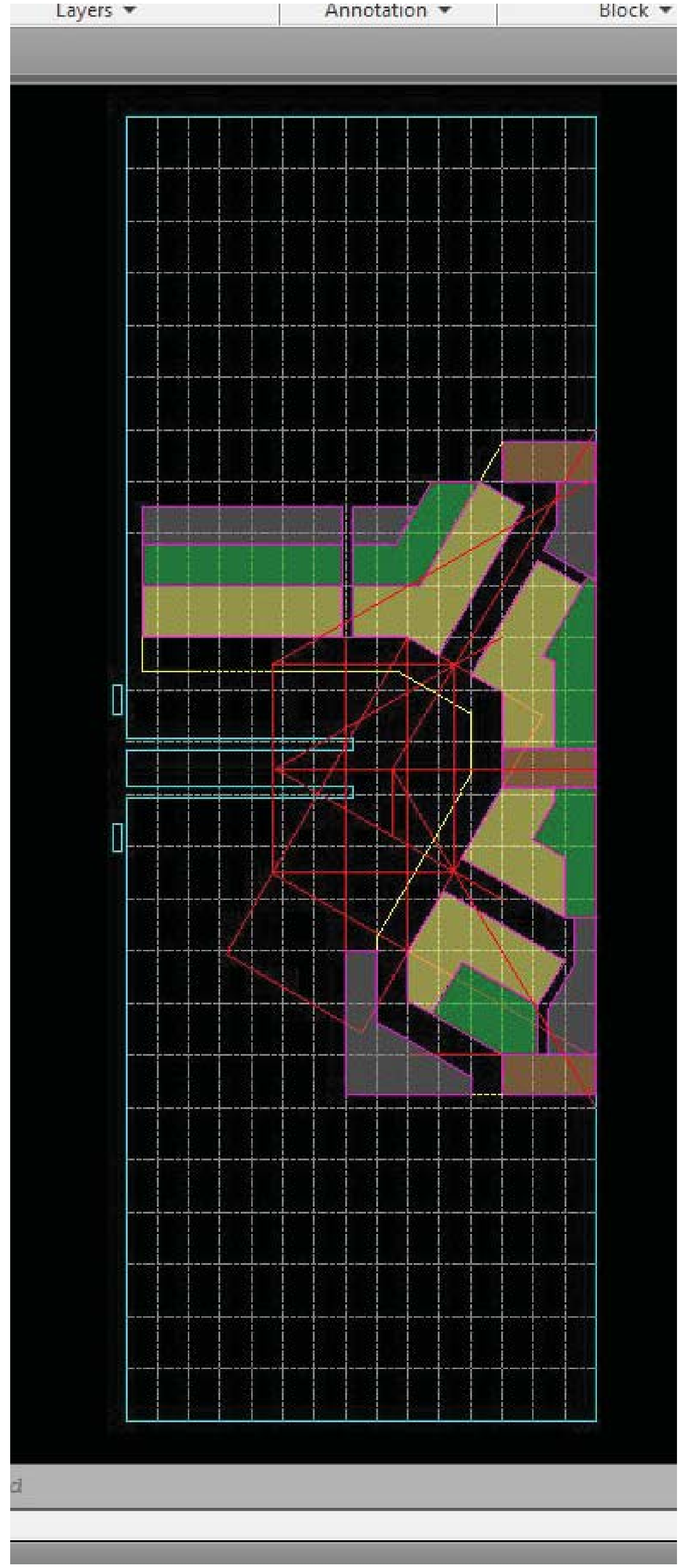
- Sketches for alternate core and CSB layouts relative to arrival at APM north, and return from south.



- Roof-level CSB studies to locate two-third of the CSB program to north of APM, one-third to south.

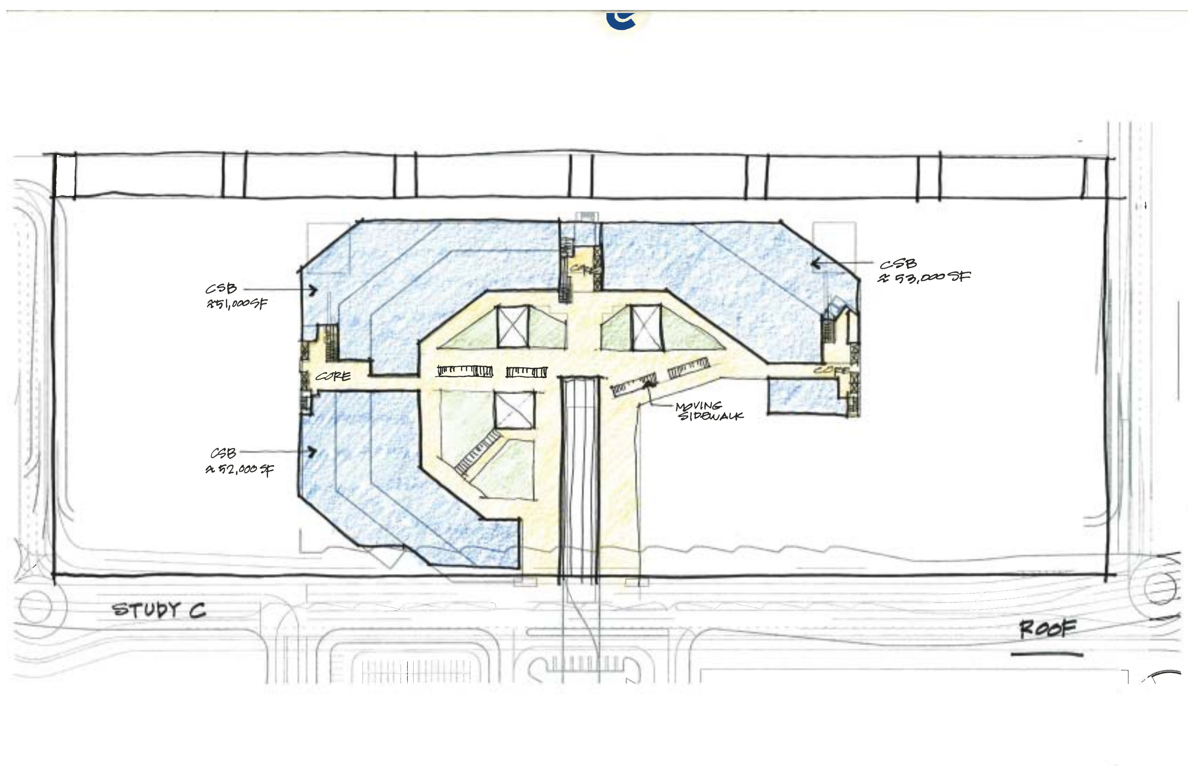


U-shaped CSB for equal opportunity views around a central courtyard

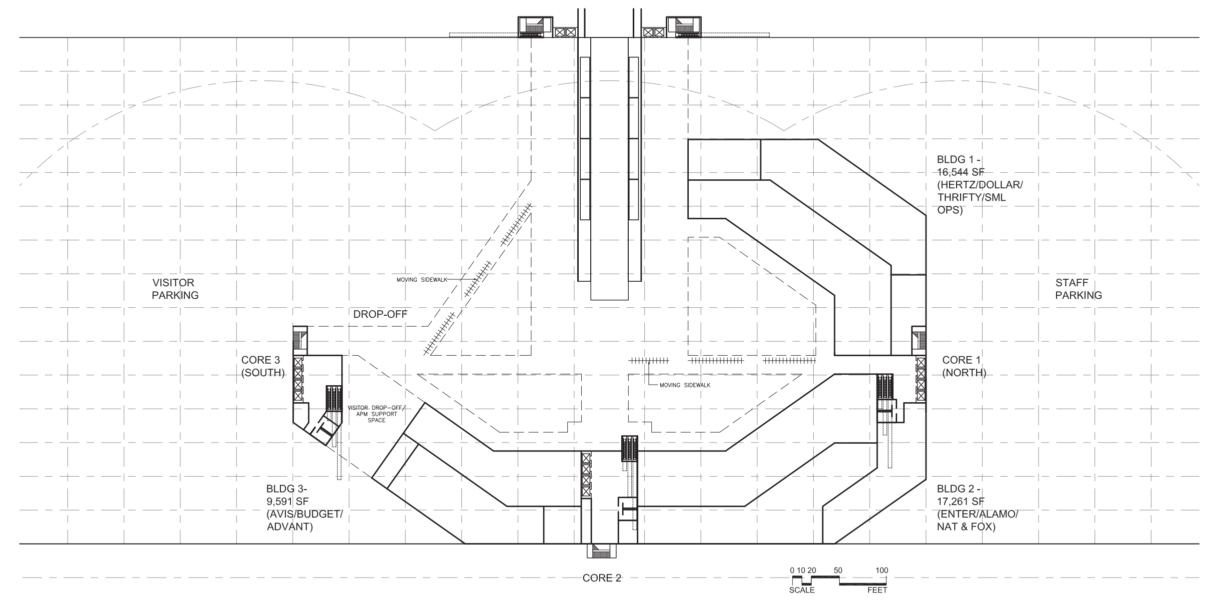


1/3 - 2/3 CSB with preliminary (courtyard) and secondary lobby access

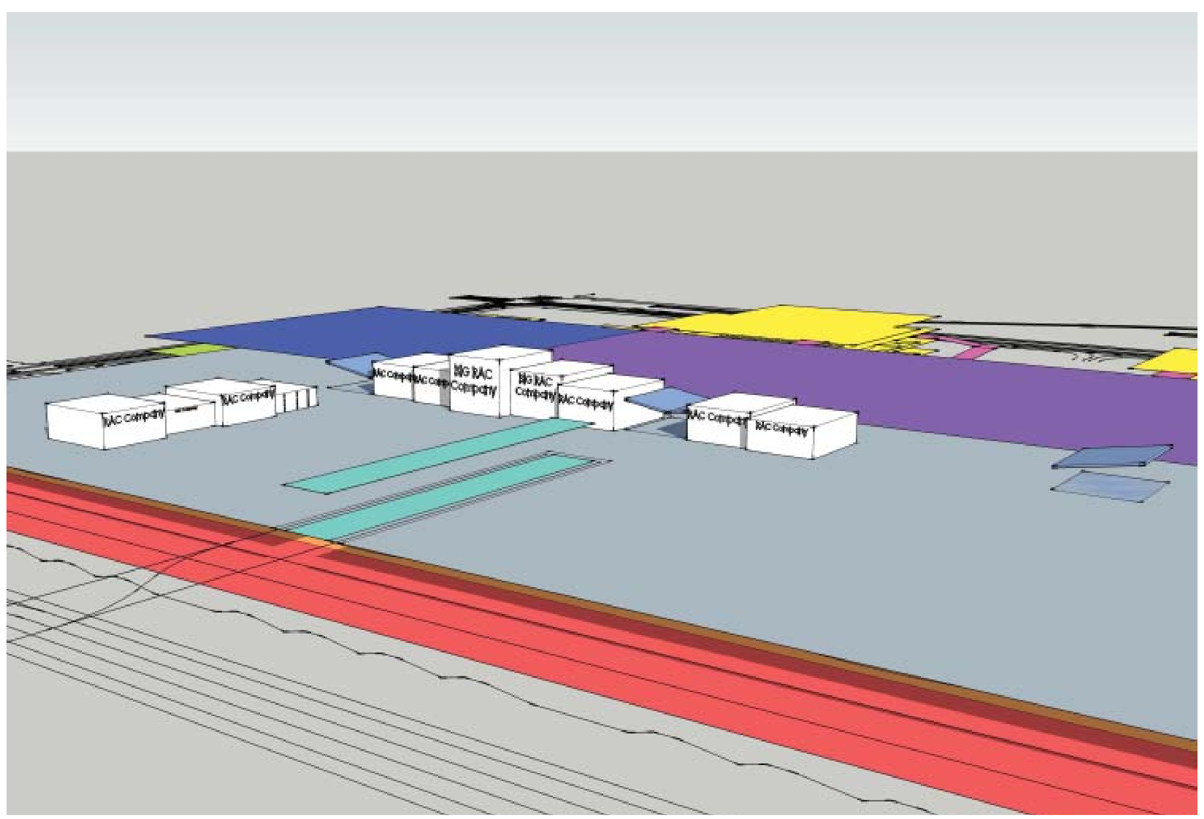
- Roof-level CSB studies:
  Lobby shown in yellow;
  Office shown in green;
  Support shown in gray



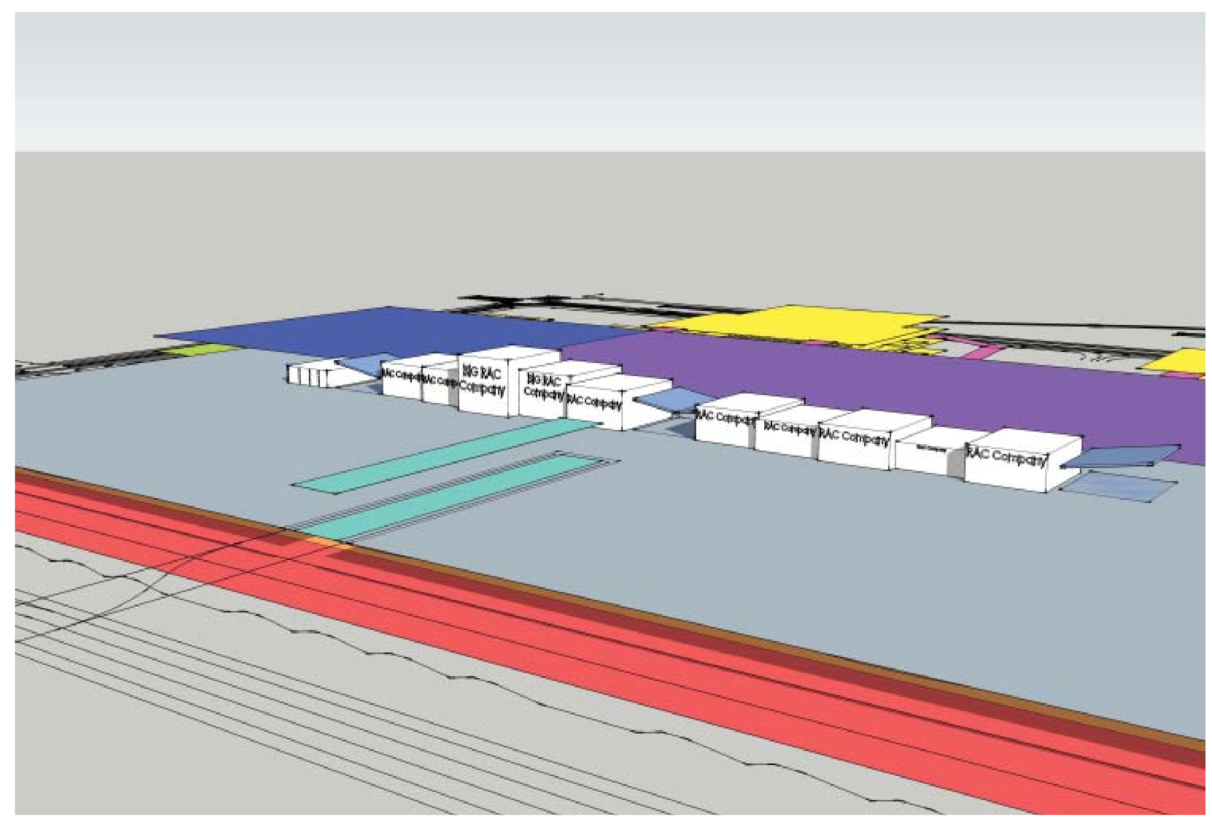
1/3 - 2/3 development with lightwells, moving sidewalks and north and south core adjustments



1/3 - 2/3 CSB development



Mall-type massing study with open cores and canopies



Mall-type massing study with open cores and canopies

- One-third/two-third CSB distributed north and south of APM. Massing study of mall-type layout which may accommodate future expansion and growth of brand families.

FIGat7th, Los Angeles

Santa Monica Place, Santa Monica

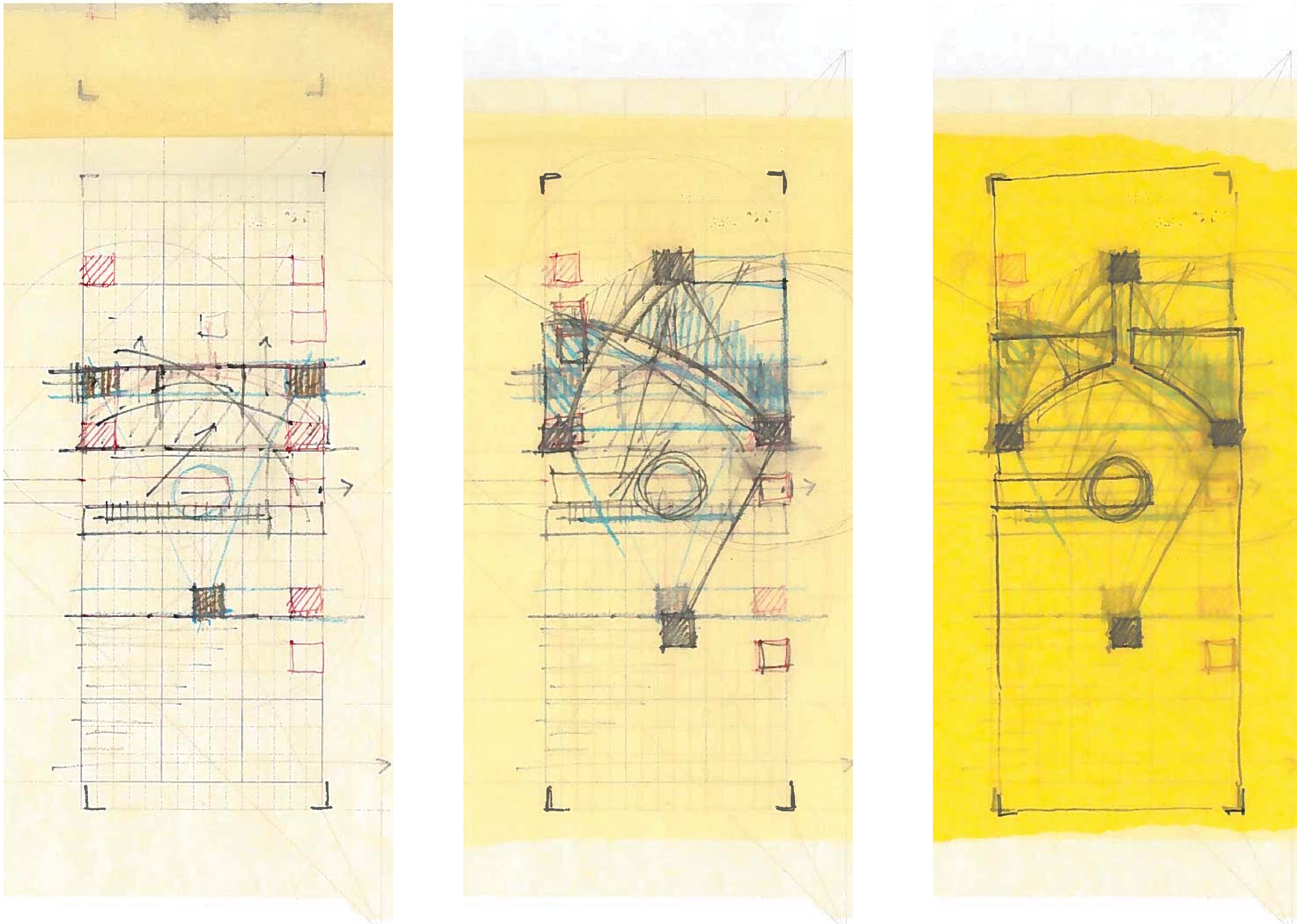
C. CSB DESIGN CONSIDERATIONS:

-Multi-story CSB with one-third/two-thirds split in RAC market share
-Concentrate CSB north of the Automated People Mover (APM) with repositioned cores (angled and radial)
-Direct access from RAC to rental cars
-Centralize visibility of CSB lobbies from single vantage point which provides equal opportunity
-Locate escalators north and south

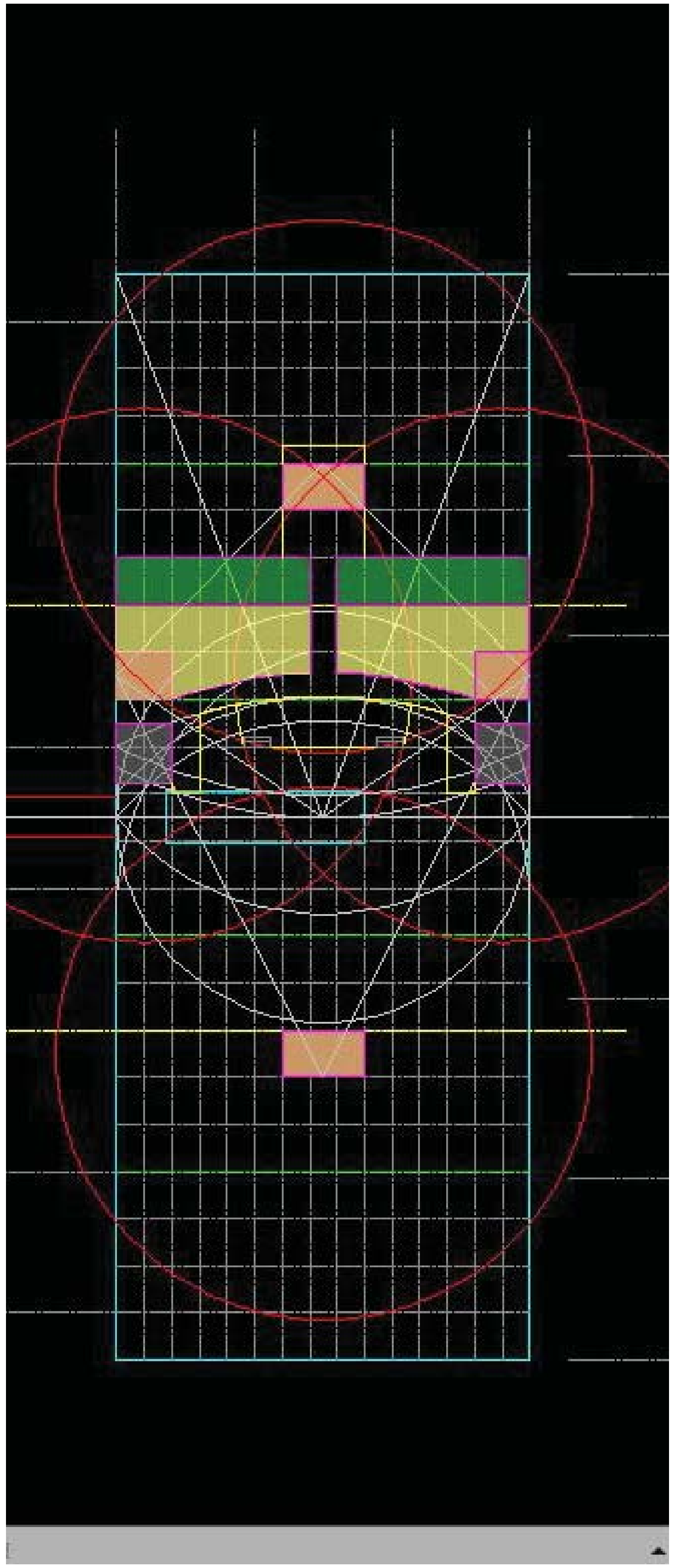
Hollywood and Highland Center, Hollywood

The Bloc, Los Angeles

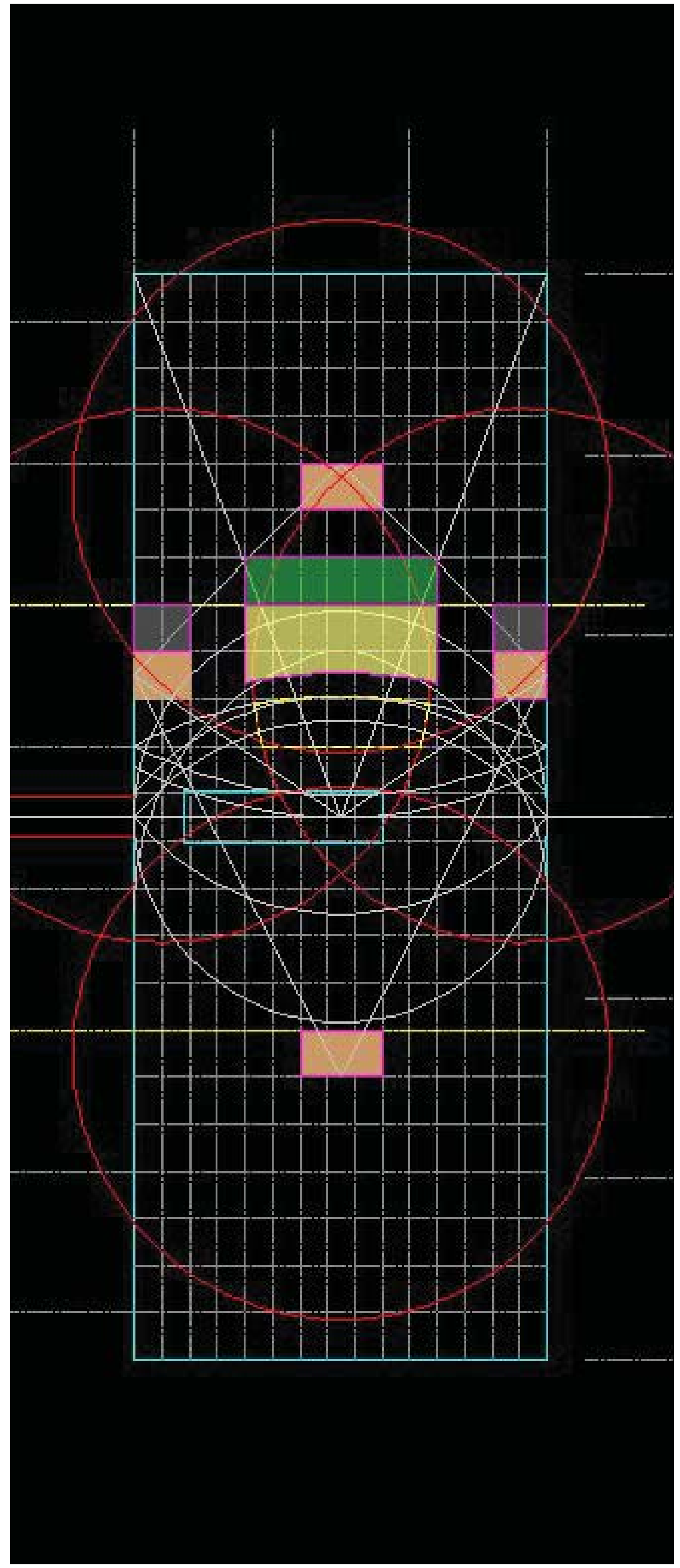
- Examples of open air, multi-level retail centers indigenous to the Los Angeles area. Examples were studied for their visual access, localized opportunities, central vertical circulation and courtyard experience.



- Sketches for a two-story CSB to north of APM with upper level at APM/roof level and lower level CSB at RAC level 3.

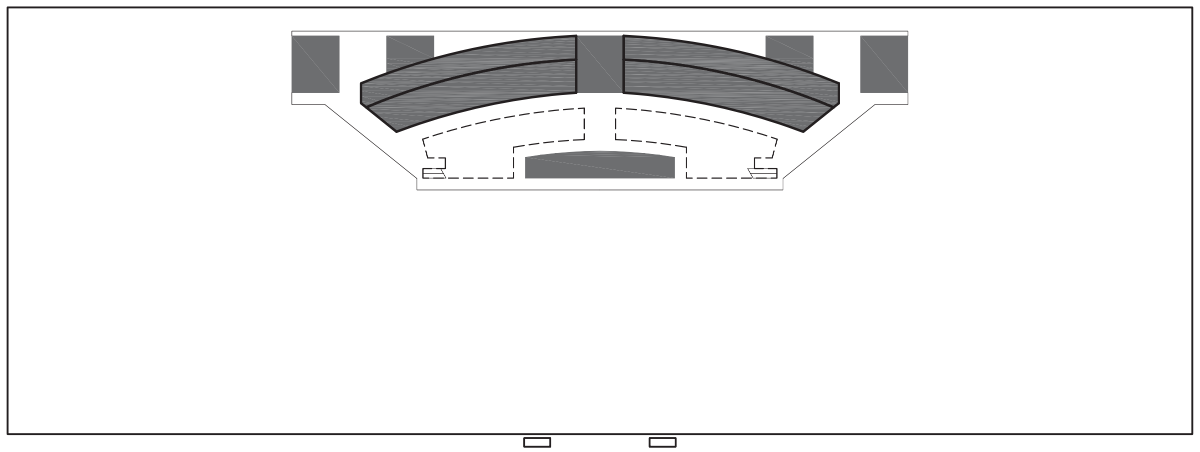


2/3 CSB at Roof Level

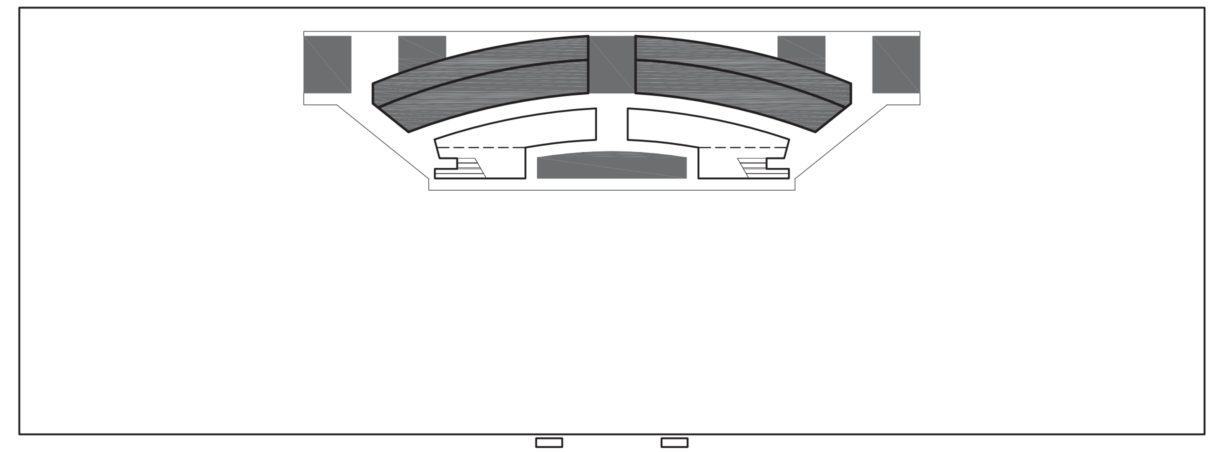


1/3 CSB at RAC Level 3

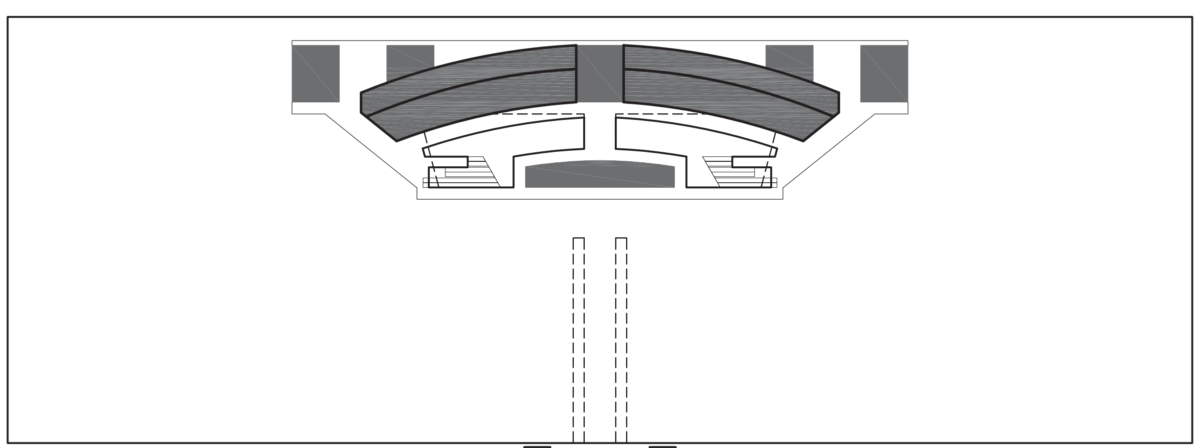
- Geometry diagrams with lobby, office and support spaces. An open-air light well with escalators is located south of the roof level lobby to allow for views and access to the level 3 lobbies.



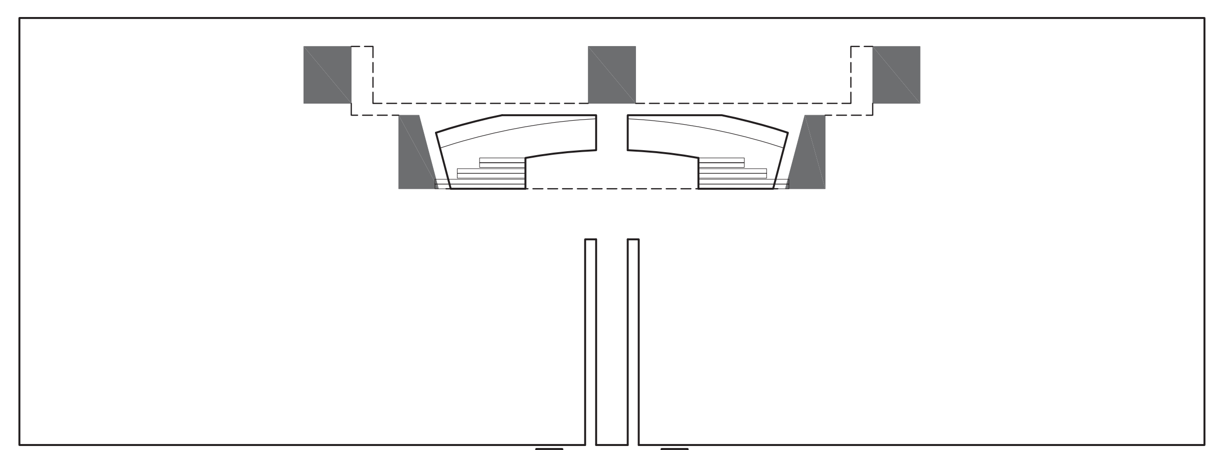
Plan at RAC/CSB level 1



Plan at RAC/CSB level 2

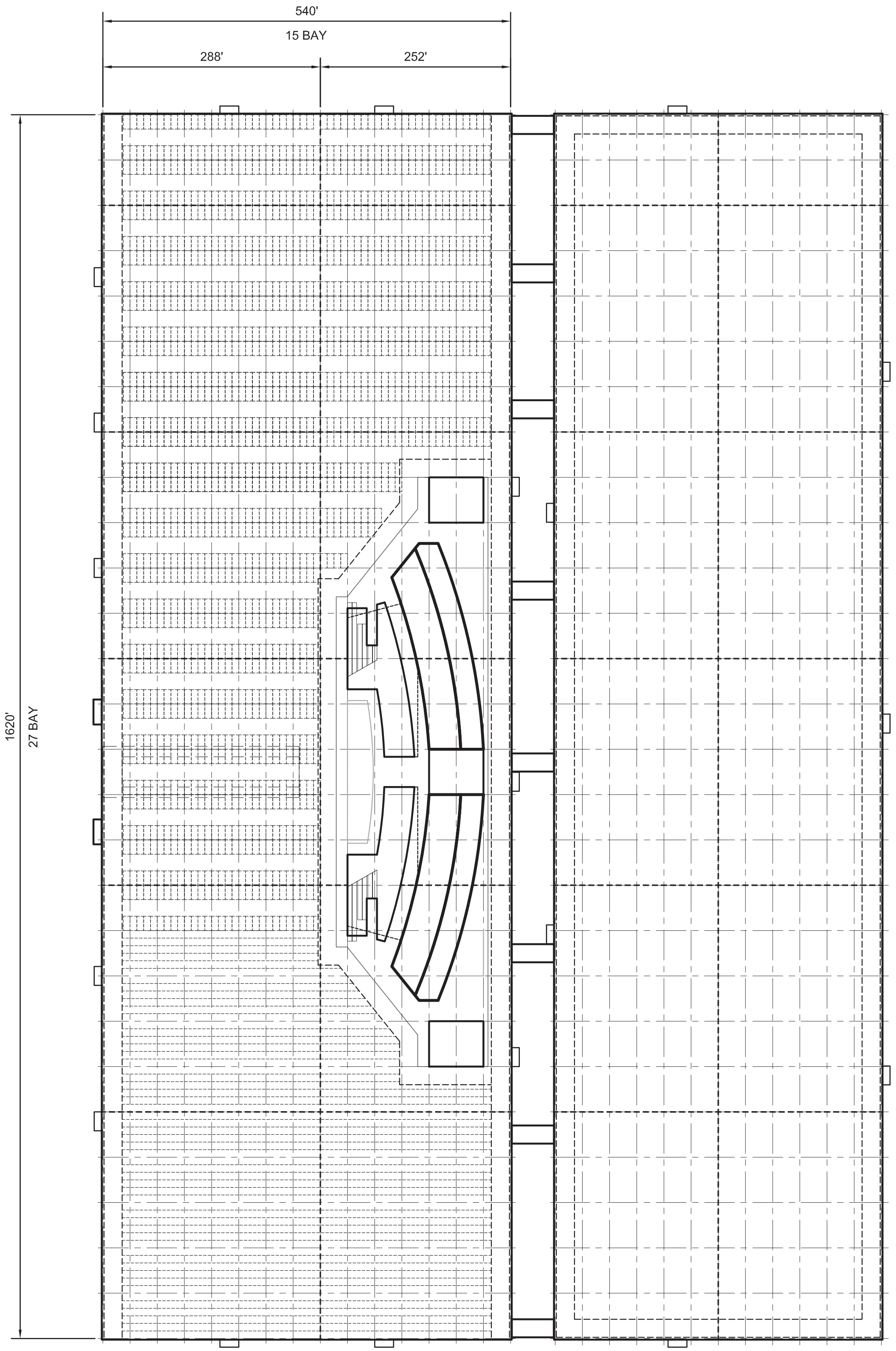


Plan at RAC/CSB level 3

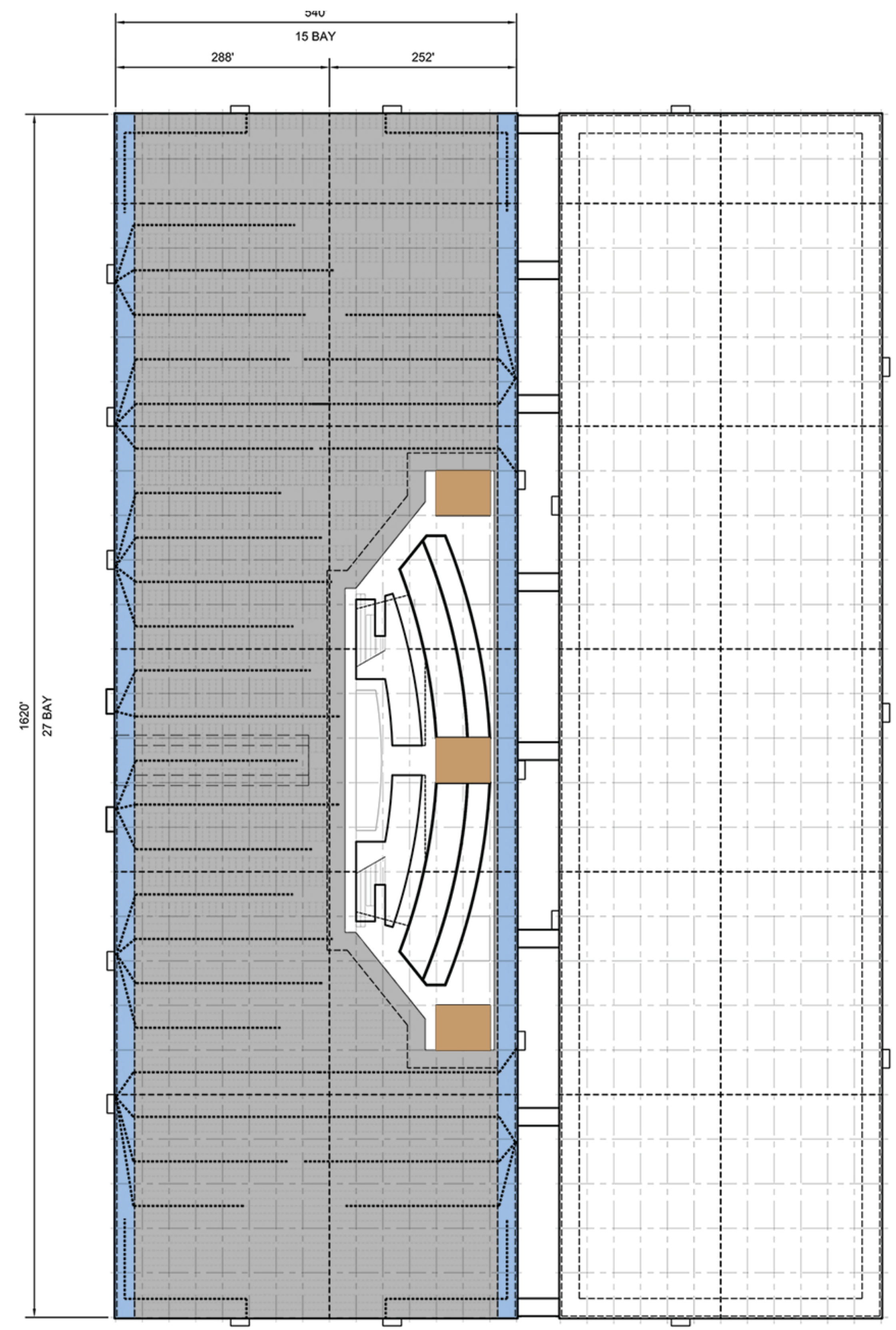


Plan at RAC/CSB roof level

- 3 story CSB draft plans for all levels. Main access to lower levels centralized with north and south directed escalators located east of APM. Large, multi-story openings allow for views and direct access to desired RAC level.

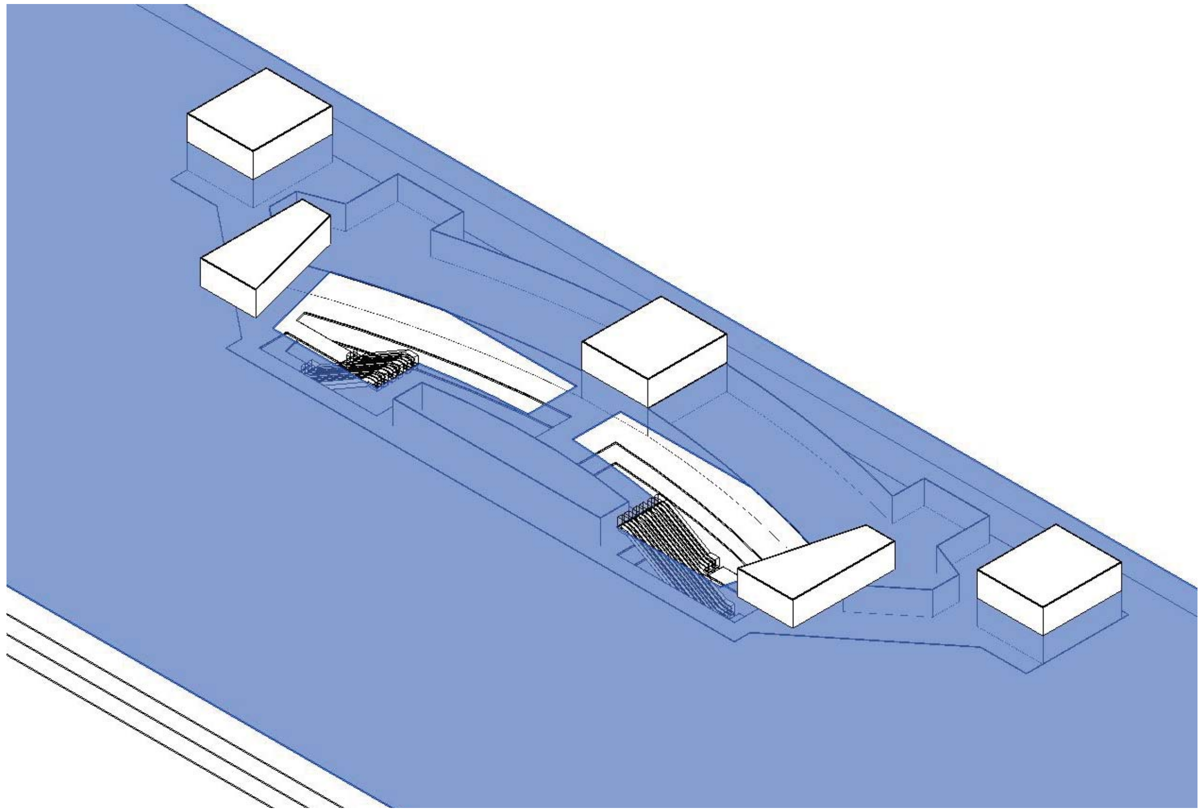


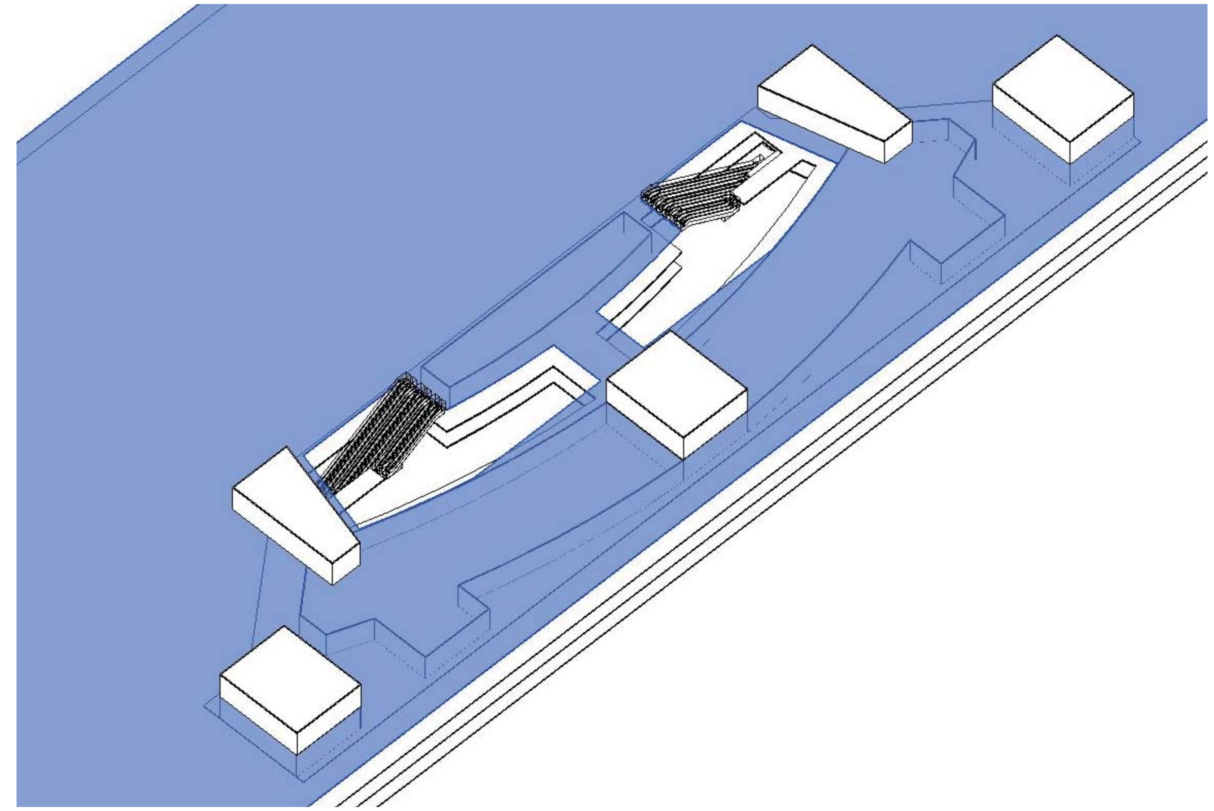
RAC/CSB level 2 parking and vehicular circulation study

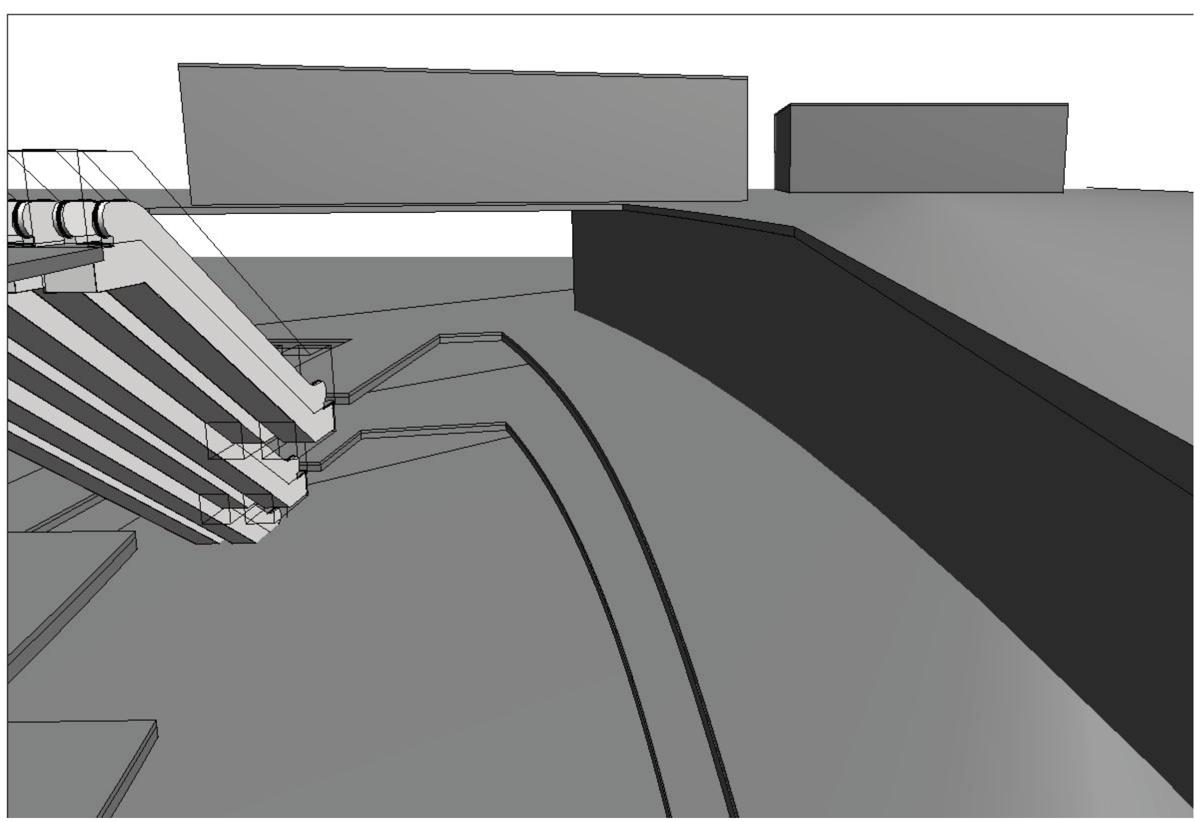


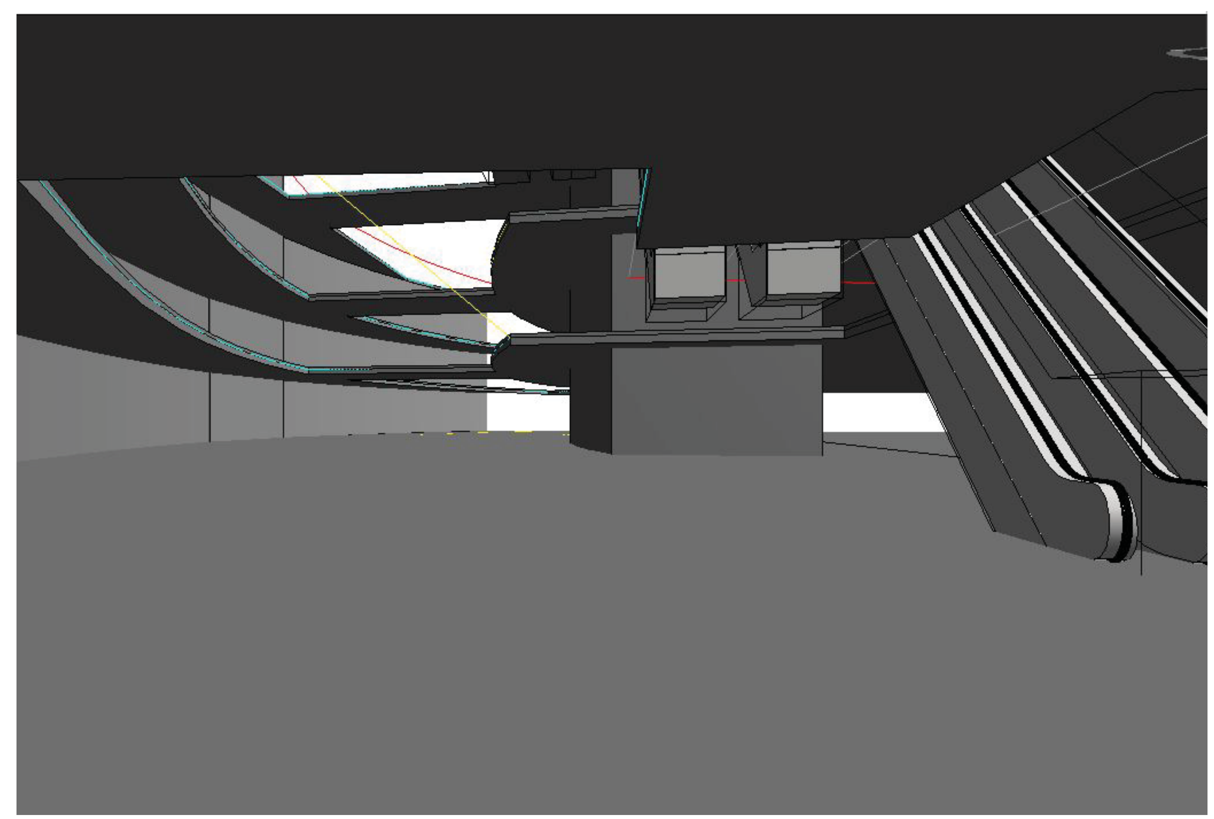
RAC/CSB level 2 egress study

- 3 story CSB required additional studies for parking, east-west vehicle circulation and egress passage.

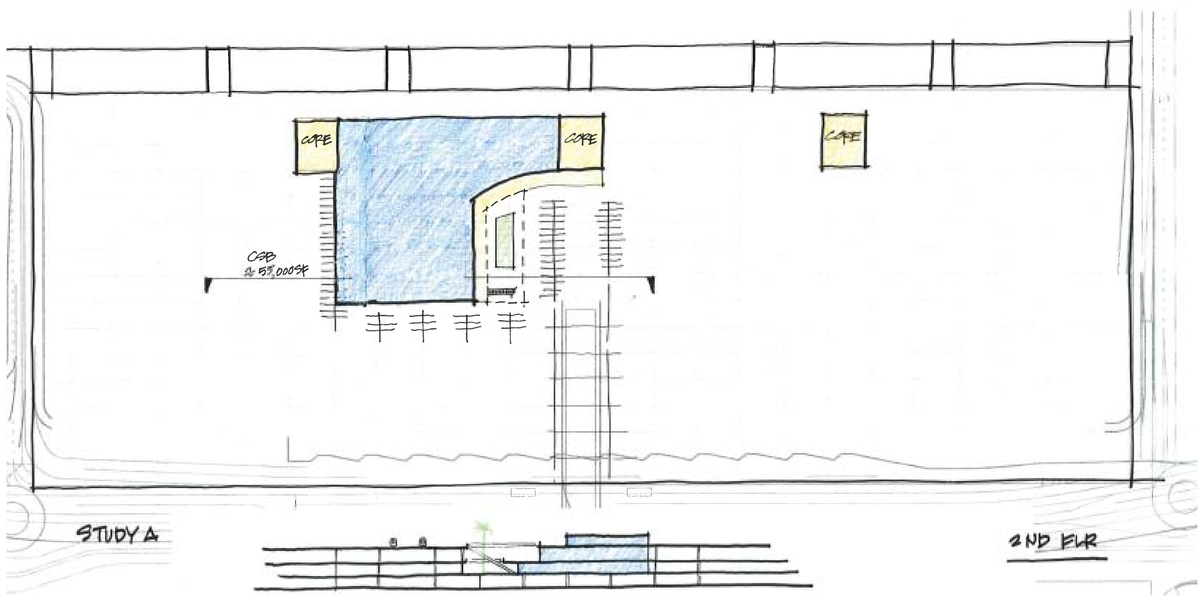

Oblique view to northeast - Roof Level highlighted in blue

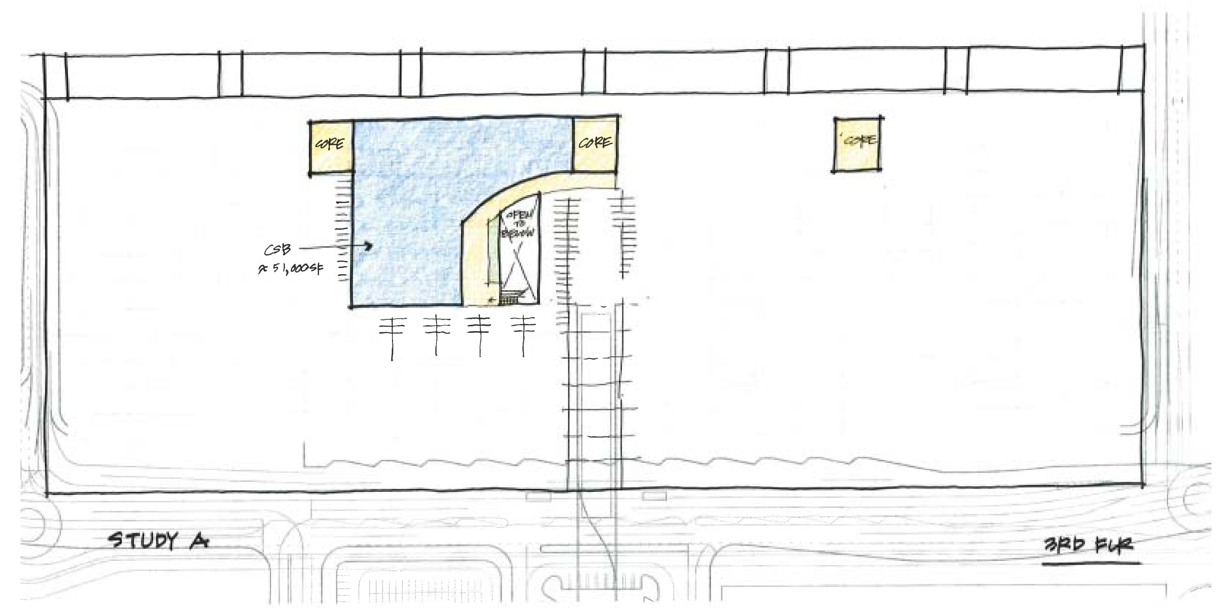

Oblique view to northwest - Roof Level highlighted in blue

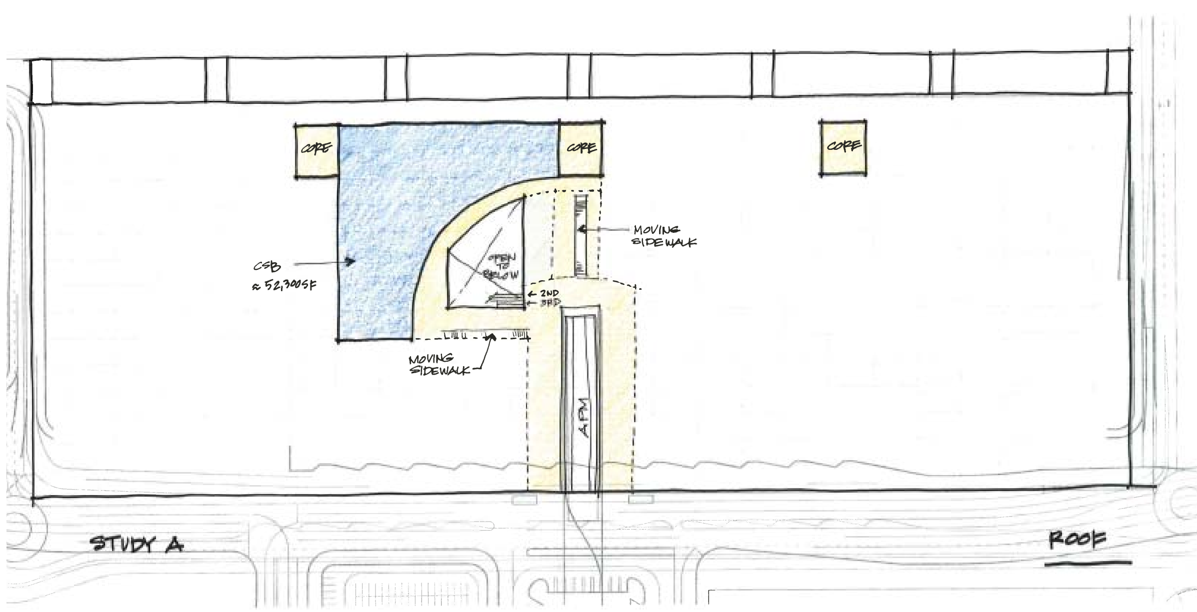

View from APM level bridge to lower level lobbies and courtyard


View from RAC Level 1 looking south

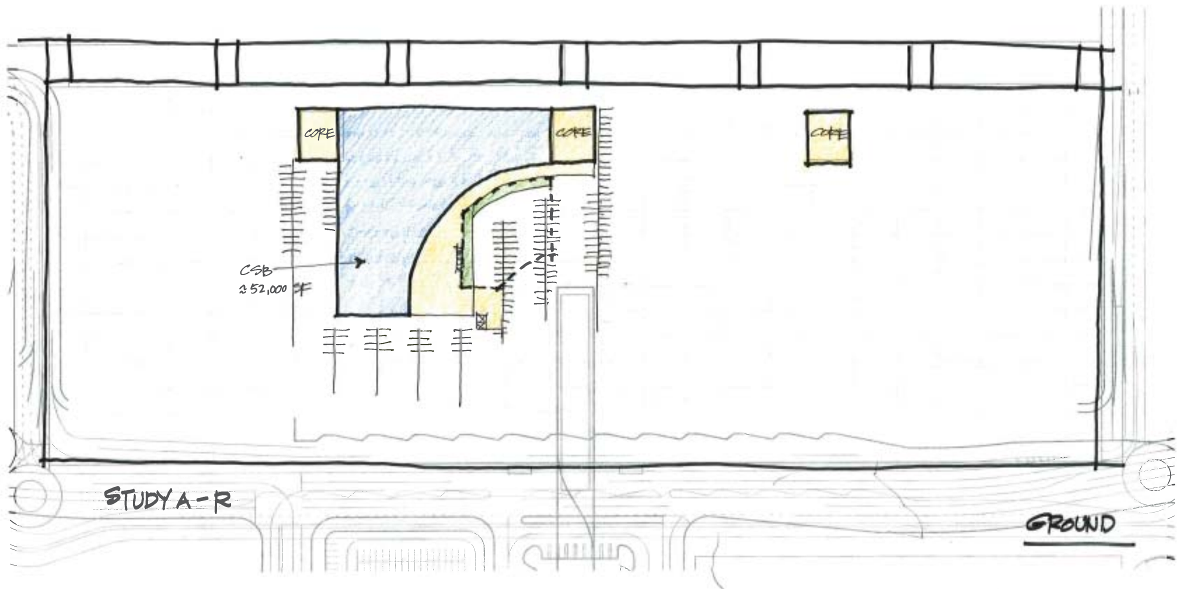
- 3 story CSB 3d Massing studies

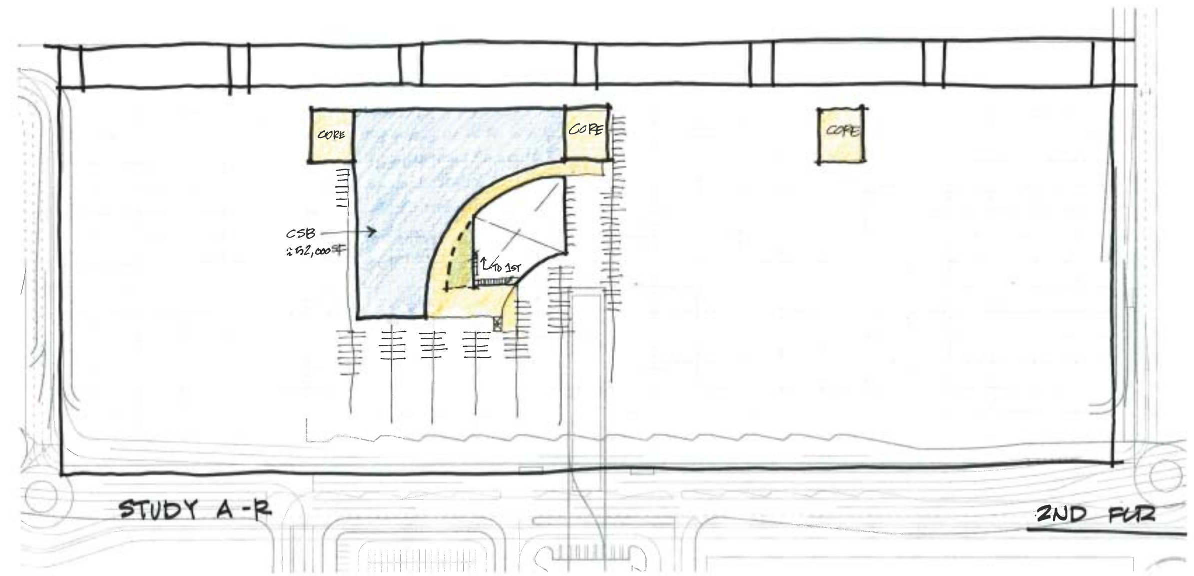


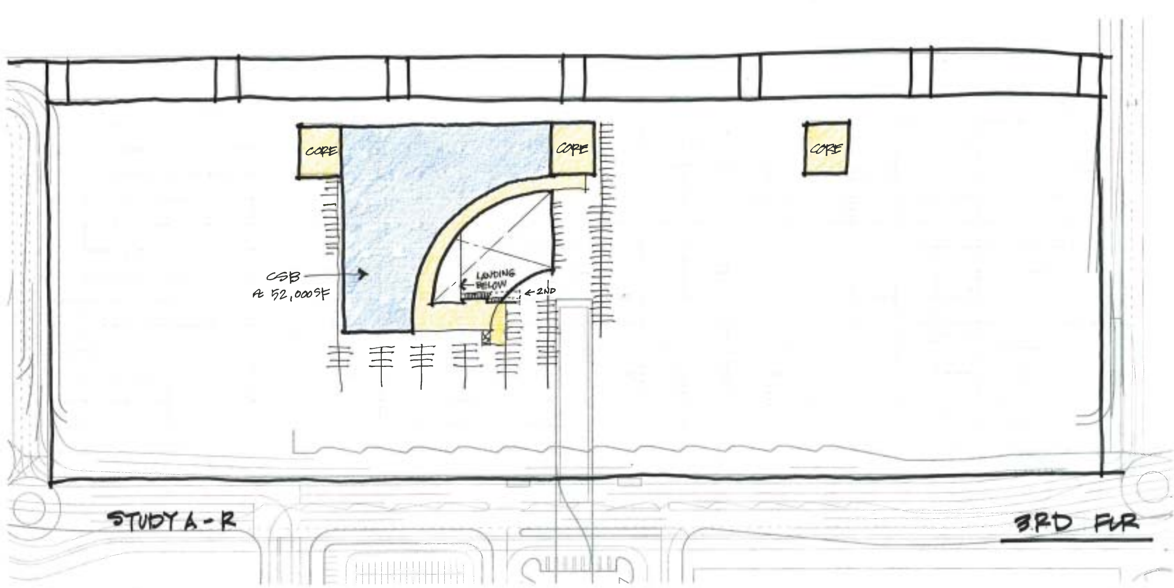


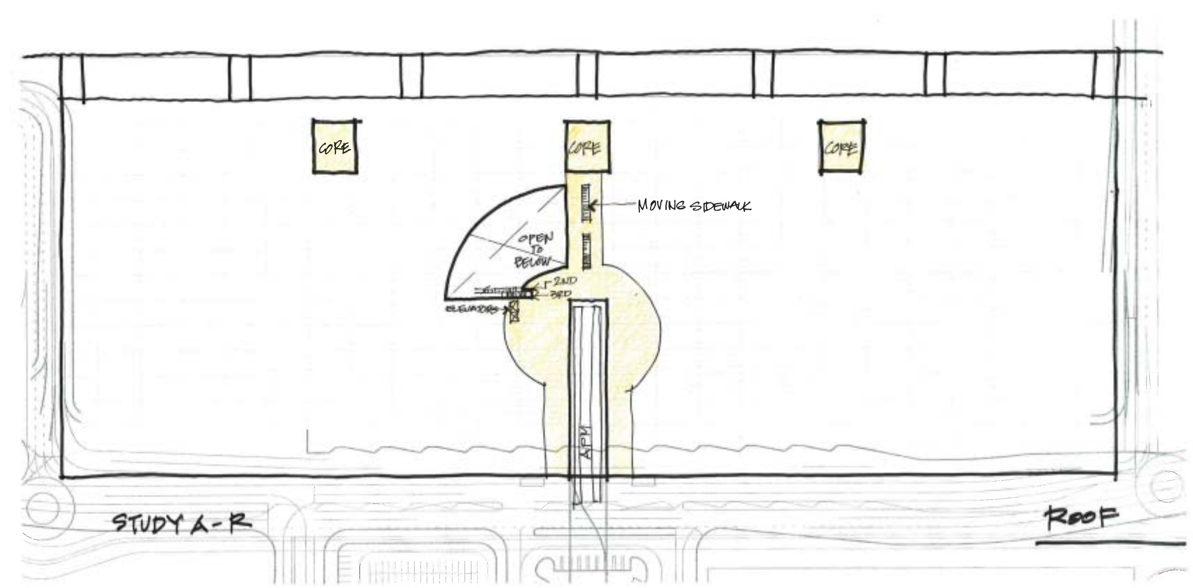


- CSB distributed to three levels north of APM with access from roof level to third and second RAC levels. Large light well at roof level penetrates all levels allowing light to reach ground level.

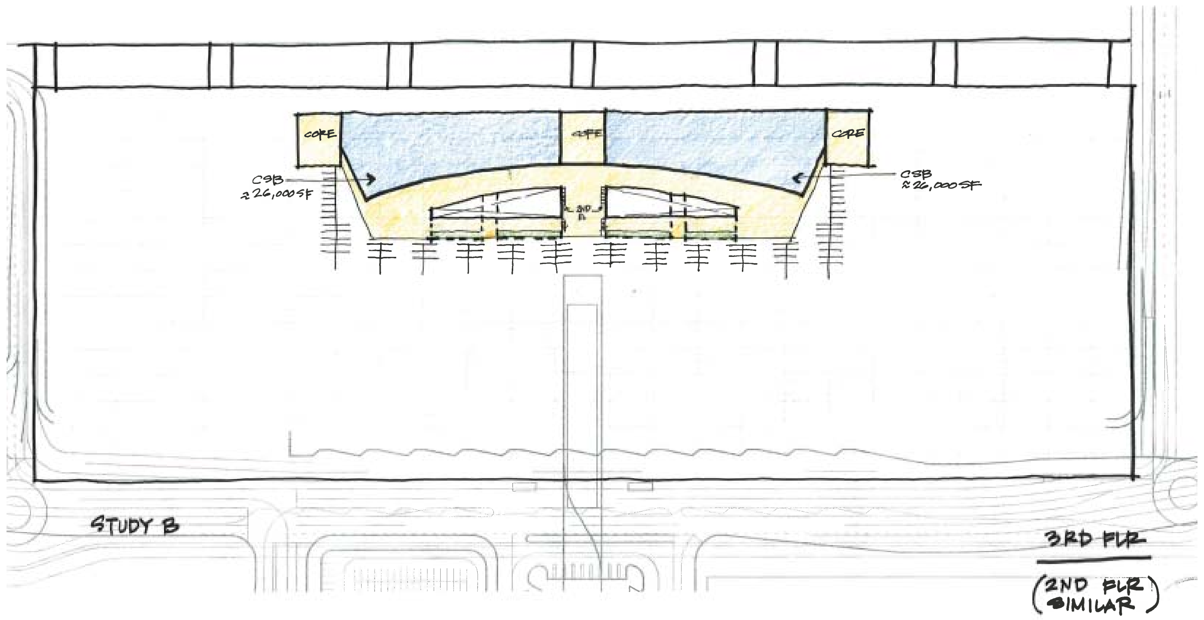


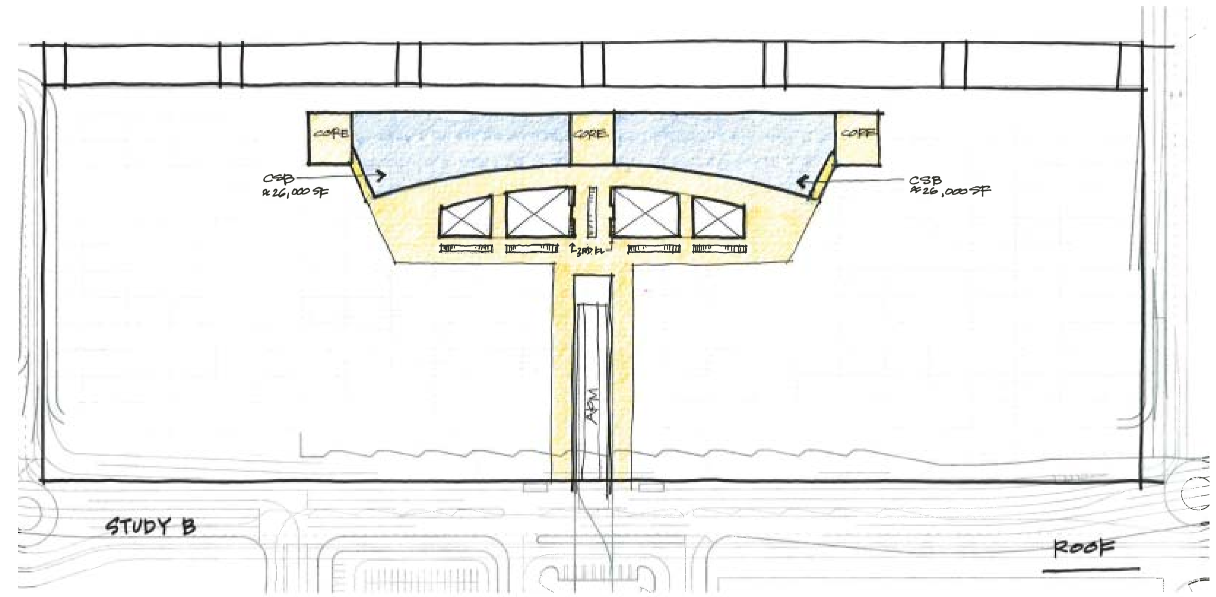


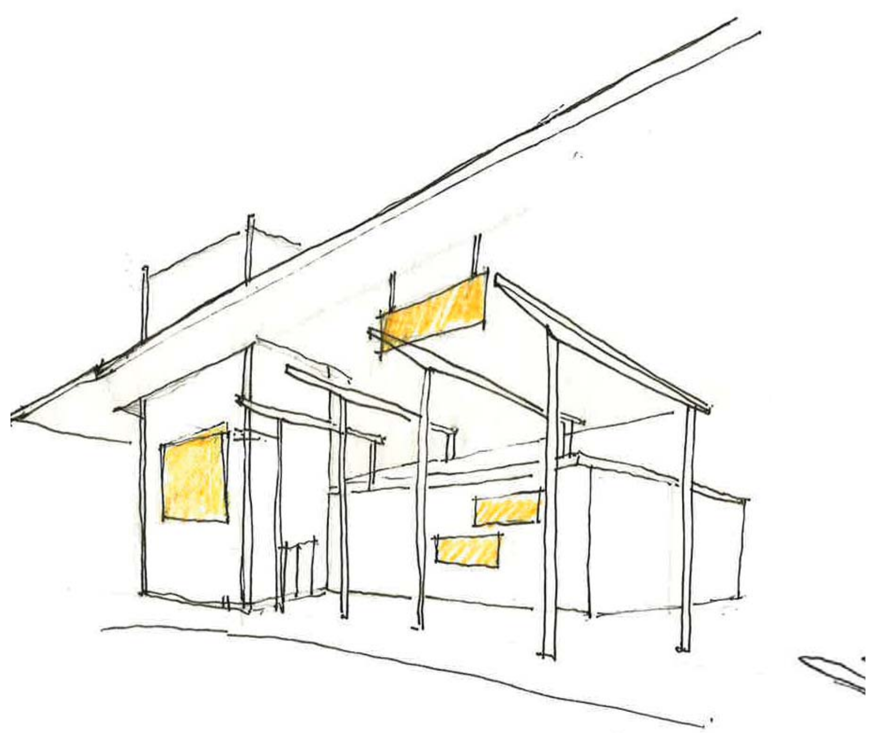




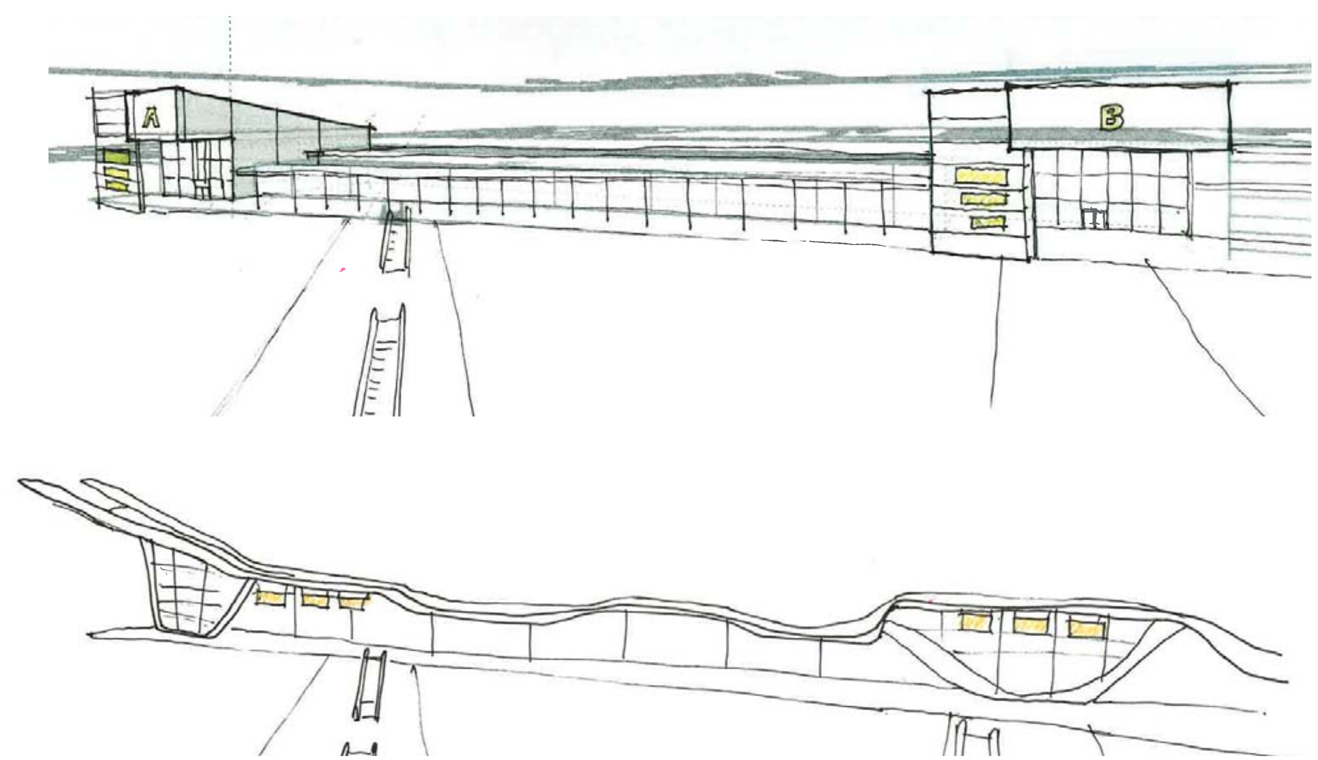
- CSB distributed to three levels north of APM and below roof level with main access from roof. Large light well at roof level penetrates all levels allowing light to reach ground level.





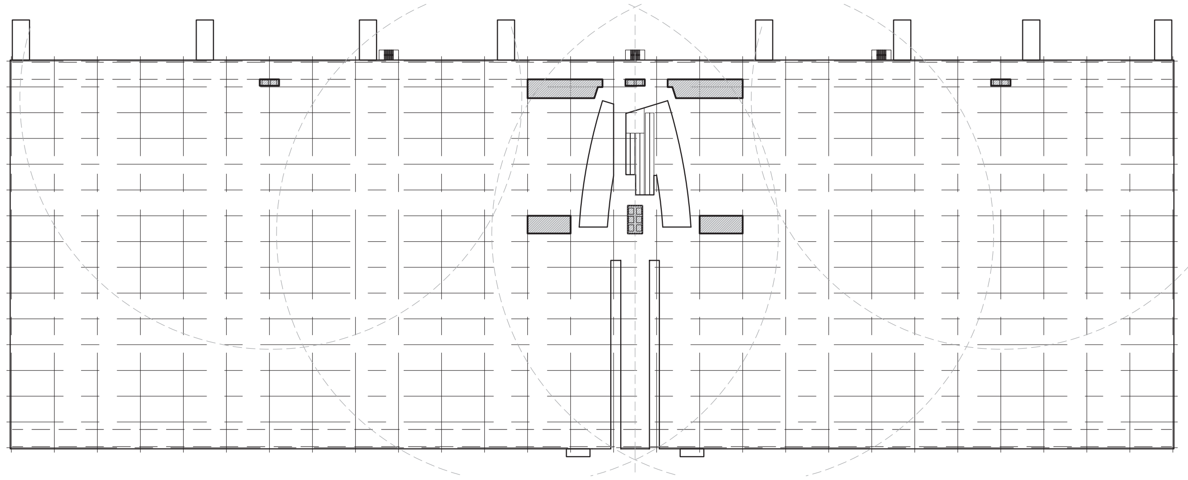


Facade studies

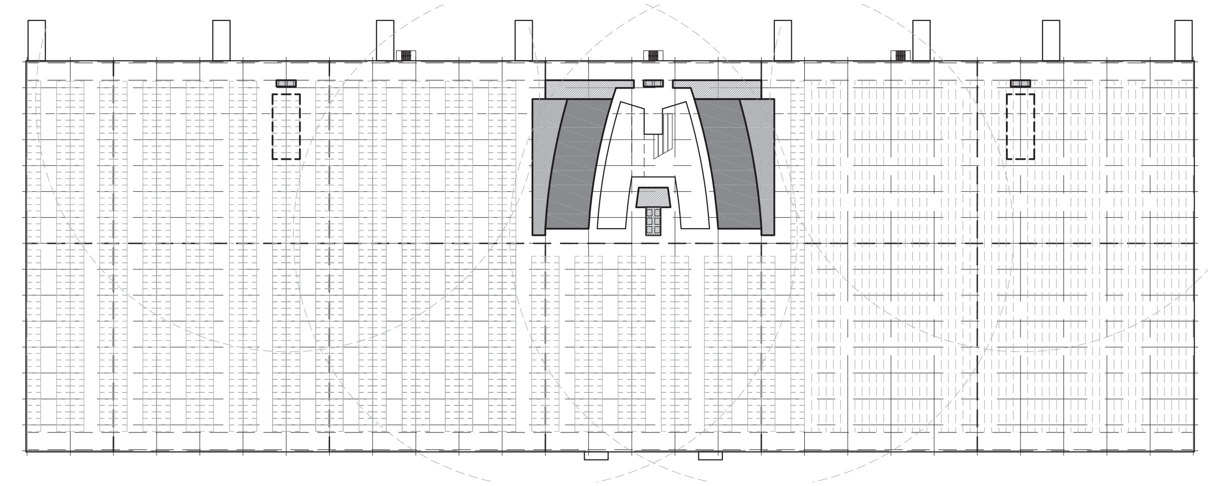


Facade studies

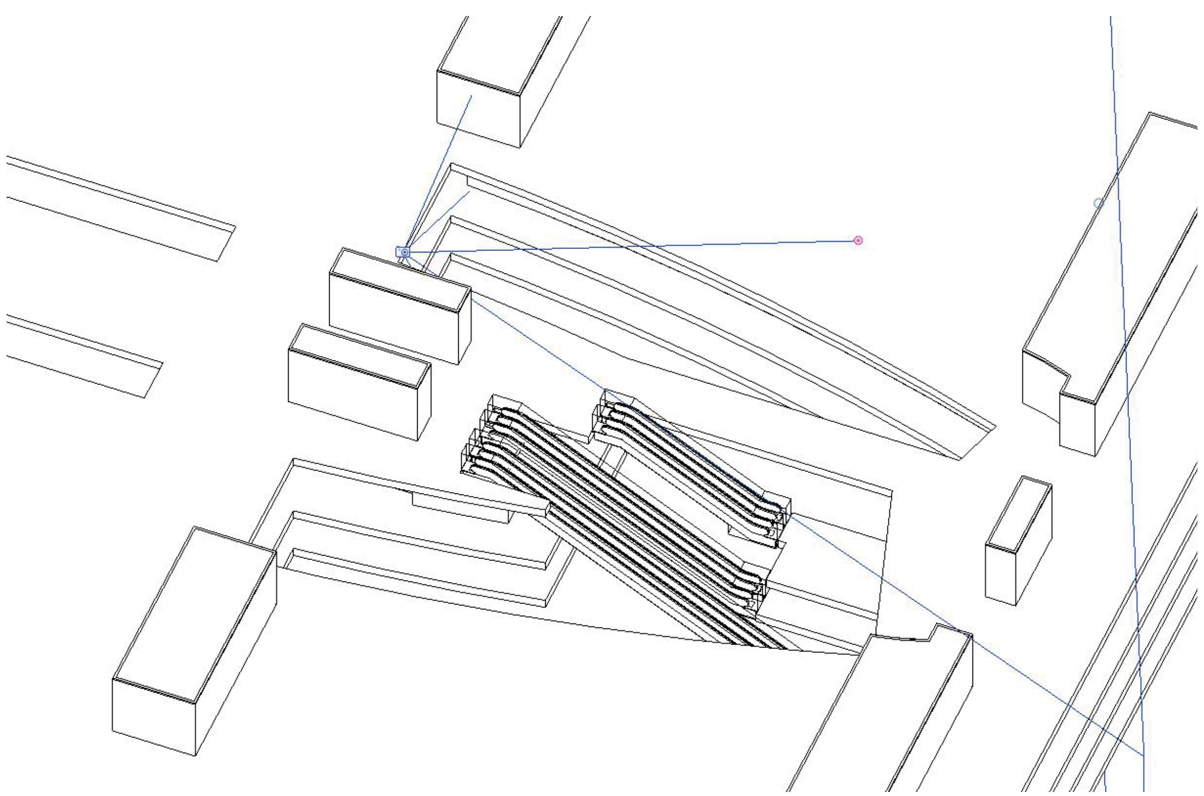
- Sketches indicating CSB area reduced on roof level by allocating majority of support and office spaces to three levels of RAC floors. Preliminary facade and signage placement studies for minimized CSB.



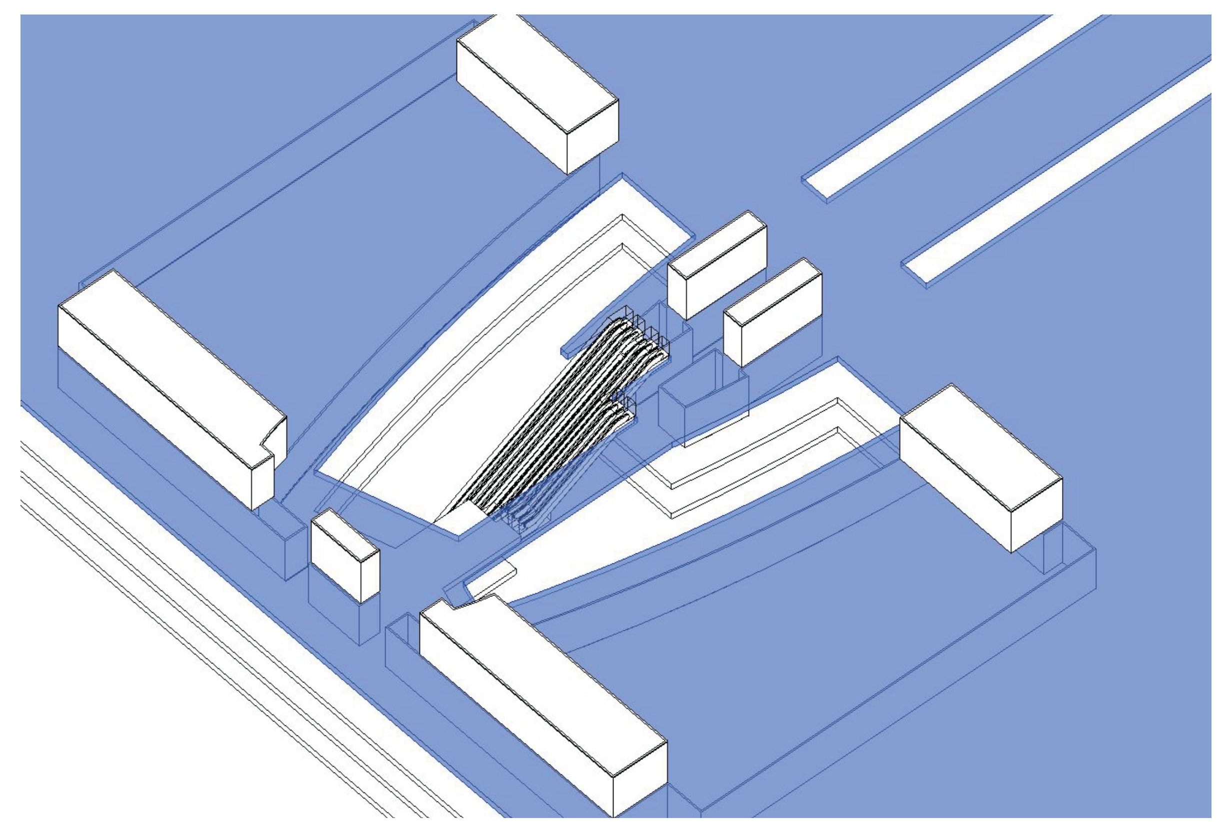
Plan at APM/Roof Level



Typical plan at RAC/CSB level

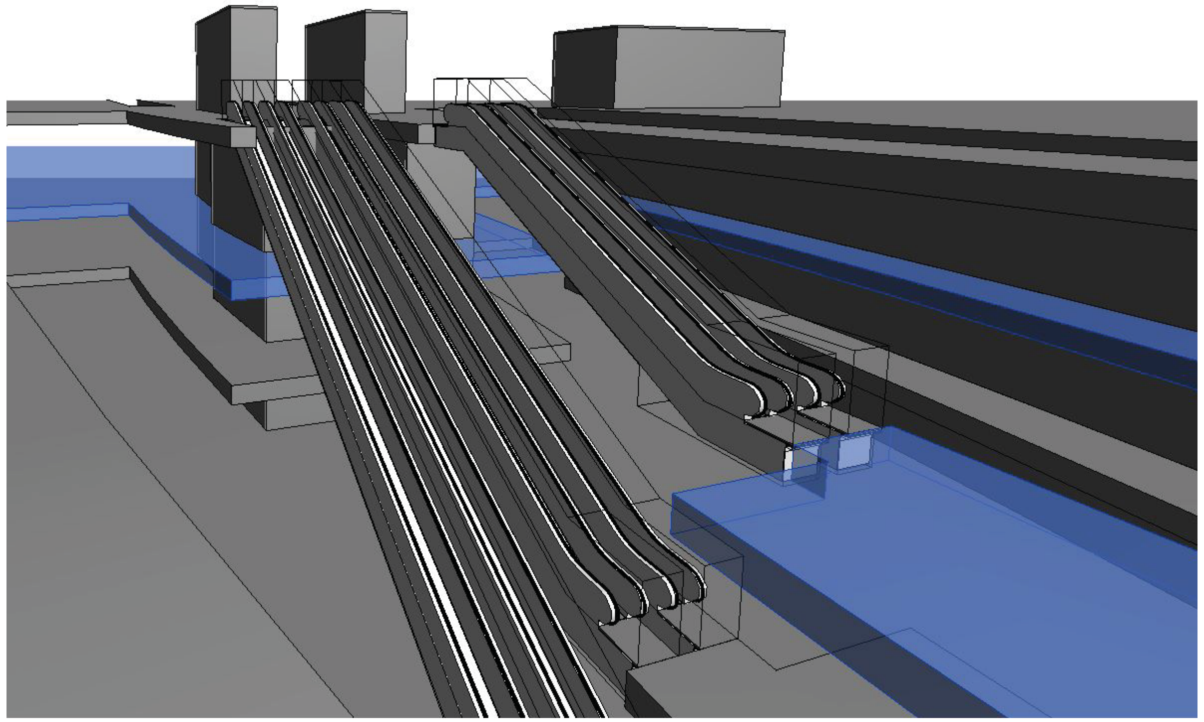


Oblique view to northwest

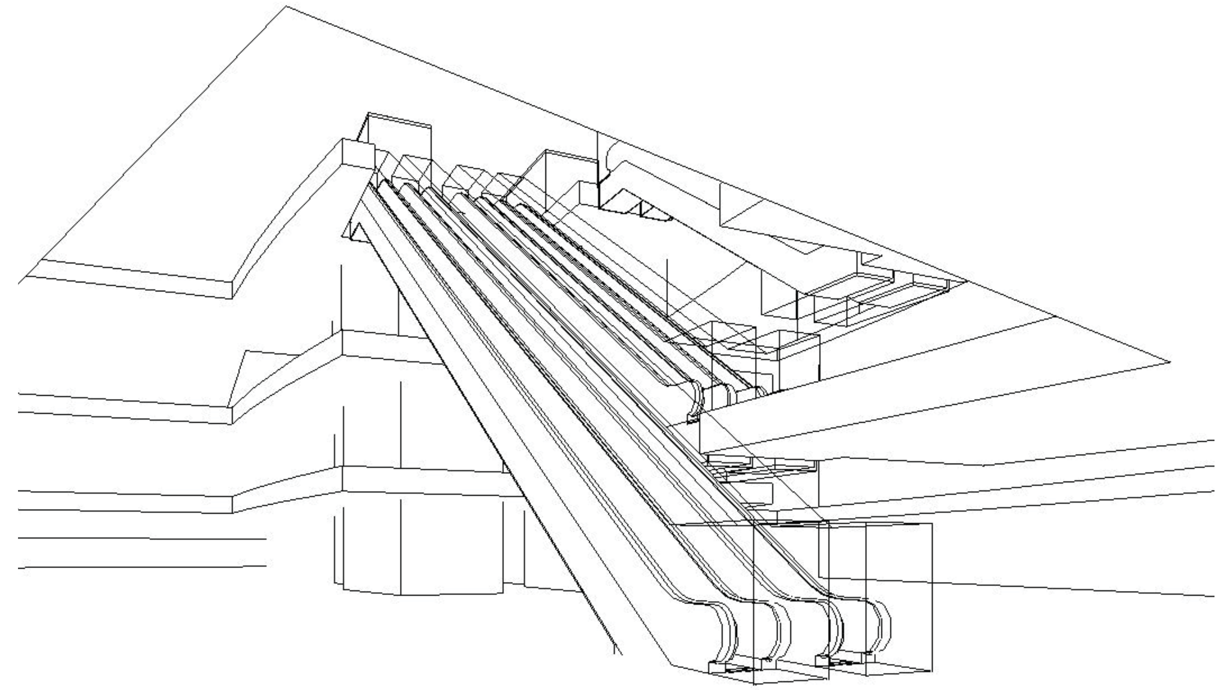


Oblique view to southwest; Roof Level highlighted in blue

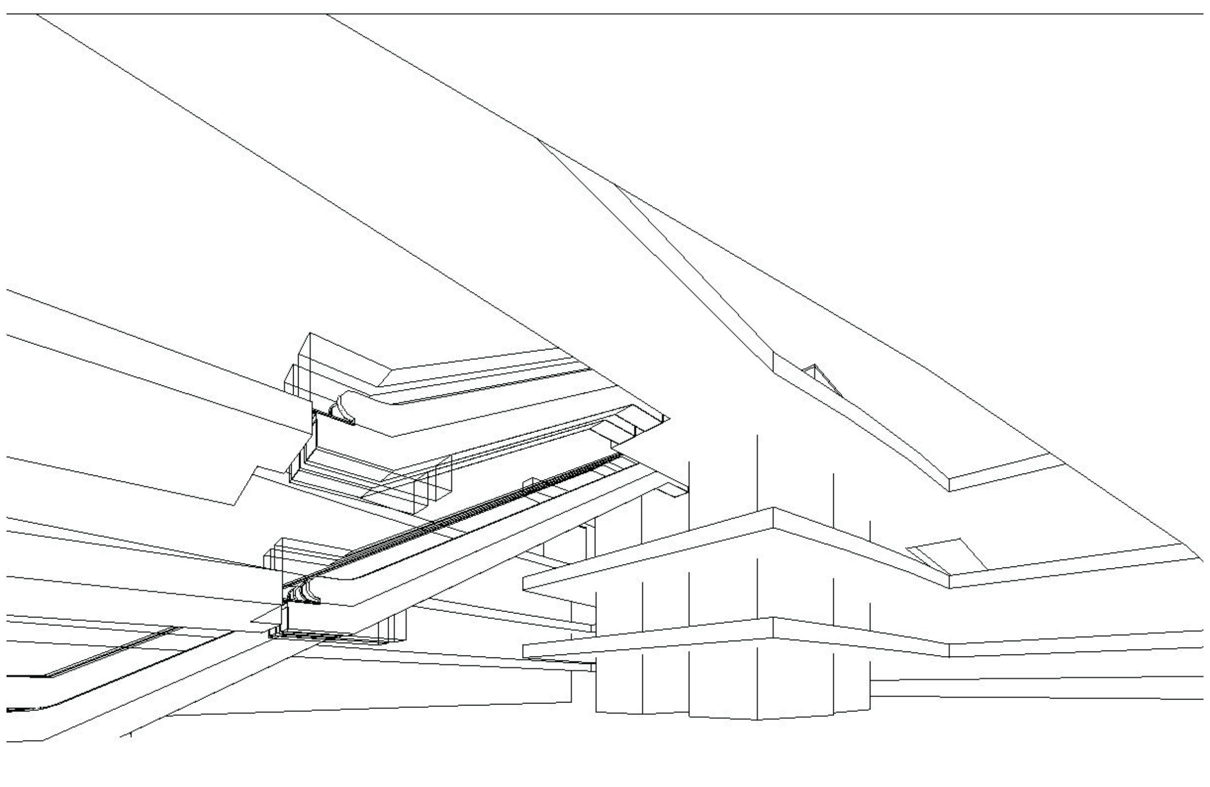
- 3 story CSB draft plan development updates for all levels. Main access to lower levels centralized with eastern directed escalators located east of APM. Large, multi-story openings allow for views and direct access to desired RAC level. Development to improve east-west flow of vehicles, egress, and further localize RAC lobbies.



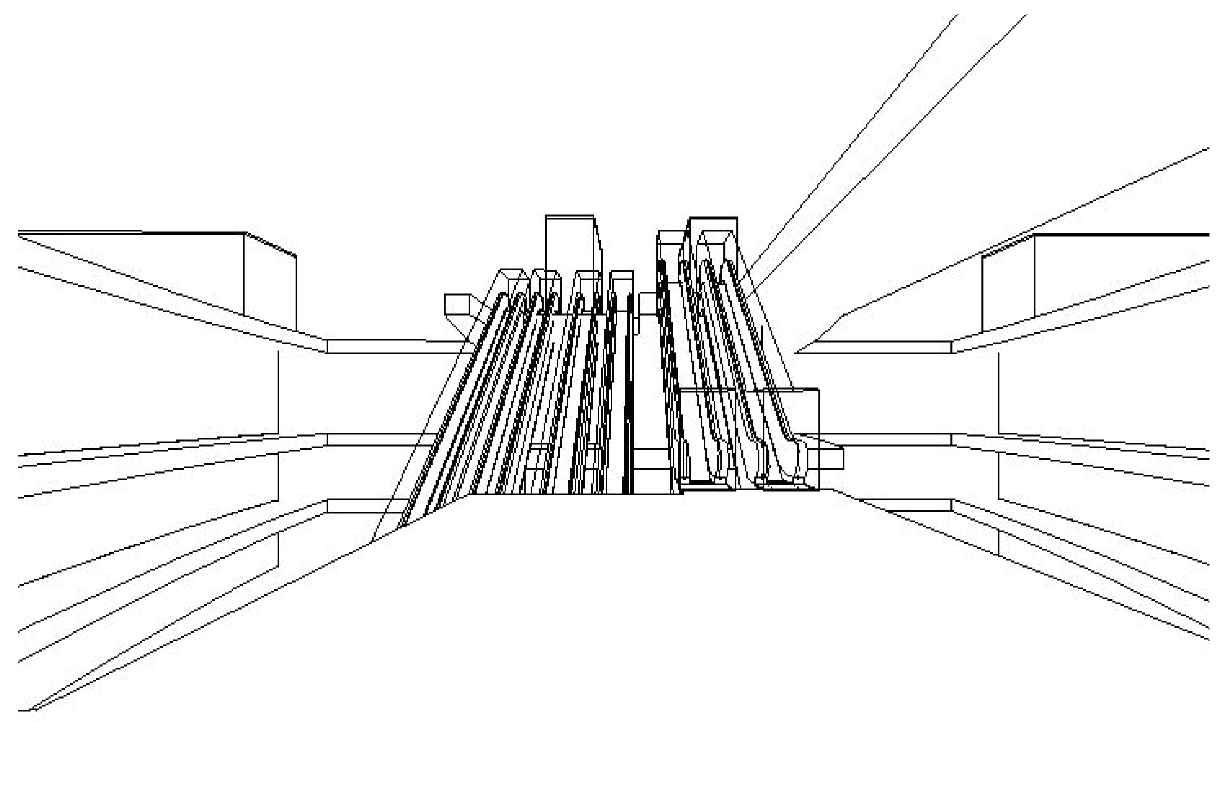
View from Roof Level; Level 3 highlighted in blue



View from RAC/CSB level 1 looking up to the west

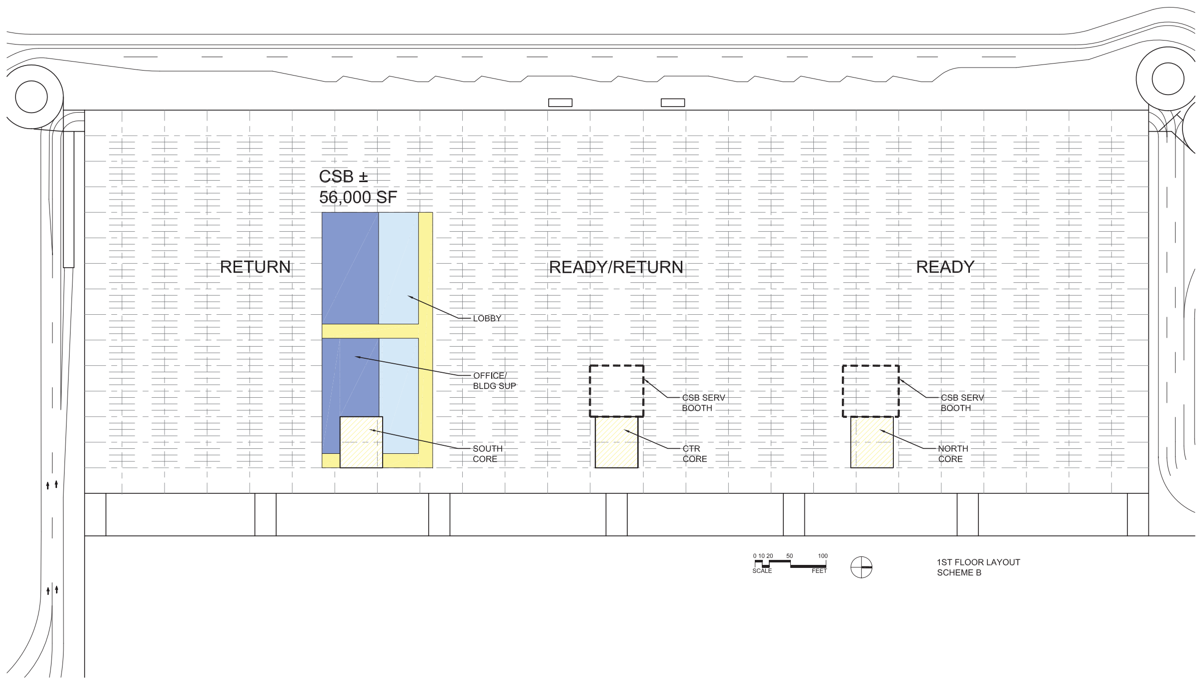


View from RAC/CSB Level 1 looking up to the East

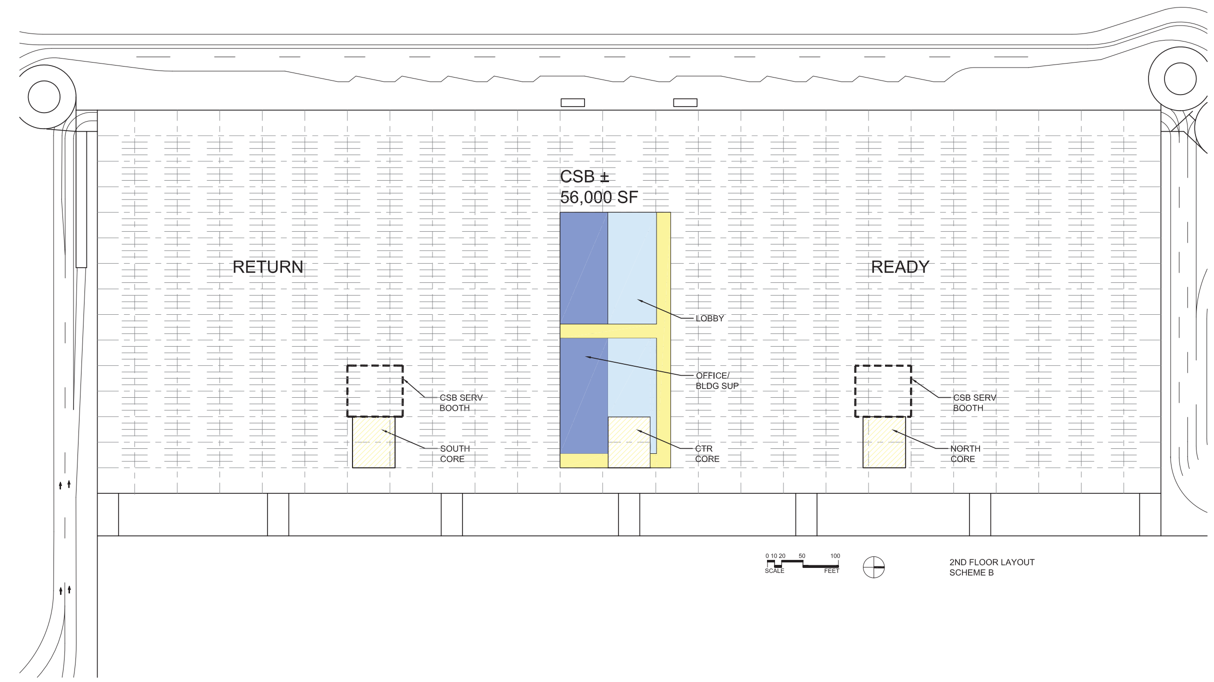


View from RAC level 3 looking East

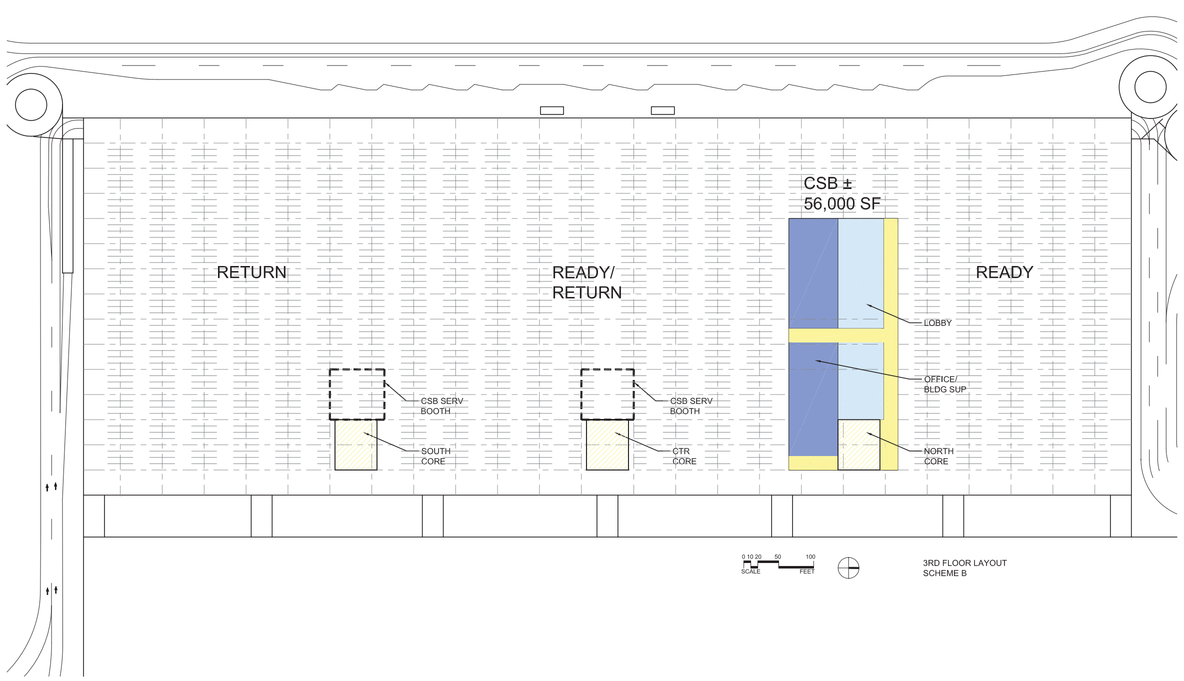
- 3 story CSB 3-D modeling



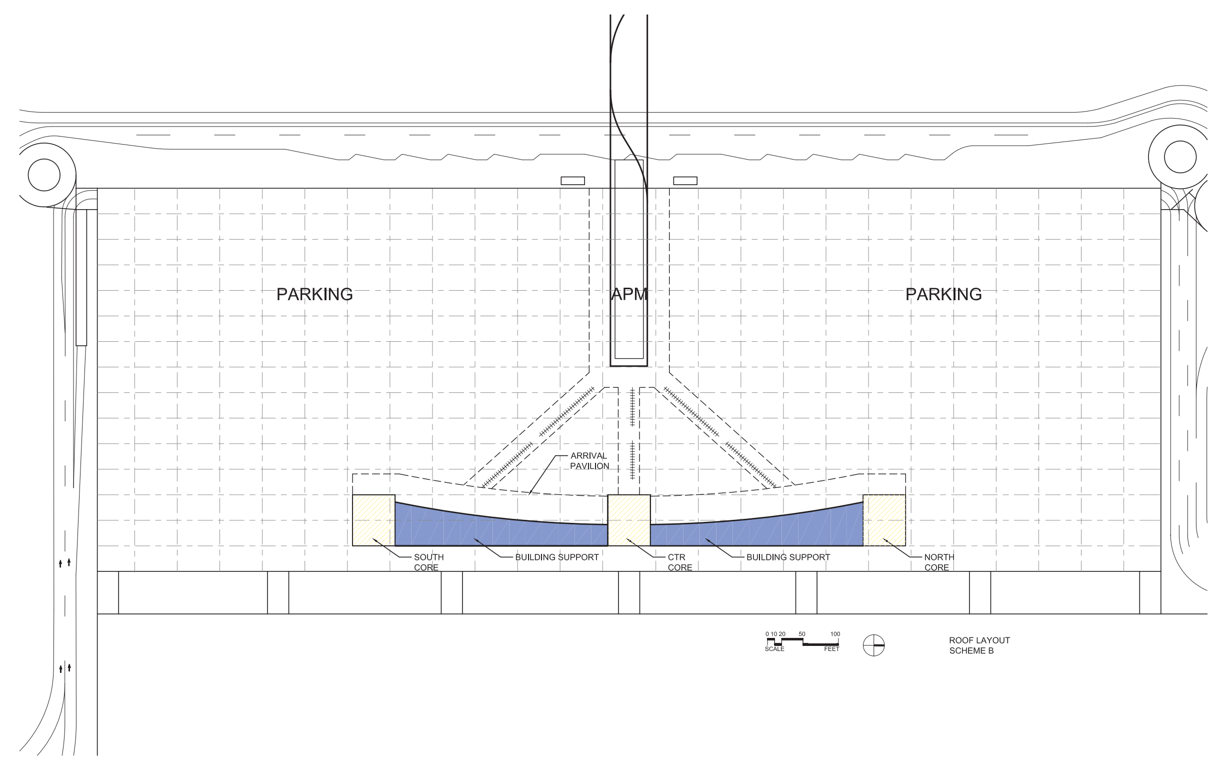
Level 1



Level 2

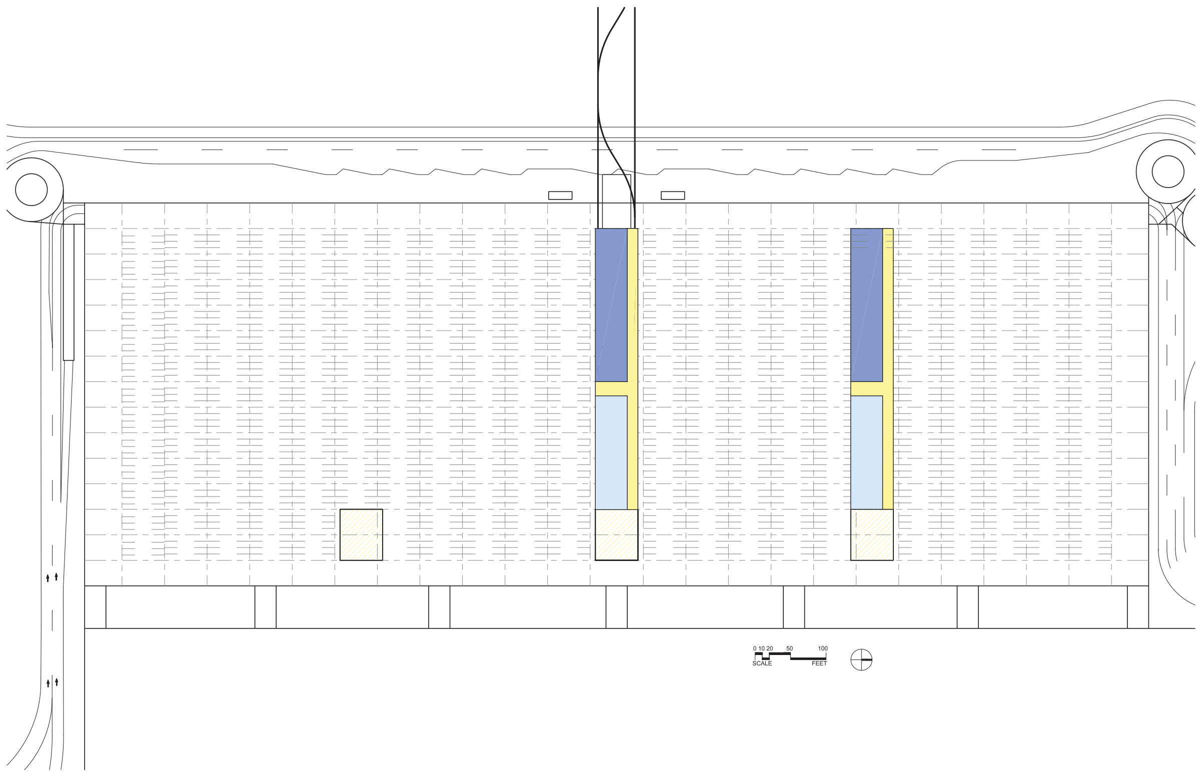


Level 3



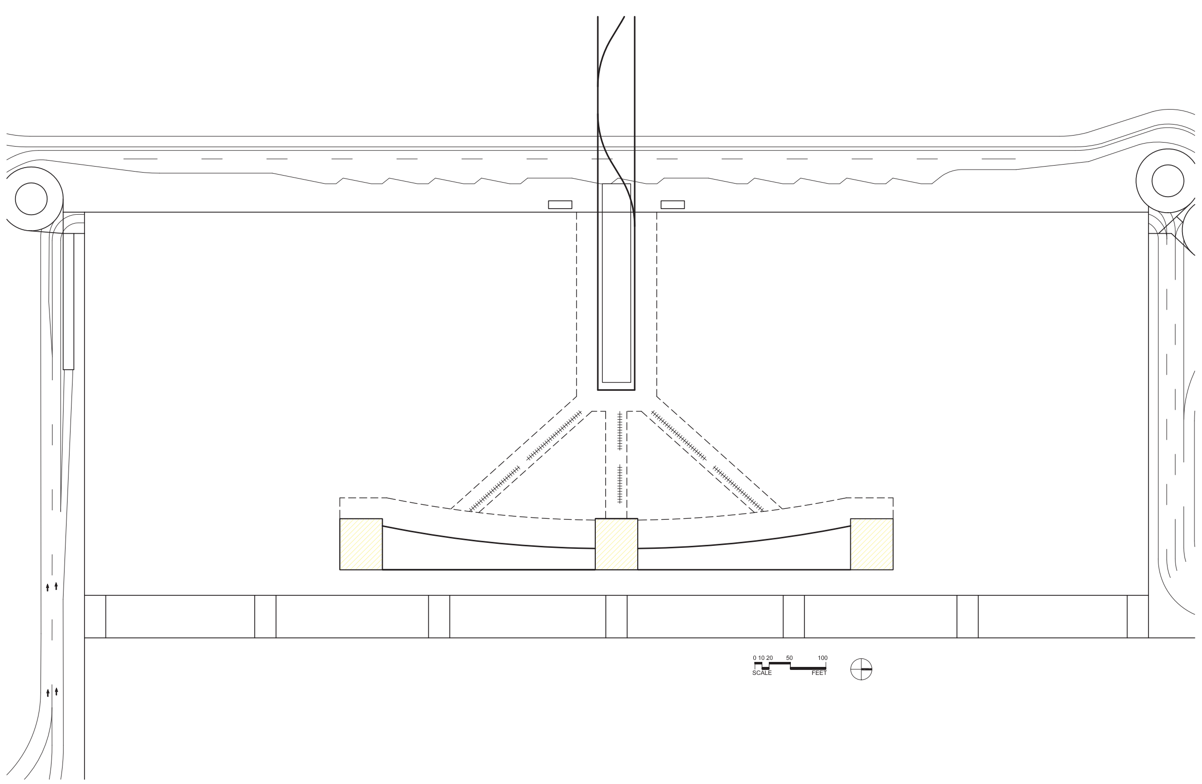
Roof Level

- 4 level CSB study with lobbies on all levels. RAC lobbies connected to cores for vertical access on roof level. Lobbies on floors 1-3 are centered around one vertical core dedicated to brand families. Support booths and kiosks are connected to remaining cores on each level.



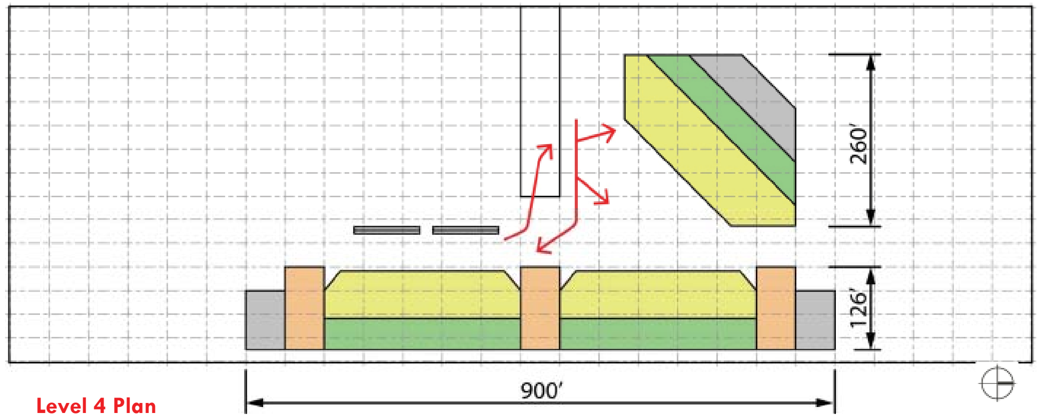
Option 1 - Typical layout on levels 1-3

Option 2 -Typical layout on levels 1-3



Roof Level

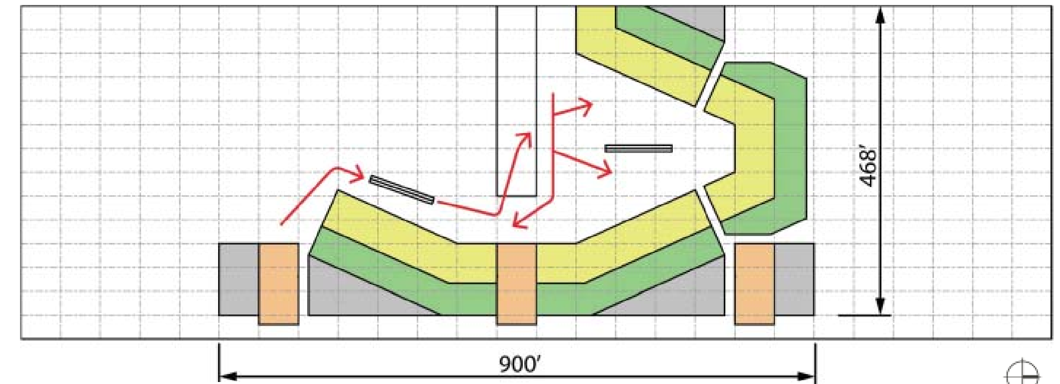
- 3 level CSB study with lobbies on levels 1-3. RAC lobbies connected to cores for vertical access and dedicated to brand families. Roof level excludes lobbies and provides minimal support and office spaces connected to cores. Lobbies arranged to minimize disruption to east-west vehicular access.



Level 4 Plan

Overall Area	199,280 SF
RAC Lobby	110,000 SF
RAC Back Office	45,000 SF
Building Support	21,600 SF
Vertical Circulation Core	22,680 SF

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation



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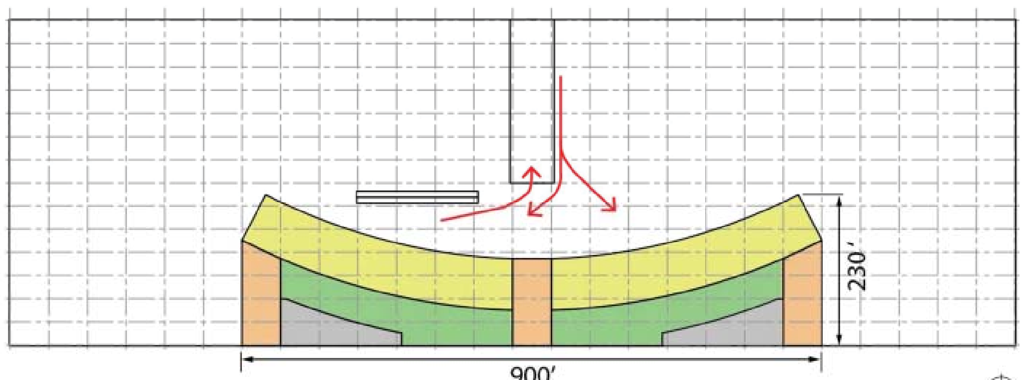
	Indoor Circulation
	Building Support
	Customer Circulation



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Color	Zone Name
	Outdoor Circulation
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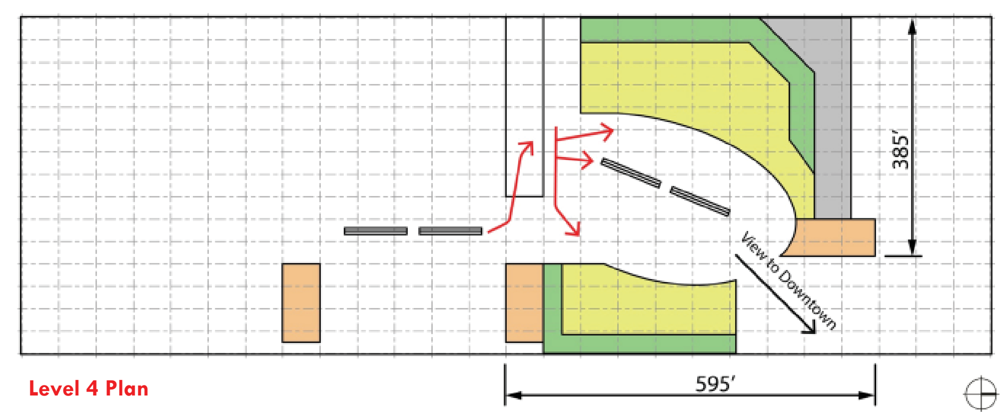
	Indoor Circulation
	Building Support
	Customer Circulation

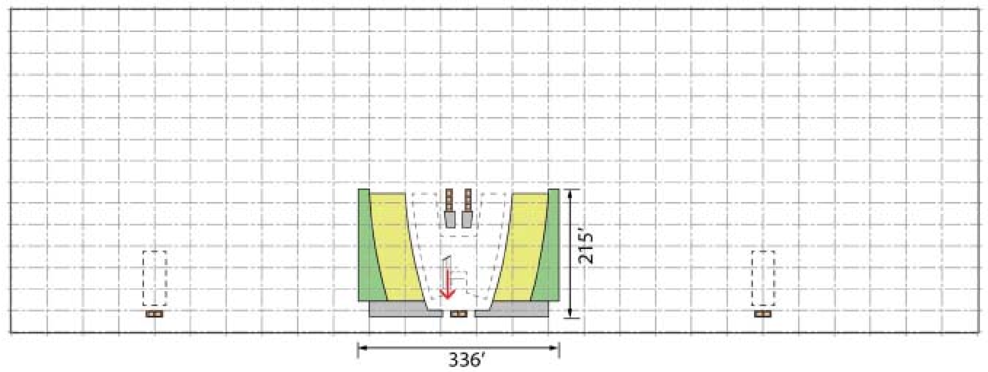


Level 4 Plan

Overall Area	199,280 SF
RAC Lobby	110,000 SF
RAC Back Office	45,000 SF
Building Support	21,600 SF
Vertical Circulation Core	22,680 SF

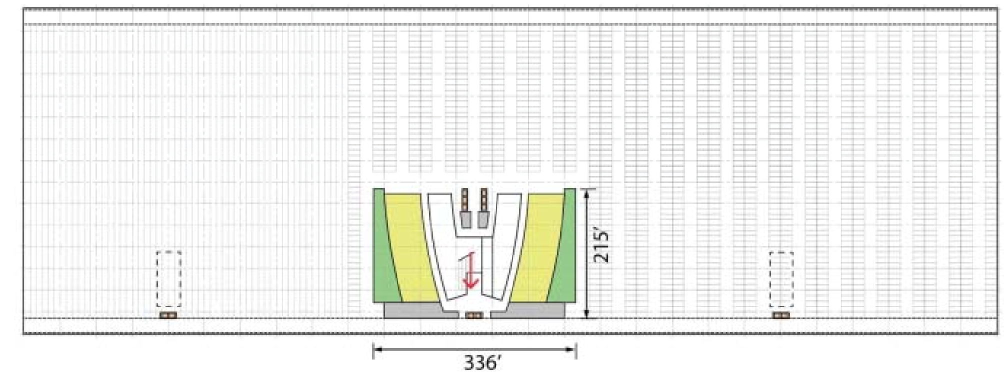
Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

- Refined concepts of CSB at APM/Roof Level focused on bringing customers closer to north and center cores to suit expected RAC operations. (See following page for comparison.)



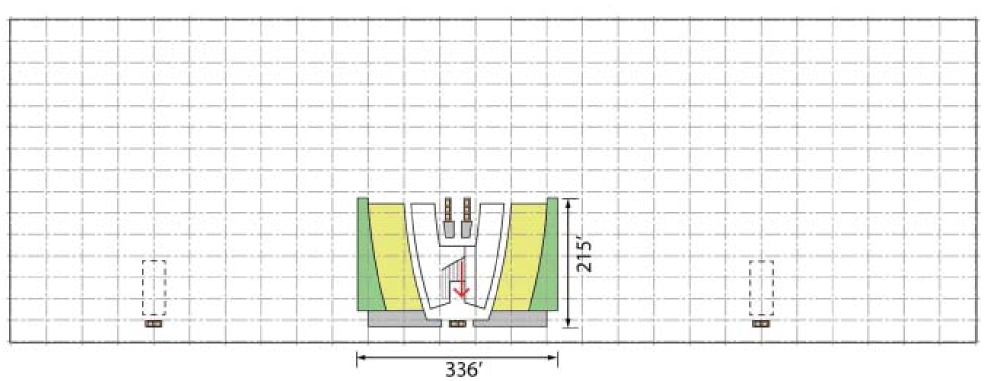
Level 1 Plan

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation



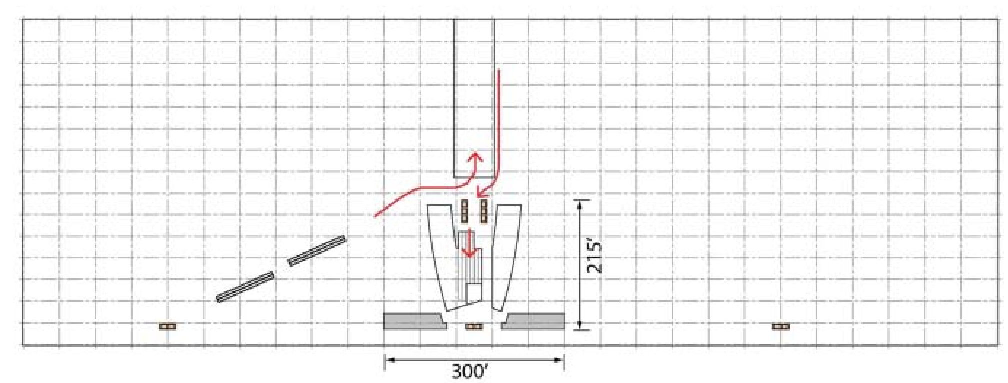
Level 2 Plan

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation



Level 3 Plan

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

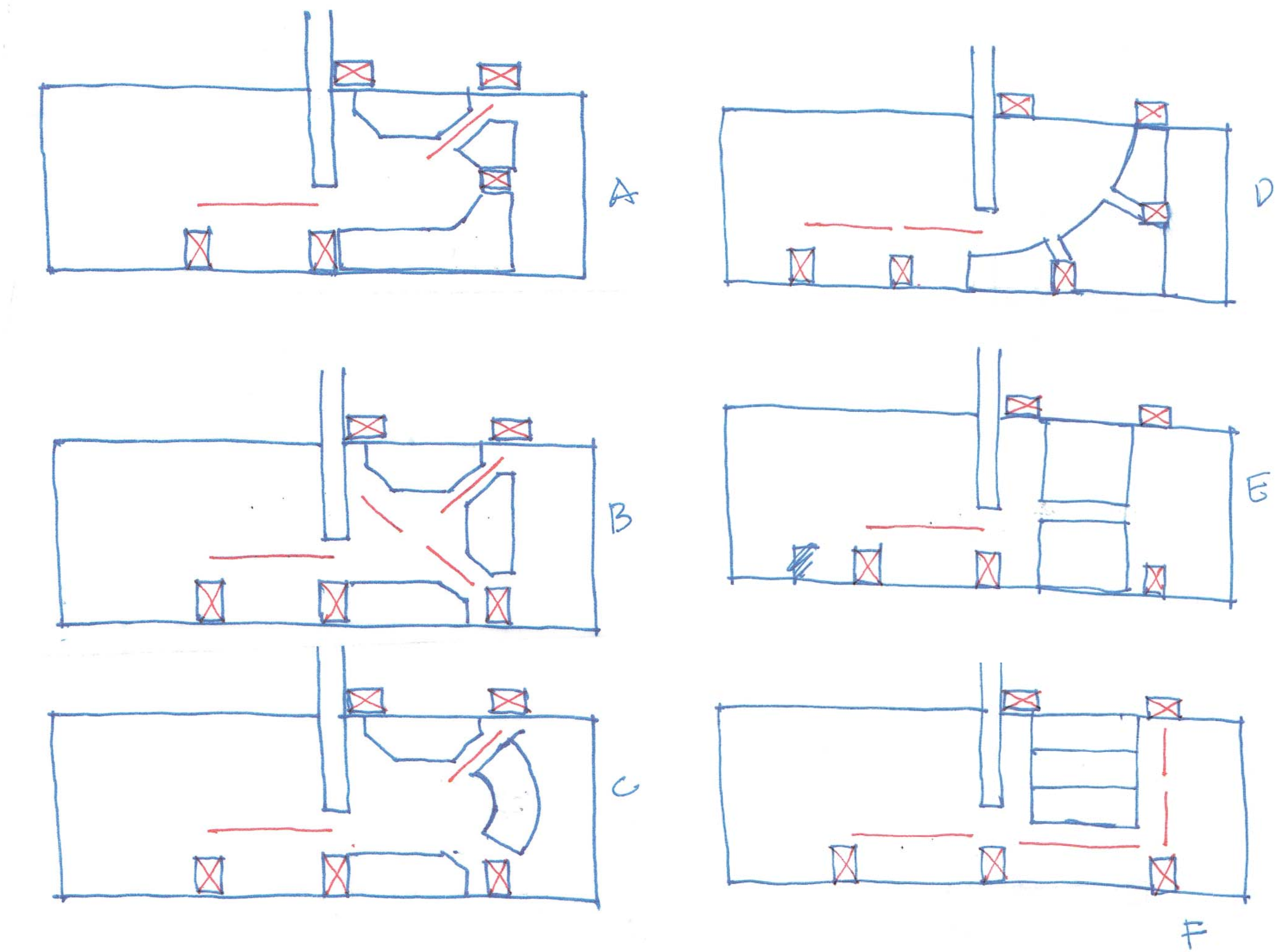


Level 4 Plan

Overall Area **(Excluding Cores)**	177,680 SF
RAC Lobby (Levels 1 thru 3)	110,000 SF
RAC Back Office (Levels 1 thru 3)	45,000 SF
Building Support (All Levels)	22,680 SF
Vertical Circulation Core	N/A

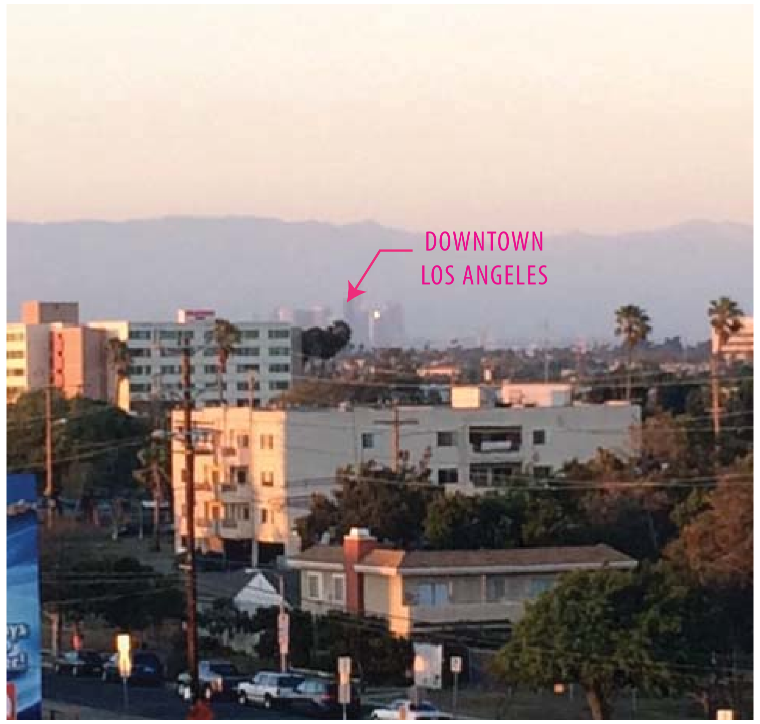
Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

- Refined concept of multi-level CSB focused on access from APM which provide level competitive playing field.



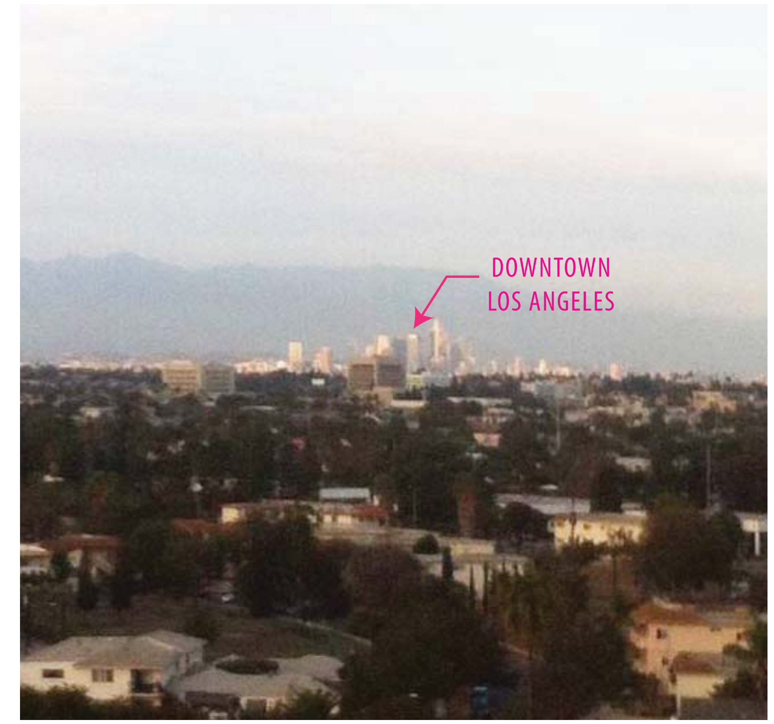
D. CSB DESIGN CONSIDERATIONS:

-Develop character of building
-Develop rooftop garden design
-CSB to have unconditioned exterior lobby space
-Cores on east side with option for north core to be centered E-W
-Design considerations for access from bus-curb- 3 east cores (north, center and south) and two west cores
-Create a CSB with a focal point/view vista orientated to Downtown Los Angeles northeast of site
-APM to enter into and occupy 7 western bays of RAC roof
-Consider arrival and return circulation for both APM and Bus options
-Distribute back-of-house offices on RAC floors

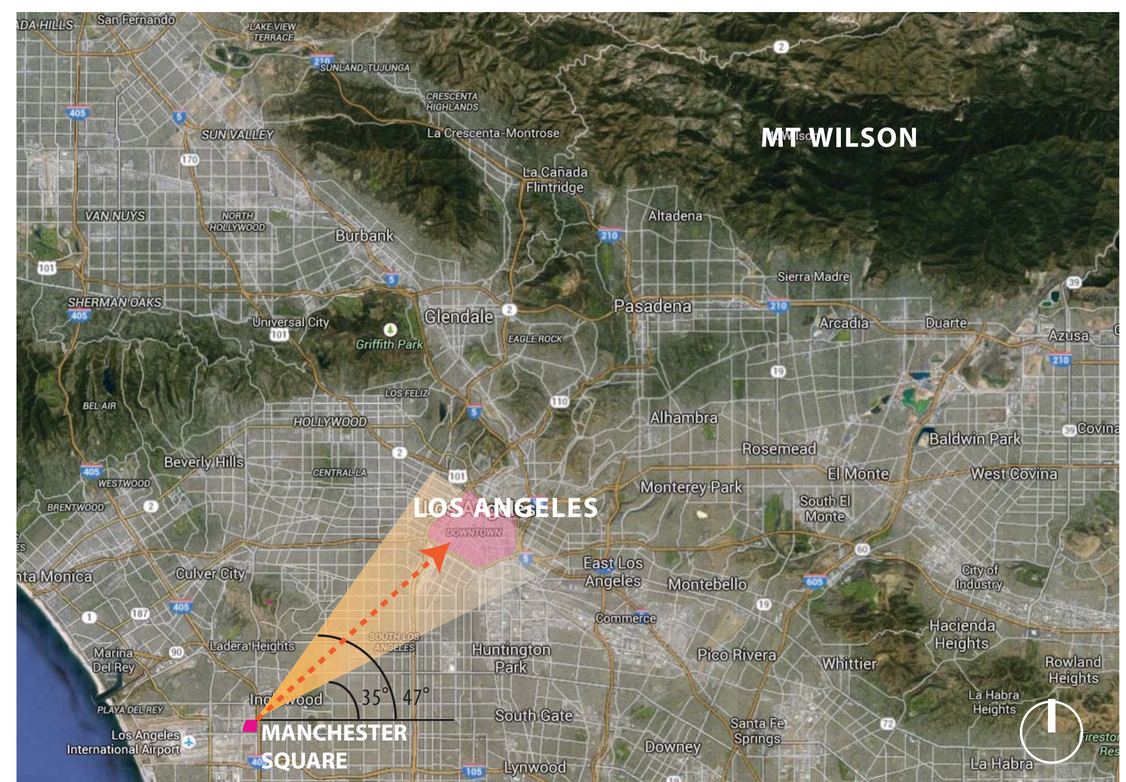


VIEW FROM WALLY PARK
(WEST OF PROJECT SITE, SEEN FROM 51')

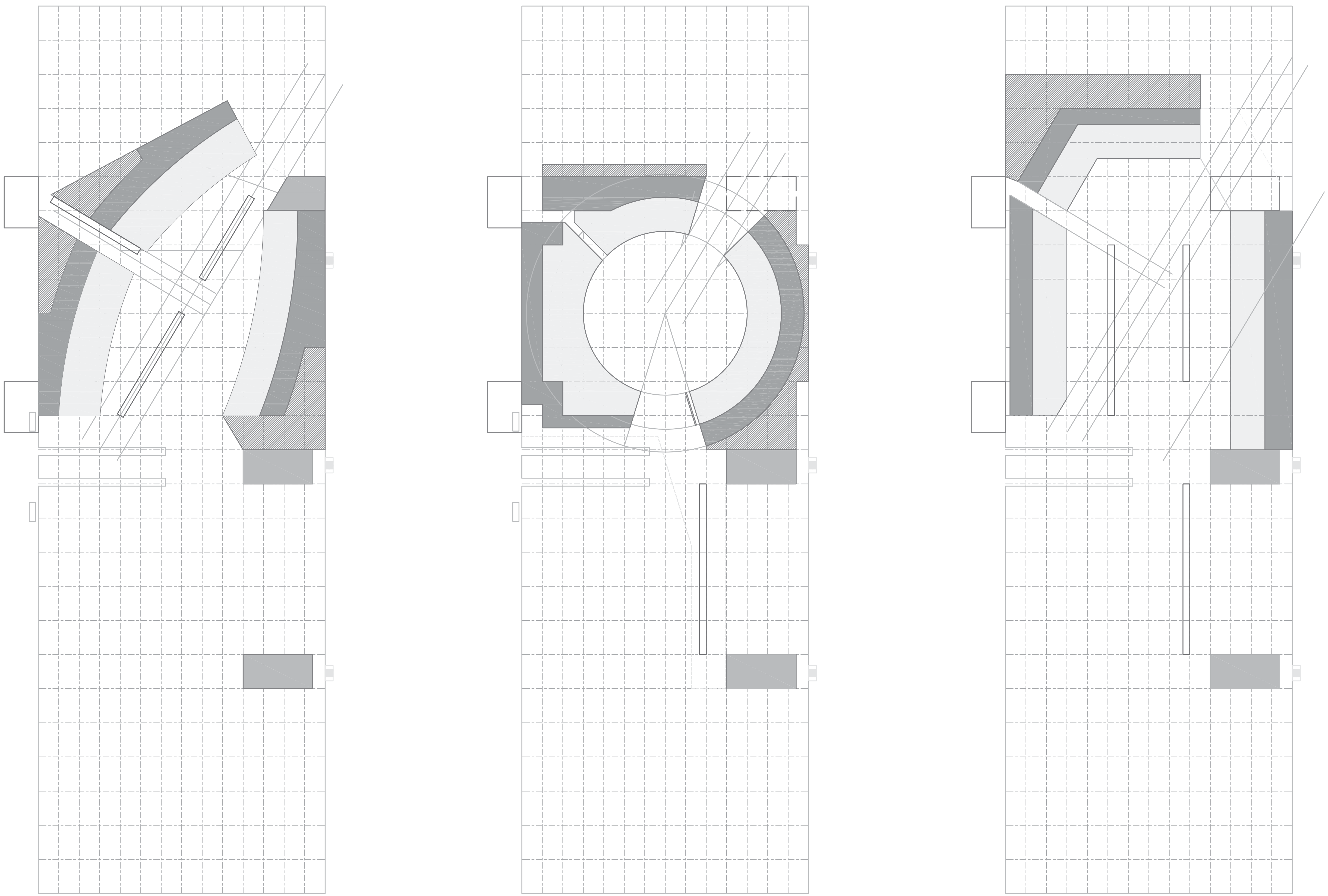
VIEW FROM HILTON HOTEL
(WEST OF PROJECT SITE)



VIEW FROM WESTIN HOTEL
(SOUTH OF PROJECT SITE)

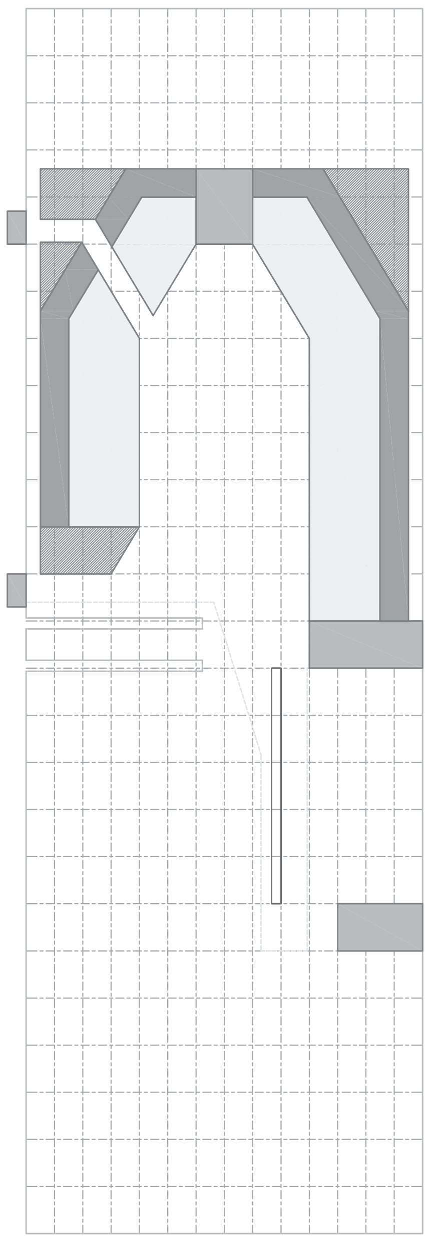


- Illustrations for the study of potential roof level view from CSB courtyard to Downtown Los Angeles

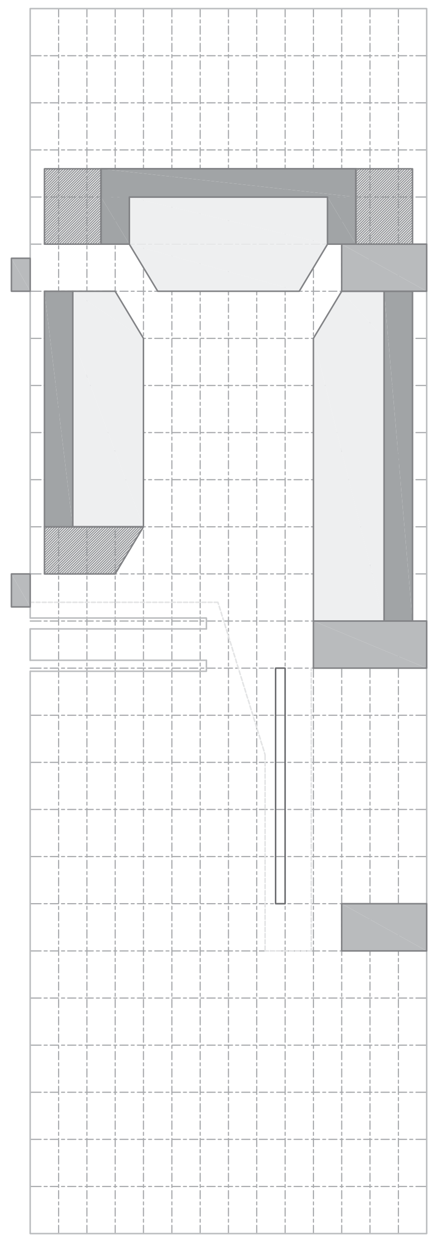


- CAD studies for the 3 core and 2 west core CSB with views to the northeast.

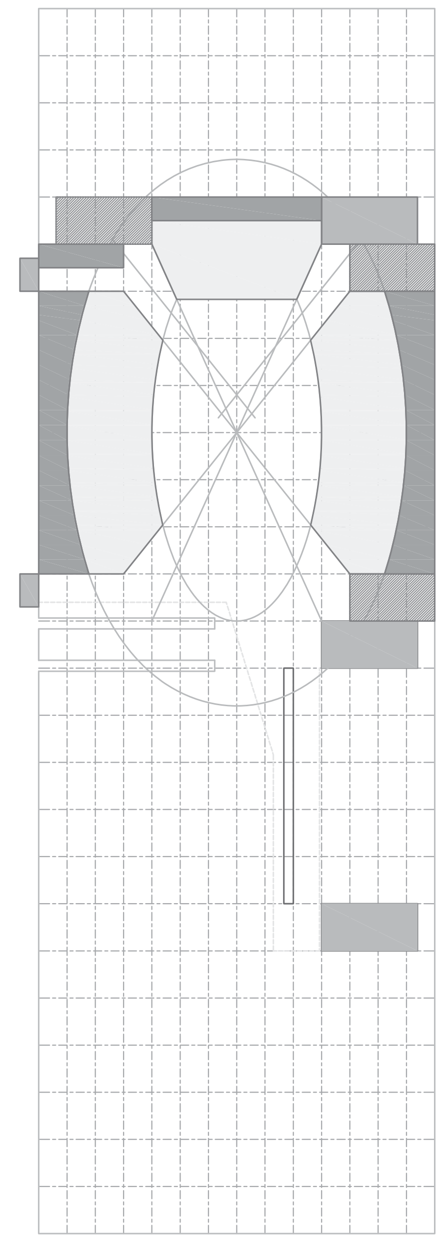
lobby: 86,190
office: 42,340
support: 24,371



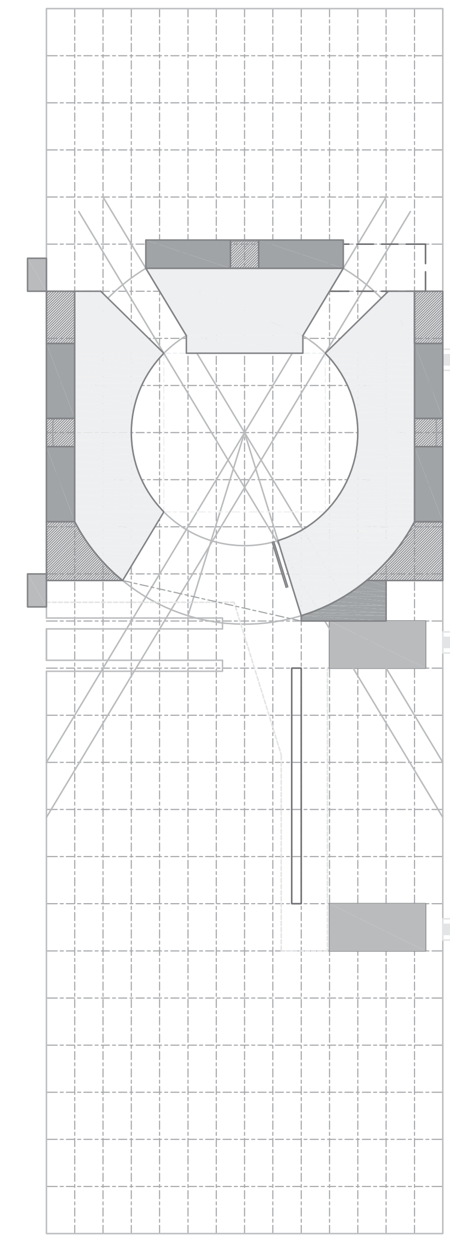
lobby: 90,752
office: 41,904
support: 20,304



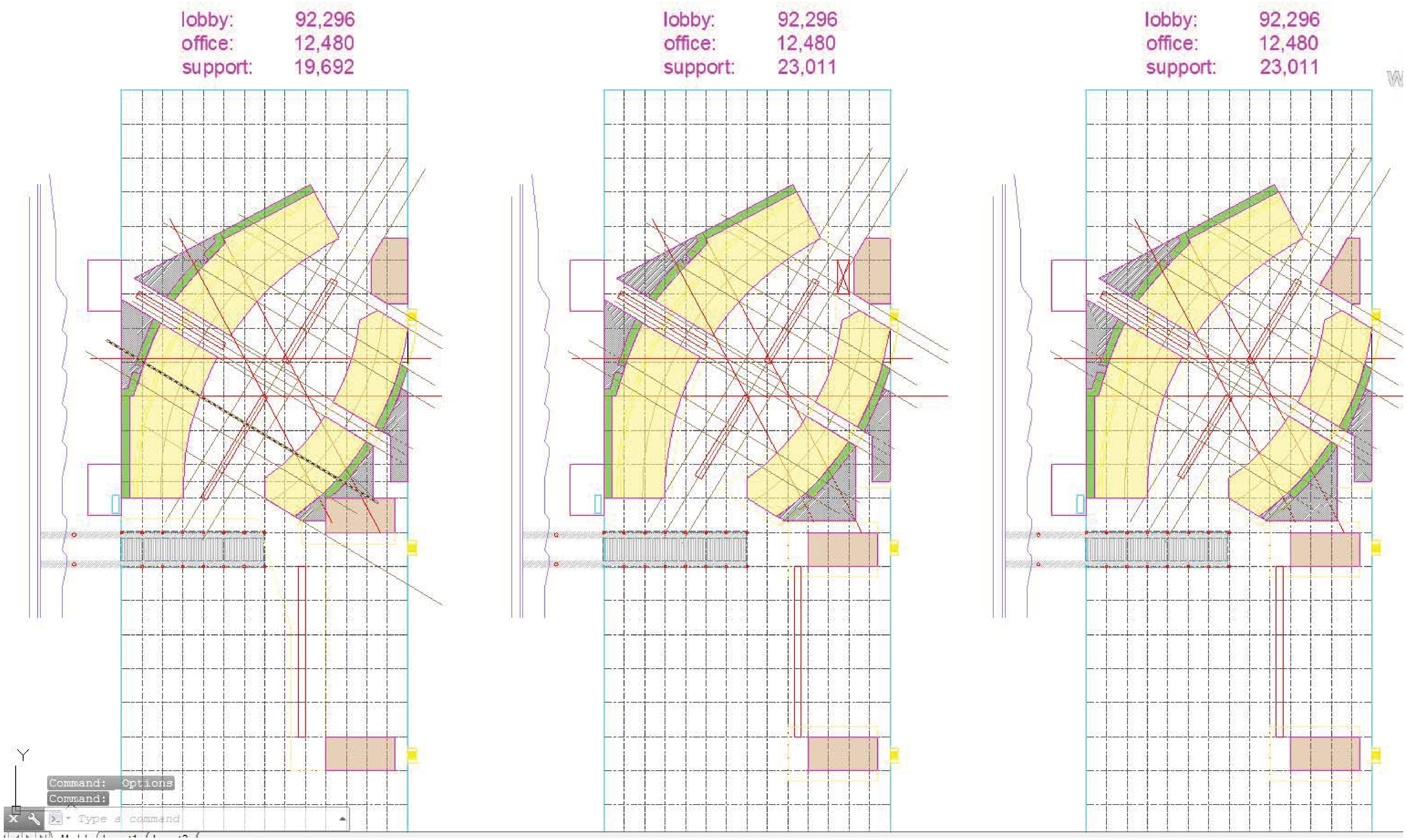
lobby: 90,002
office: 42,240
support: 19,440



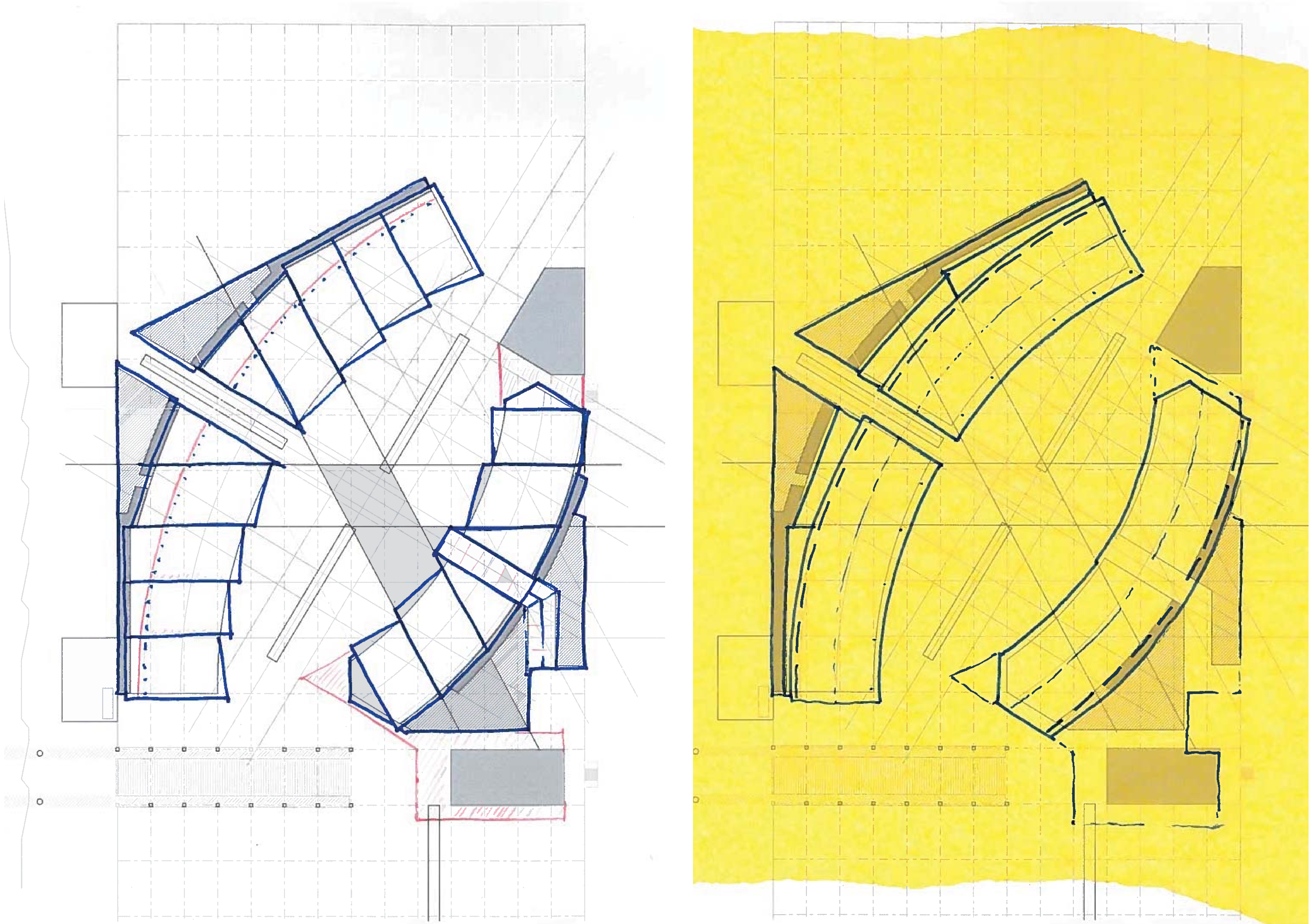
lobby: 85,914
office: 24,918
support: 18,016



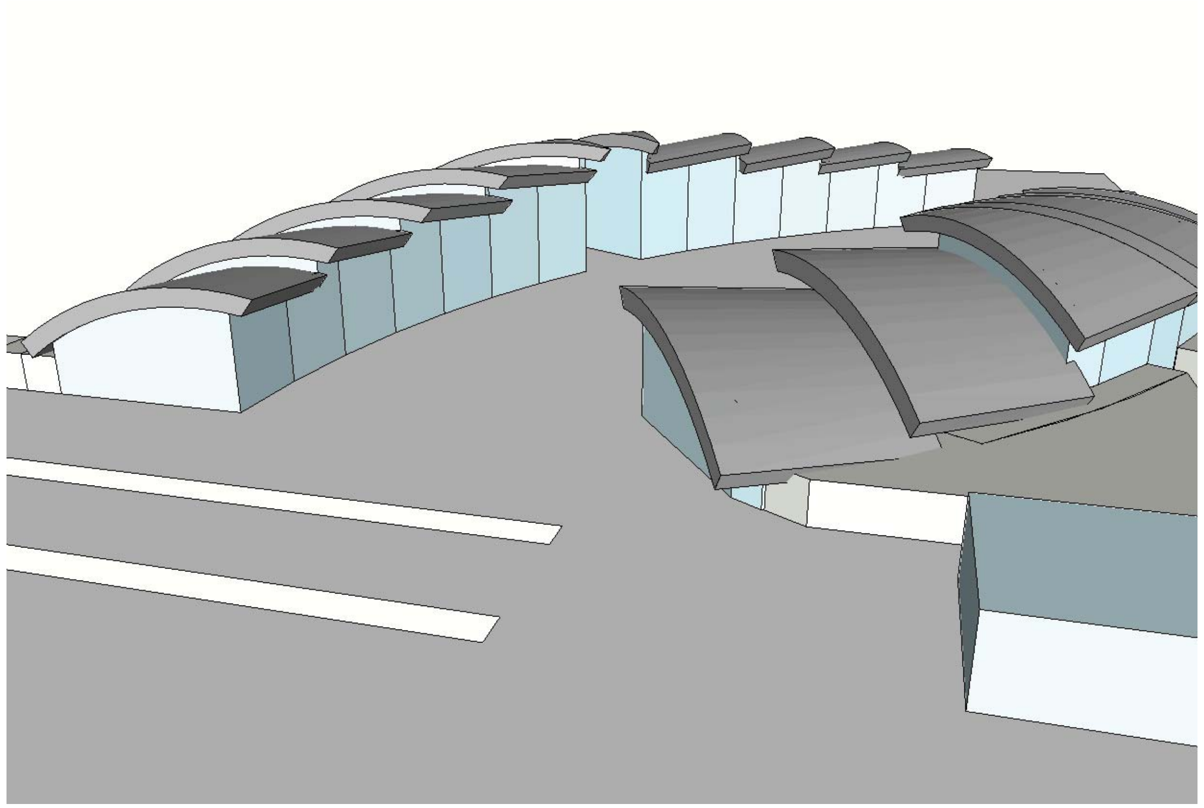
- Additional CAD studies for the 3 core and 2 west core CSB - “U” and “Circle” scheme alternatives.



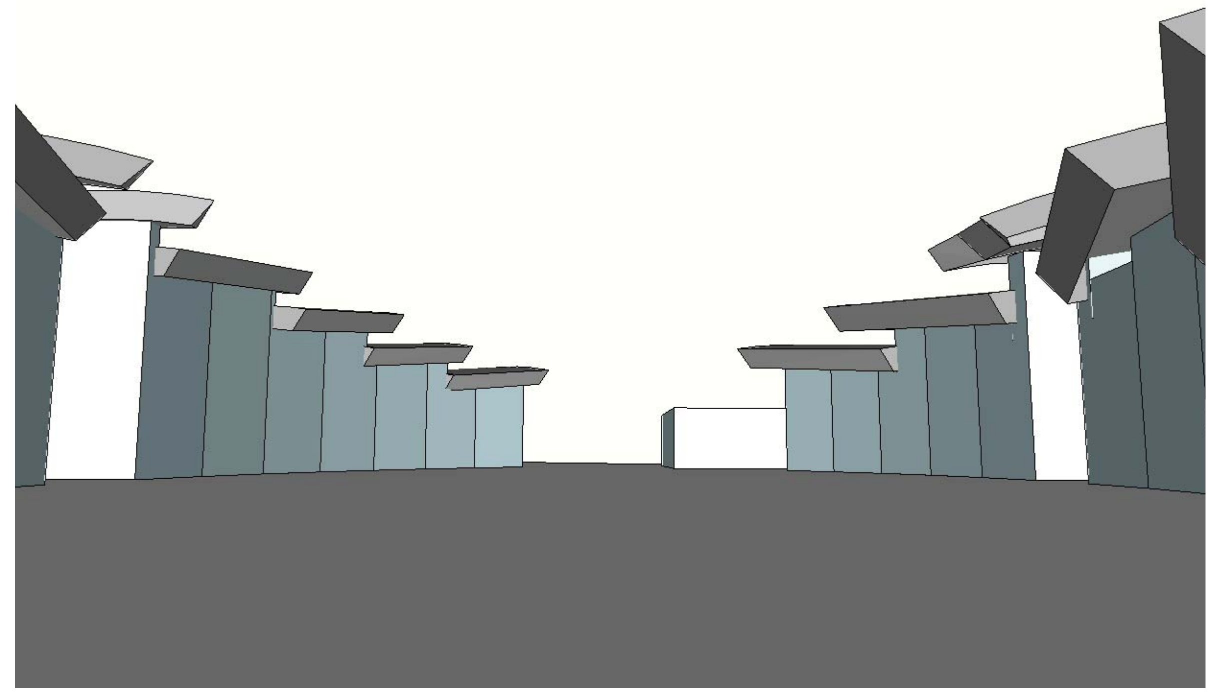
- "Tilted Oval" scheme development: CAD studies with alternatives for the north and center cores.



- "Tilted Oval" scheme preliminary roof studies.

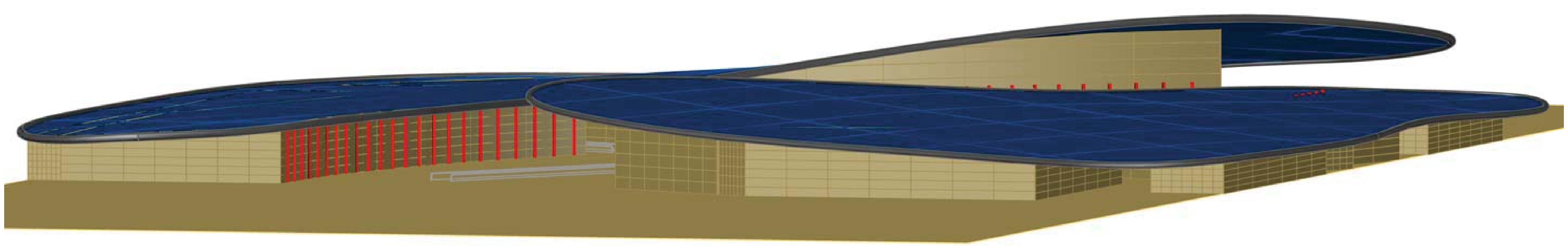


Oblique view of lap and clerestory option



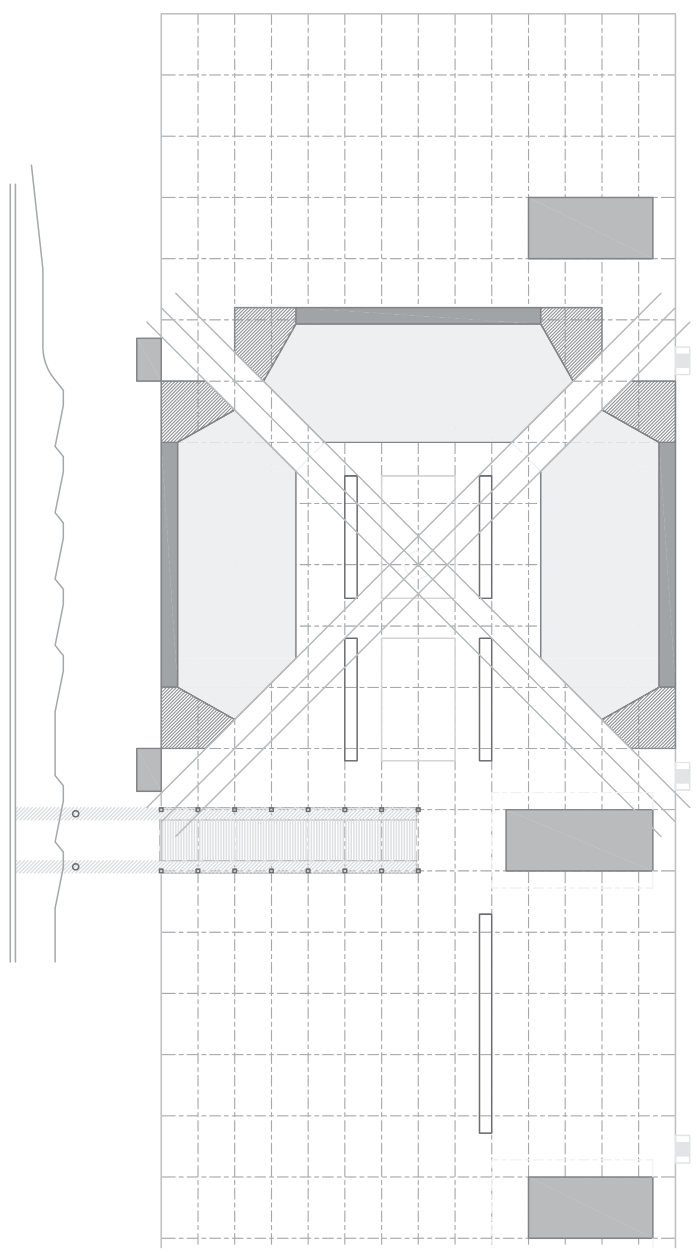
Oblique view of lap and clerestory option

- "Tilted Oval" 3-D massing and roof studies.

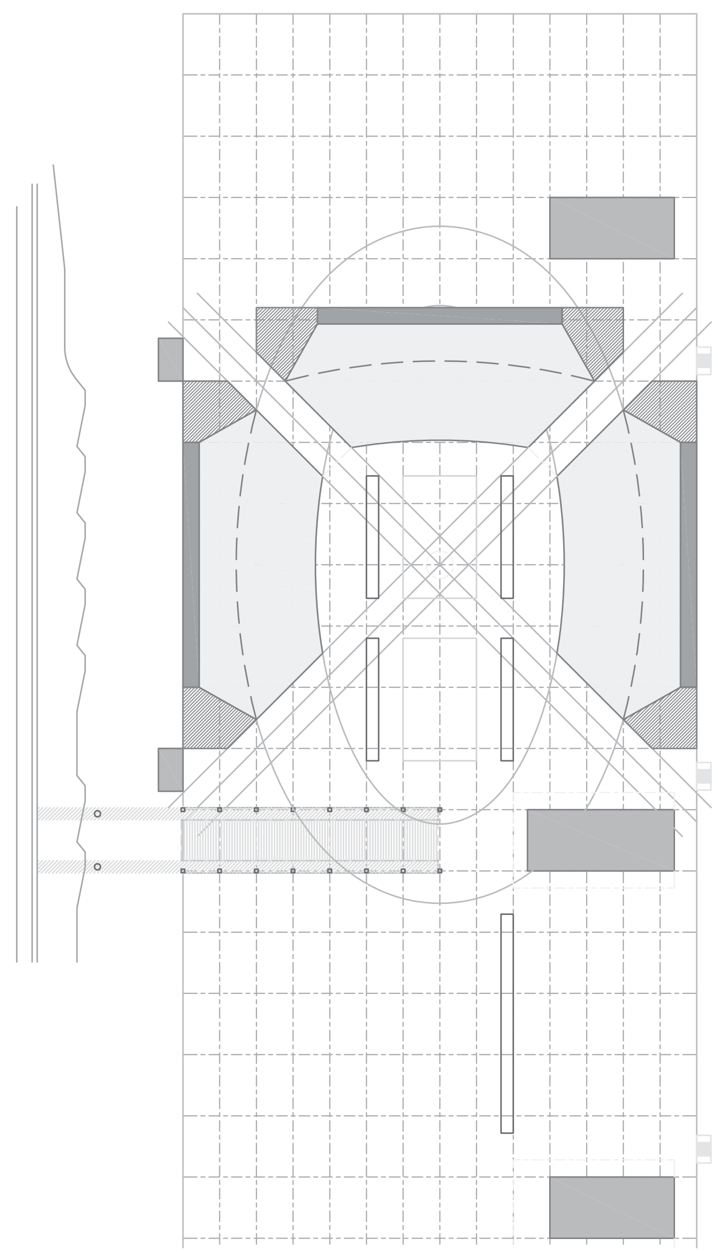


Oblique view of organic form roof study

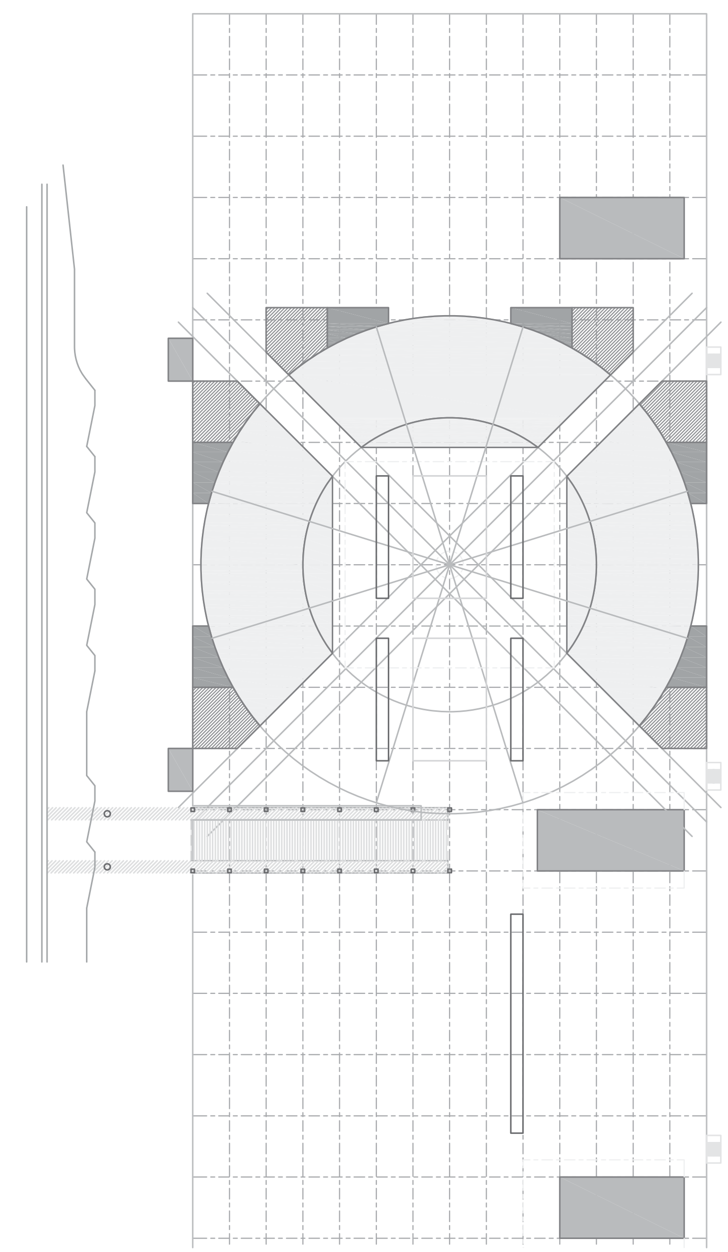
lobby: 89,463
office: 11,520
support: 18,186



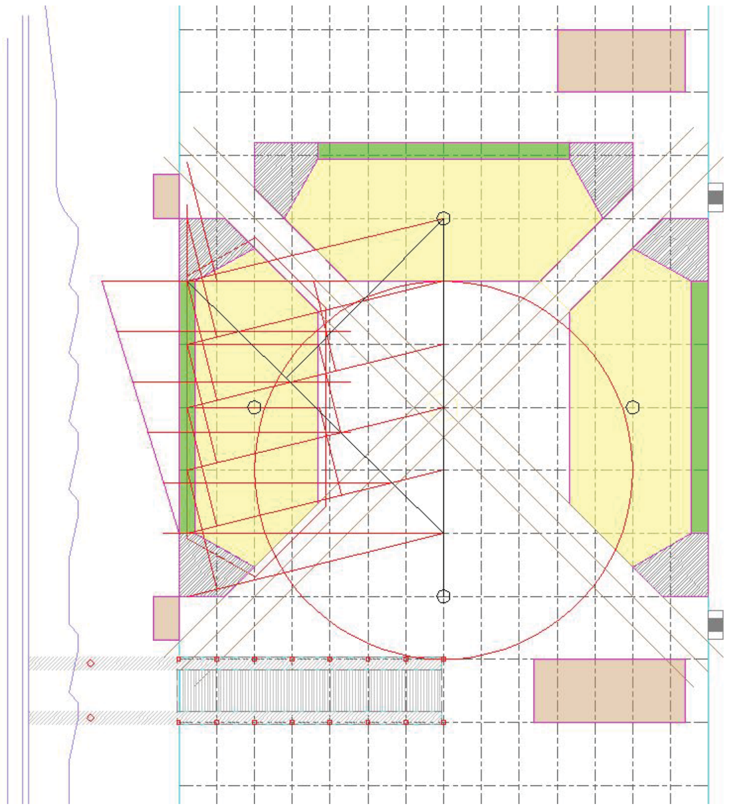
lobby: 89,688
office: 11,520
support: 18,186

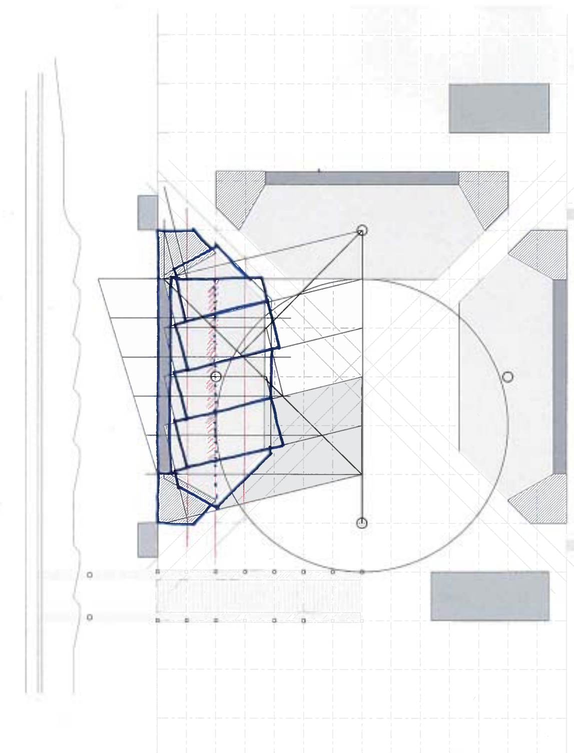


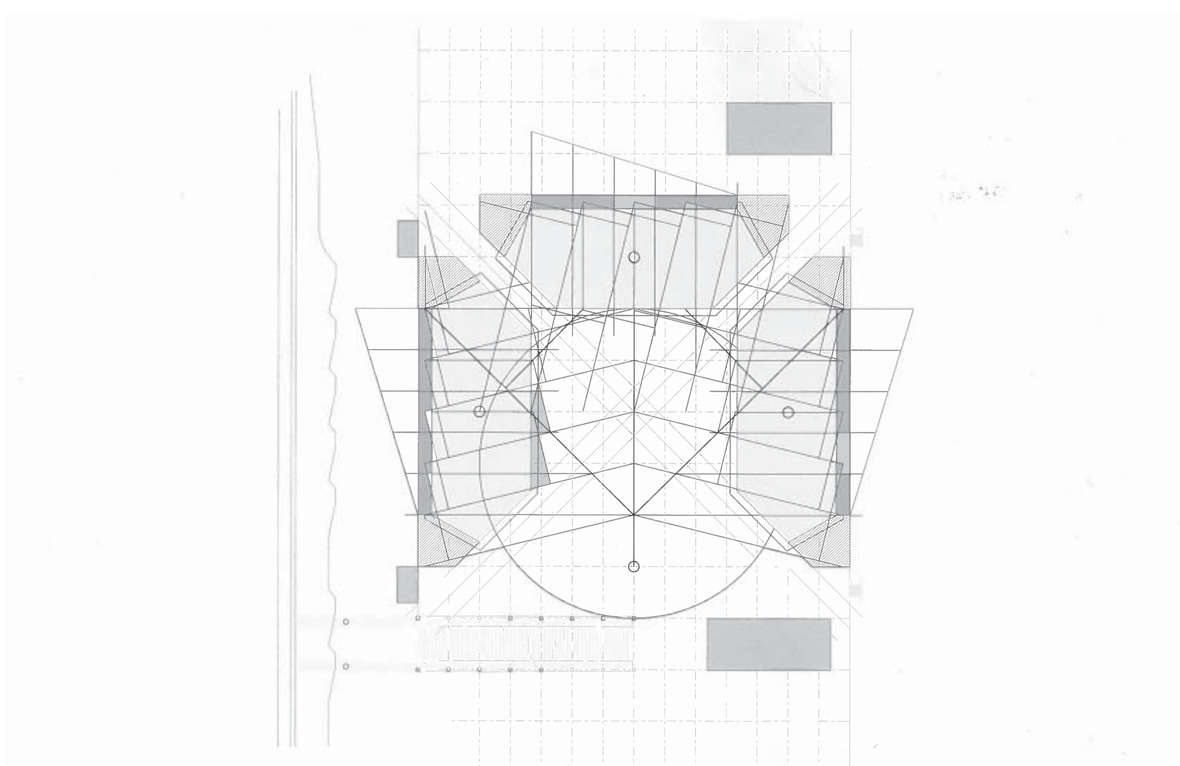
lobby: 89,682
office: 9,348
support: 19,056

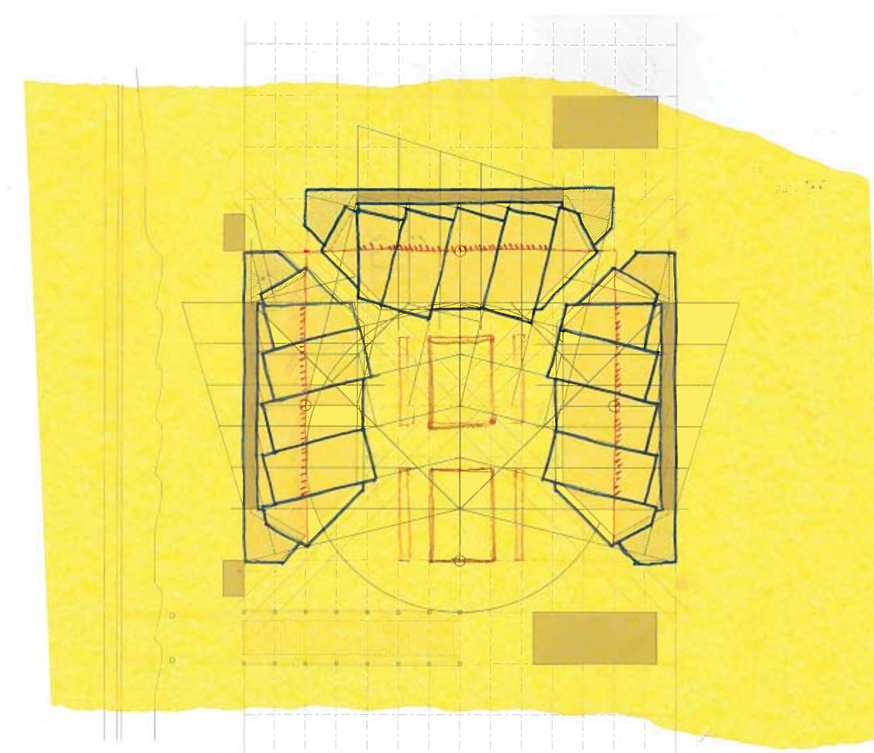


- "U" scheme development CAD studies.

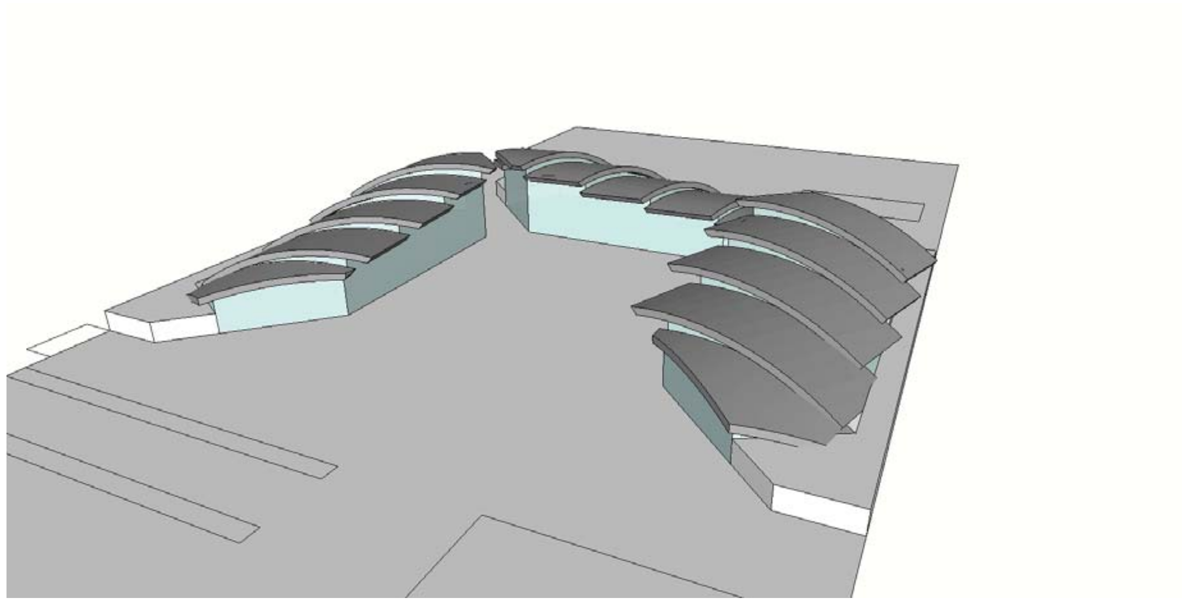




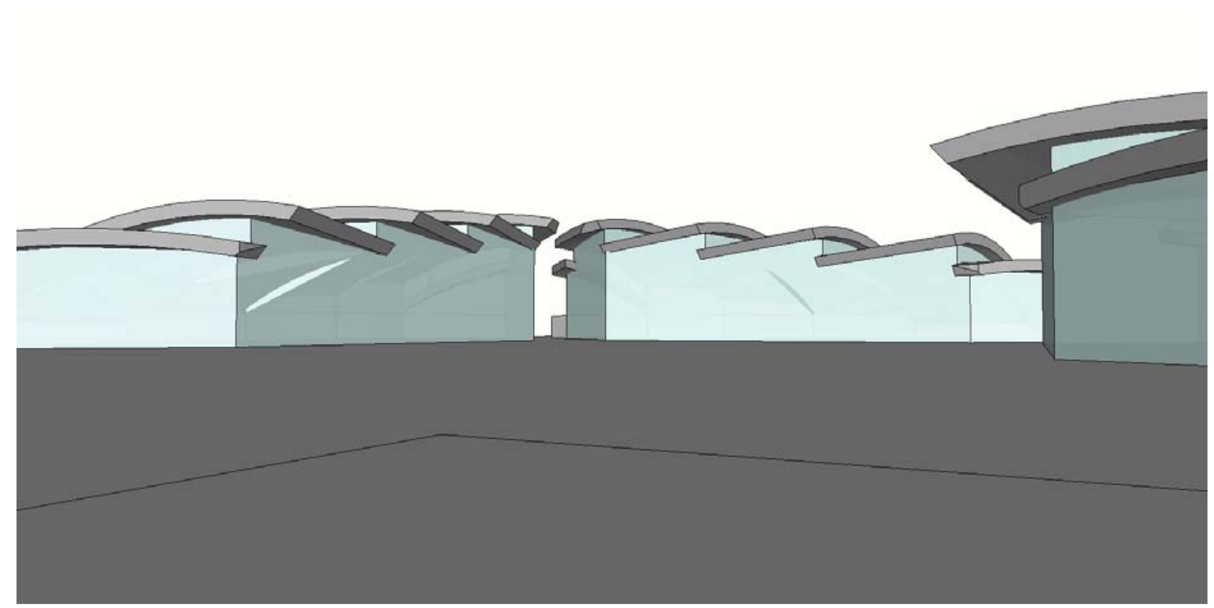




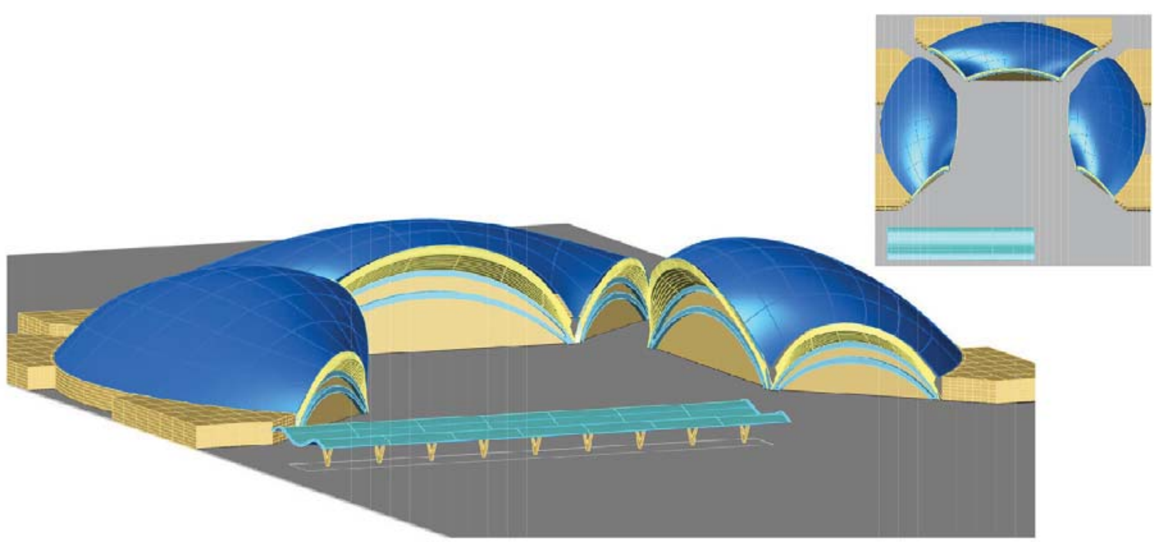
- "U" scheme preliminary roof studies.



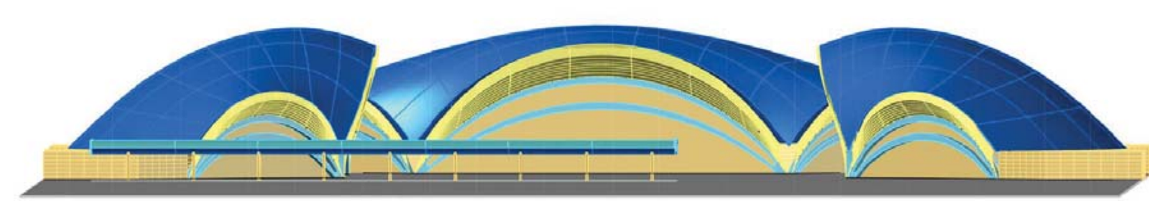
Oblique view of lap and clerestory option



Passenger view of lap and clerestory option

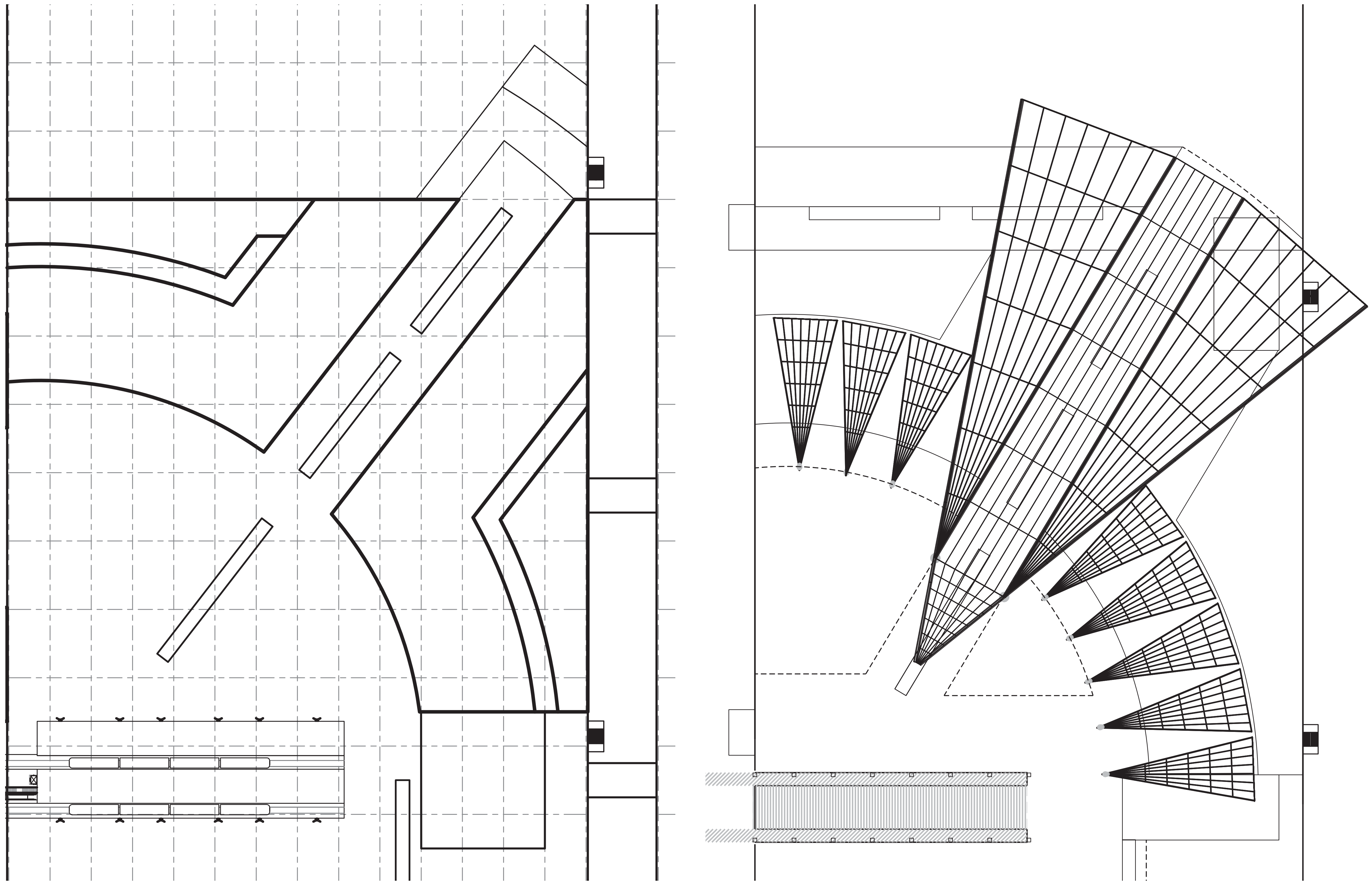


Oblique view of parabolic dome roof study

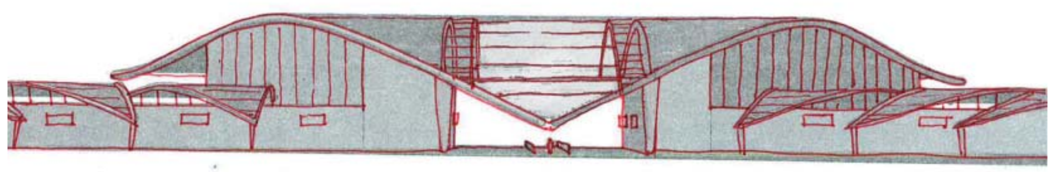


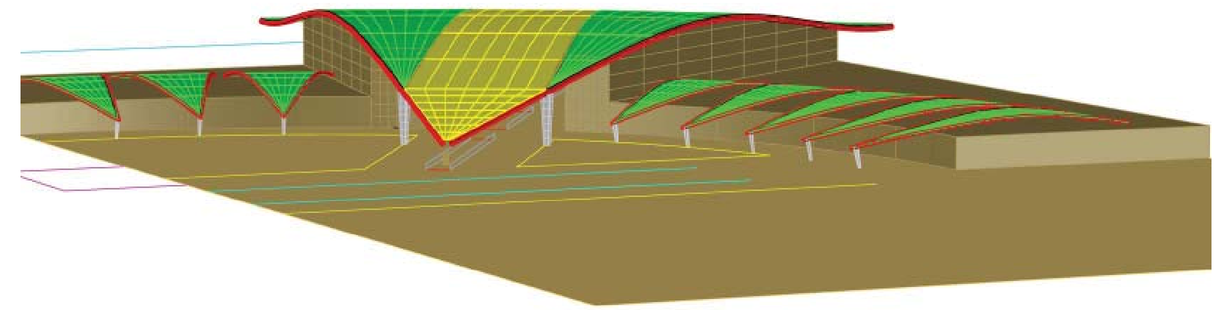
Oblique view of parabolic dome roof study

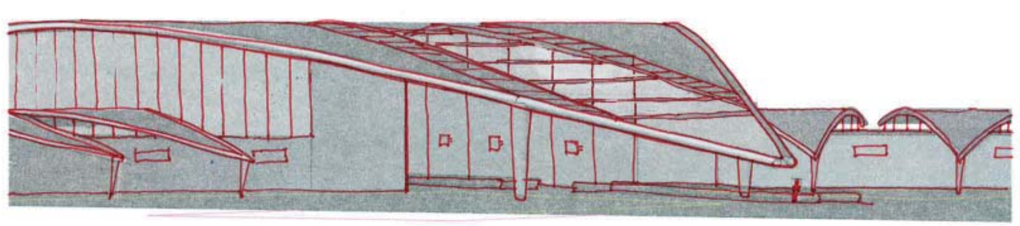
- "U" scheme massing and roof studies.

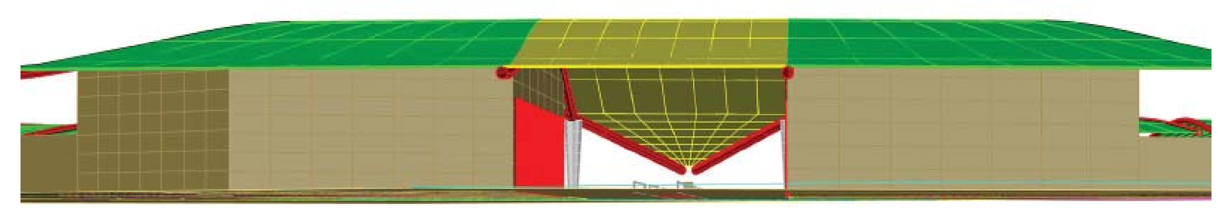


■ “ARC” scheme plan and roof studies

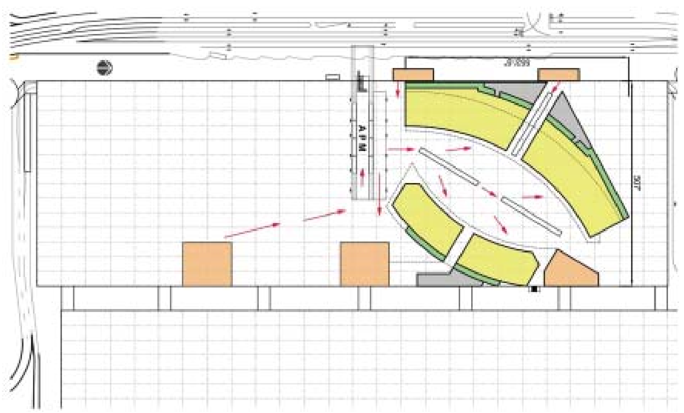








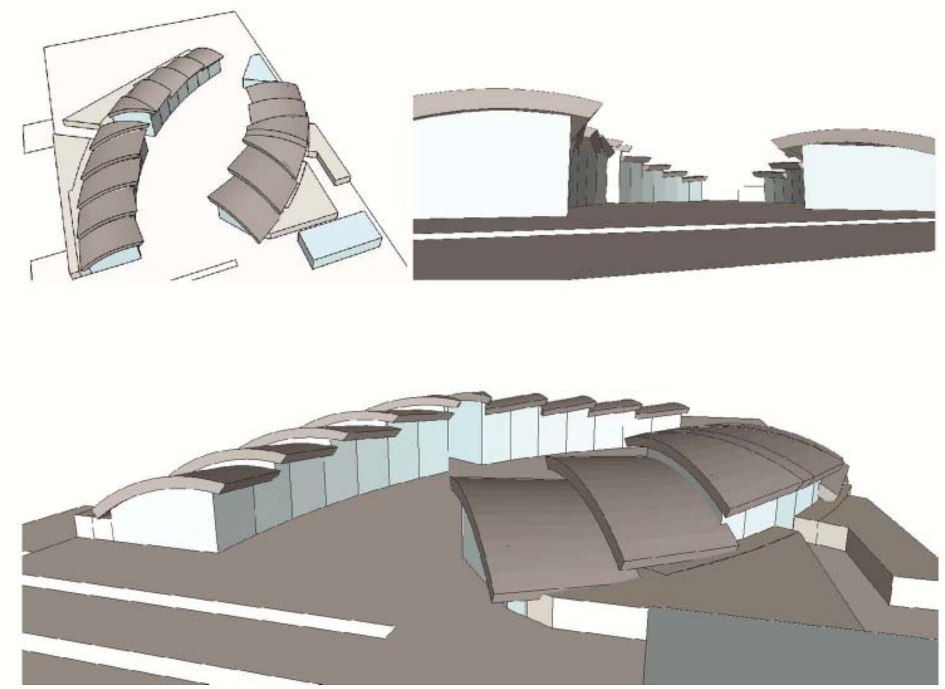
■ “ARC” scheme massing and roof studies



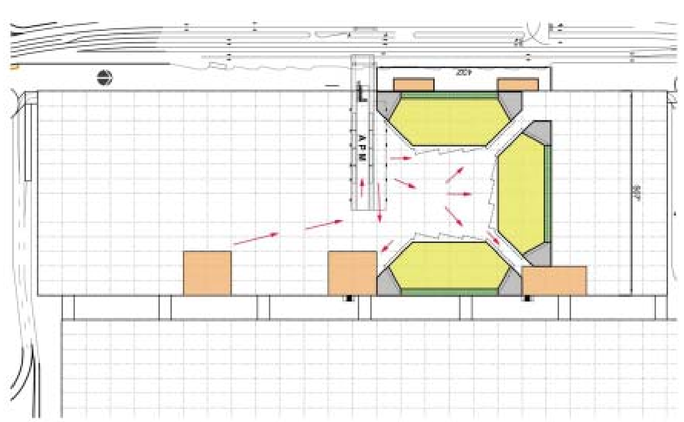
Overall Area	147,700 SF
RAC Lobby	93,000 SF
RAC Back Office on Level 4	14,000 SF
Building Support on Level 4	18,000 SF
Vertical Circulation Core	22,700 SF

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

"Elliptical" scheme plan and circulation



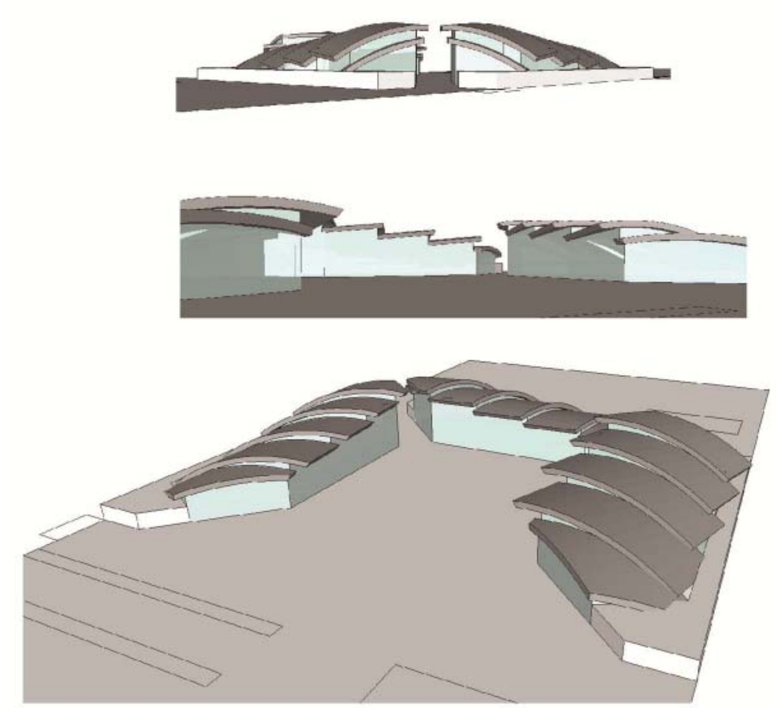
"Elliptical" scheme massing and roof studies



Overall Area	147,700 SF
RAC Lobby	93,000 SF
RAC Back Office on Level 4	14,000 SF
Building Support on Level 4	18,000 SF
Vertical Circulation Core	22,700 SF

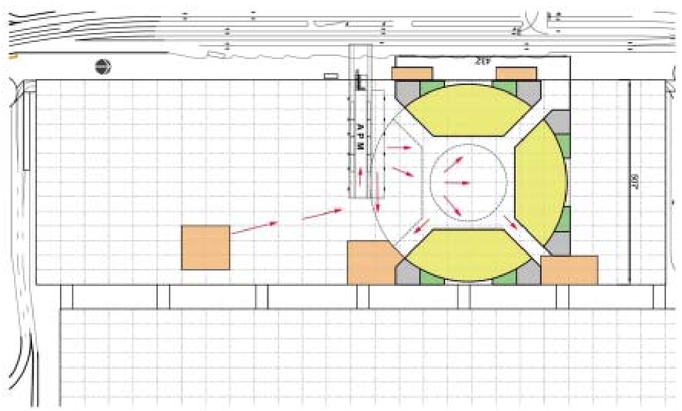
Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

"U" scheme plan and circulation



"U" scheme massing and roof studies

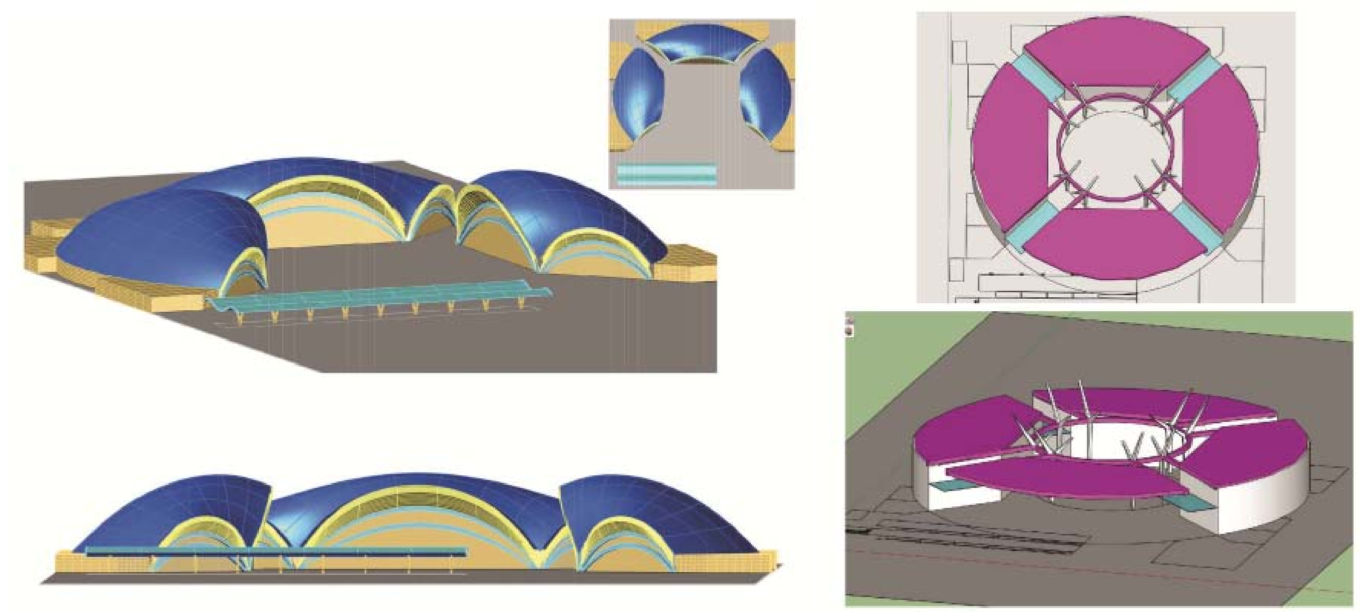
- Refined concepts of CSB with massing and roof studies.



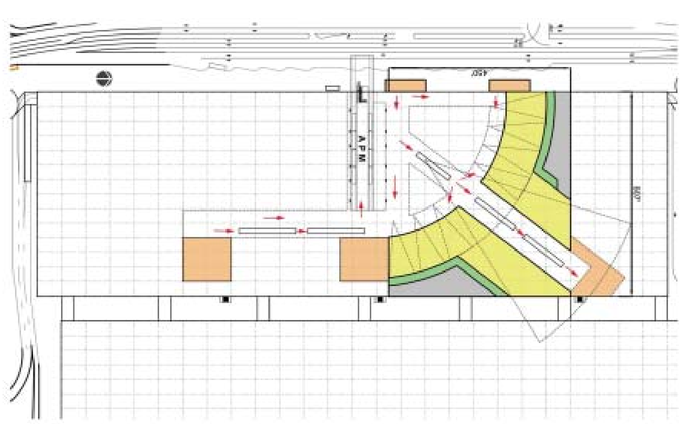
Overall Area	147,700 SF
RAC Lobby	93,000 SF
RAC Back Office on Level 4	14,000 SF
Building Support on Level 4	18,000 SF
Vertical Circulation Core	22,700 SF

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

"Circle" scheme plan and circulation



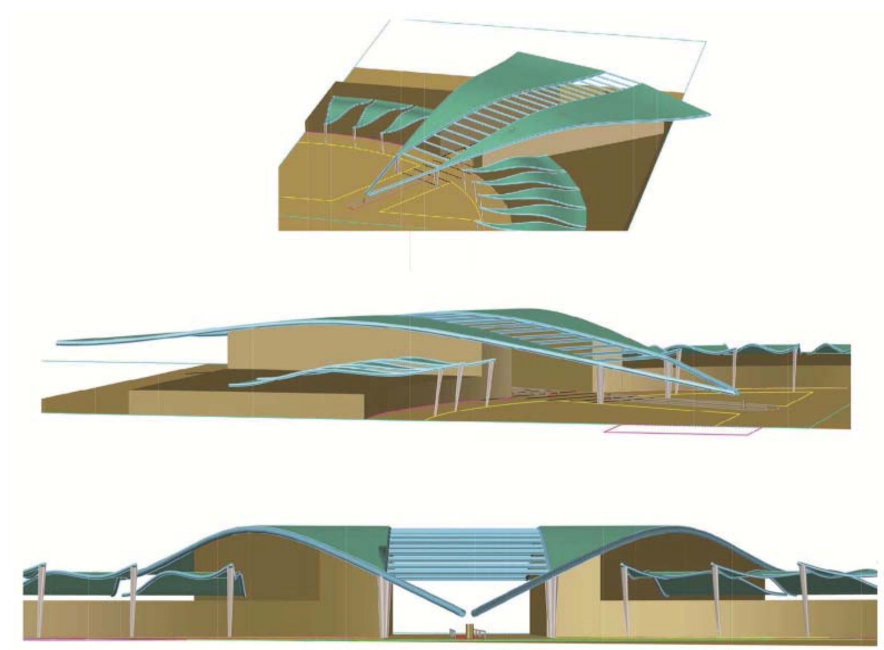
"Circle" scheme massing and roof studies



Overall Area	147,700 SF
RAC Lobby	93,000 SF
RAC Back Office on Level 4	14,000 SF
Building Support on Level 4	18,000 SF
Vertical Circulation Core	22,700 SF

Color	Zone Name
	Outdoor Circulation
	Vertical Circulation Core
	RAC Lobby
	RAC Back Office
	Indoor Circulation
	Building Support
	Customer Circulation

"Arc" scheme plan and circulation

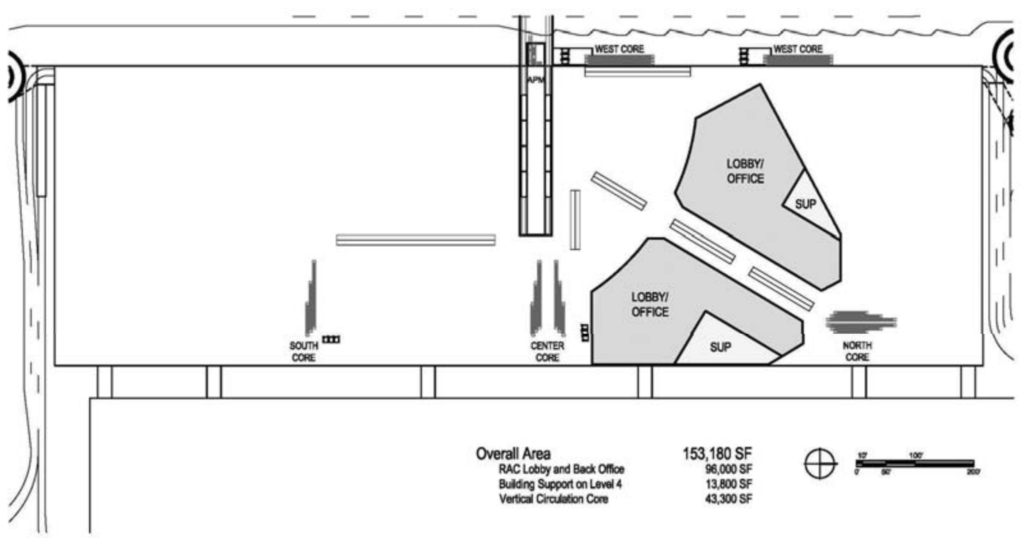


"Arc" scheme massing and roof studies

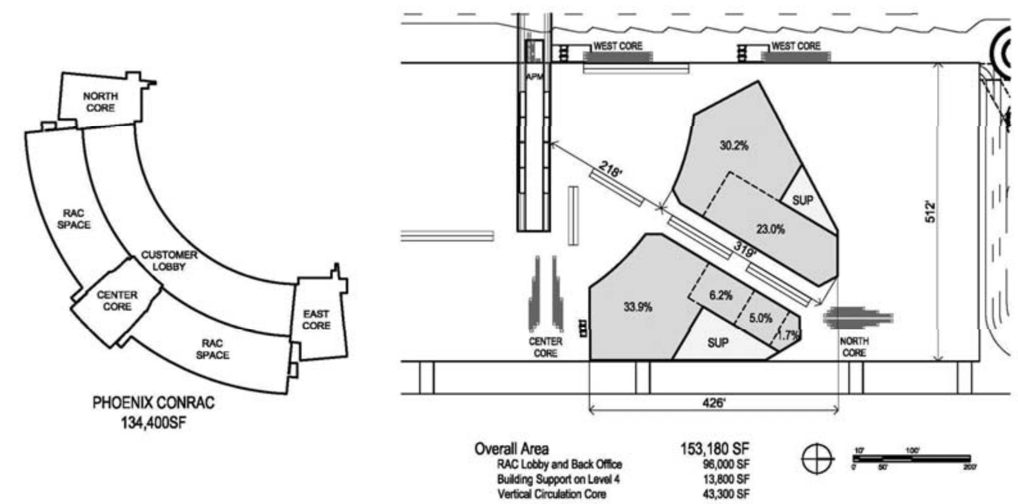
- Refined concepts of CSB with massing and roof studies.

E: DESIGN CONSIDERATIONS:

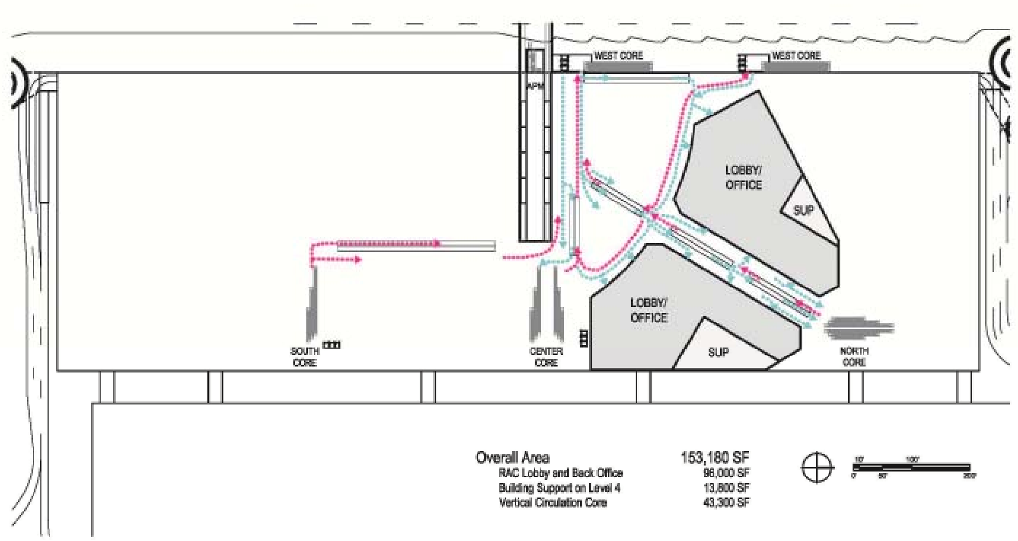
-Potential allocation of space for Brand families
-Moving sidewalks for ease of travel
-Convenient for access from APM, bus curbs, parking
-Accessible when busing in operation and when APM in operation
-Direct customer access always moving toward destination
-Direct access for business travelers to rental cars
-Ease of wayfinding in facility
-Support brand family consolidated operation



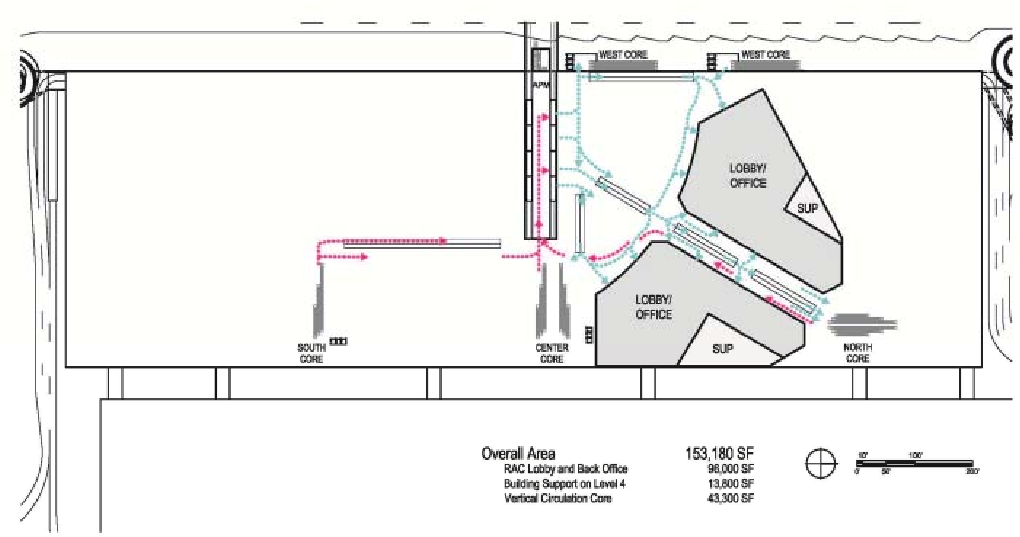
CSB design concept 1 overview



CSB design concept 1 size comparison and brand allocation

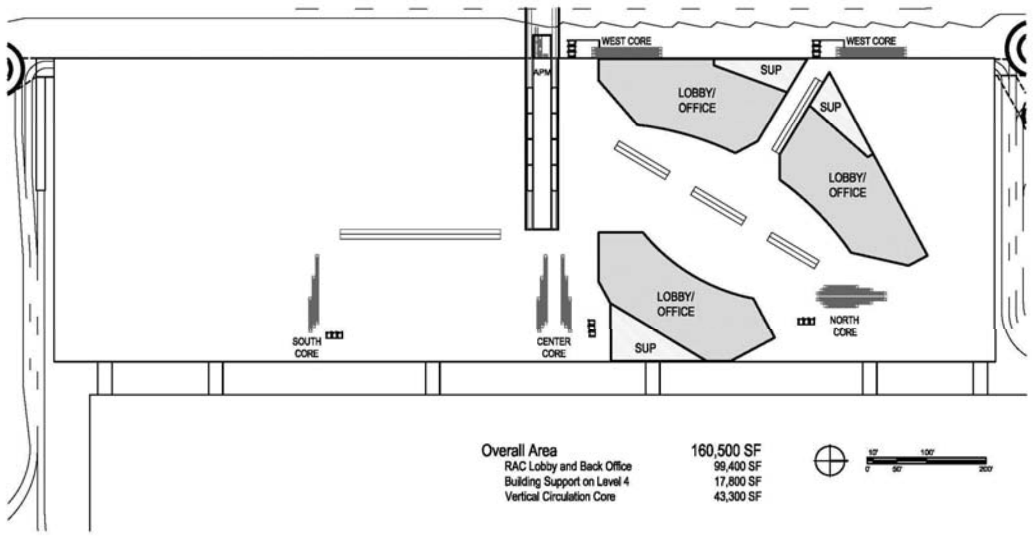


CSB design concept 1 circulation (Bus operation)

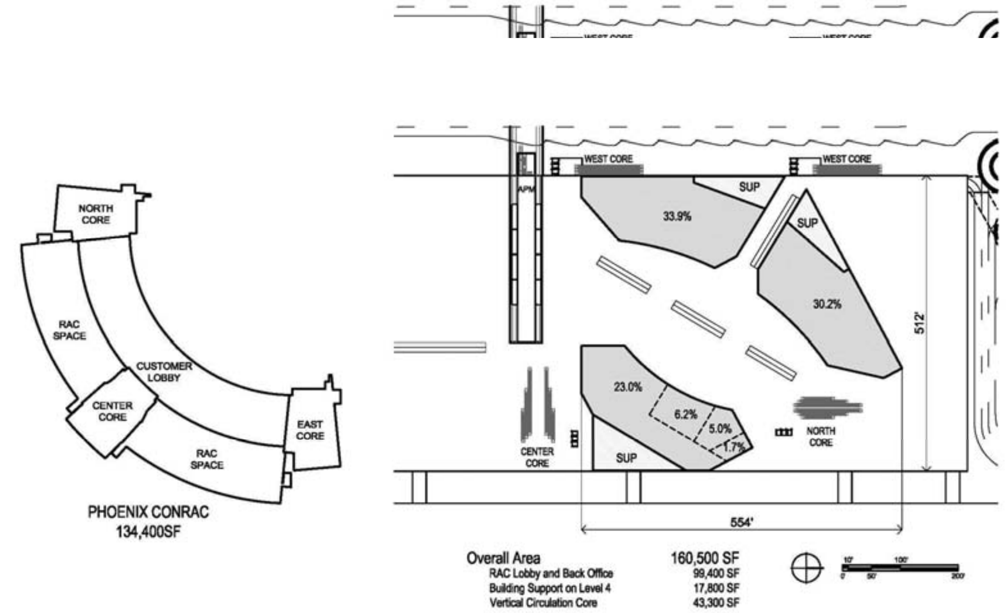


CSB design concept 1 circulation (APM operation)

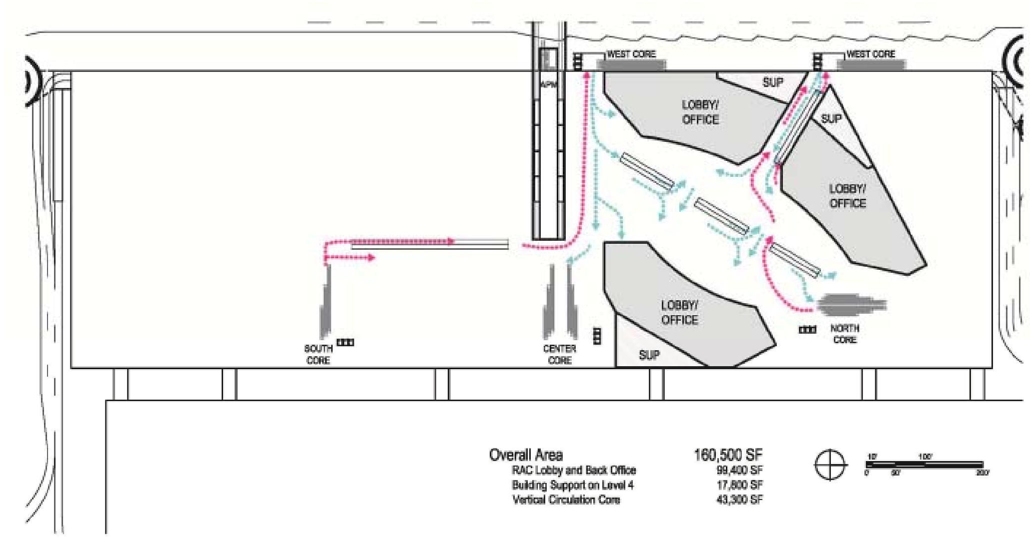
- Studies of concept 1 “Arc” scheme showing breakdown of brand allocation and circulation diagrams for bus and APM operations.



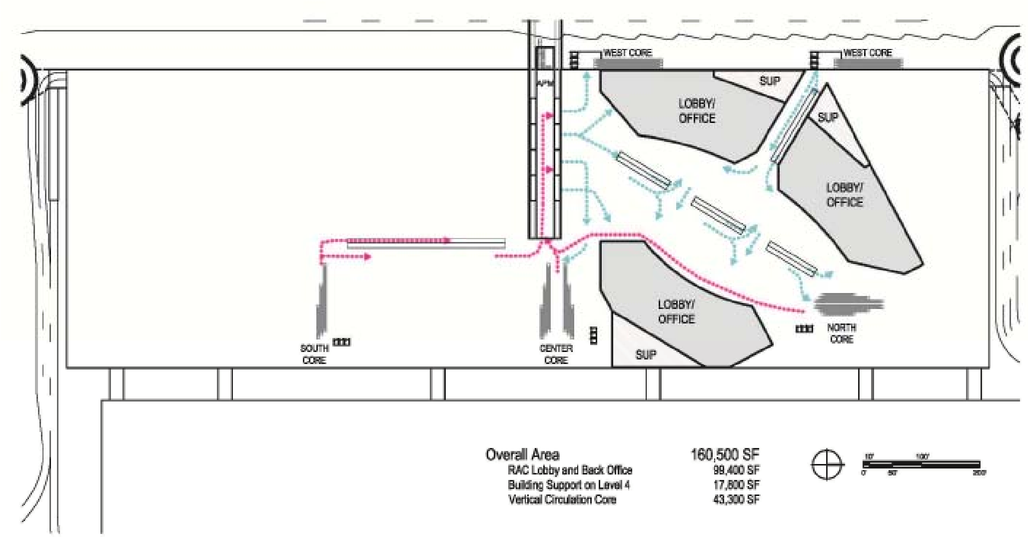
CSB design concept 2 overview



CSB design concept 2 size comparison and brand allocation

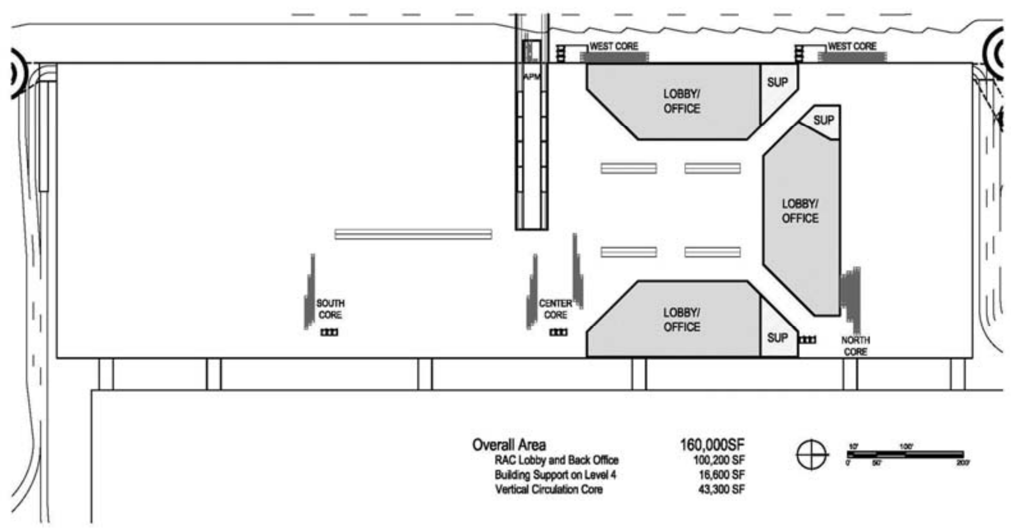


CSB design concept 2 circulation (Bus operation)

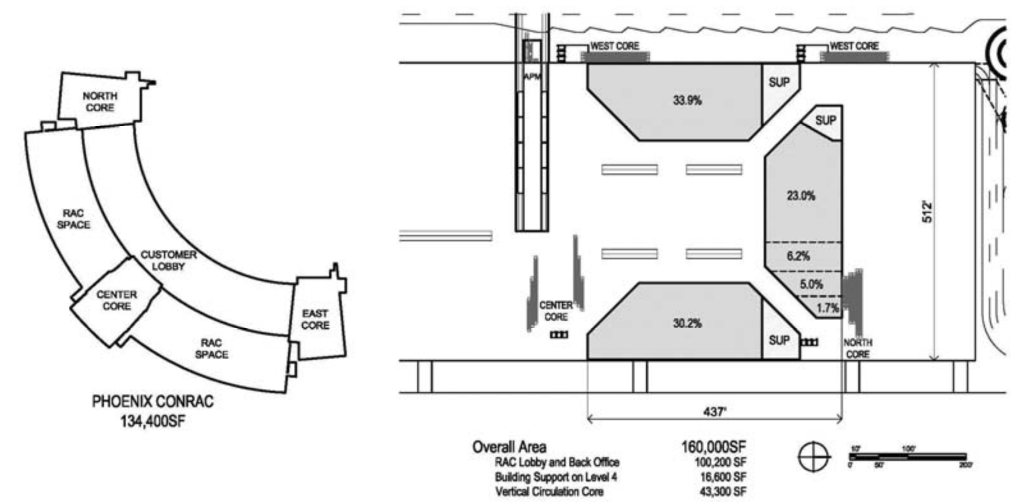


CSB design concept 2 circulation (APM operation)

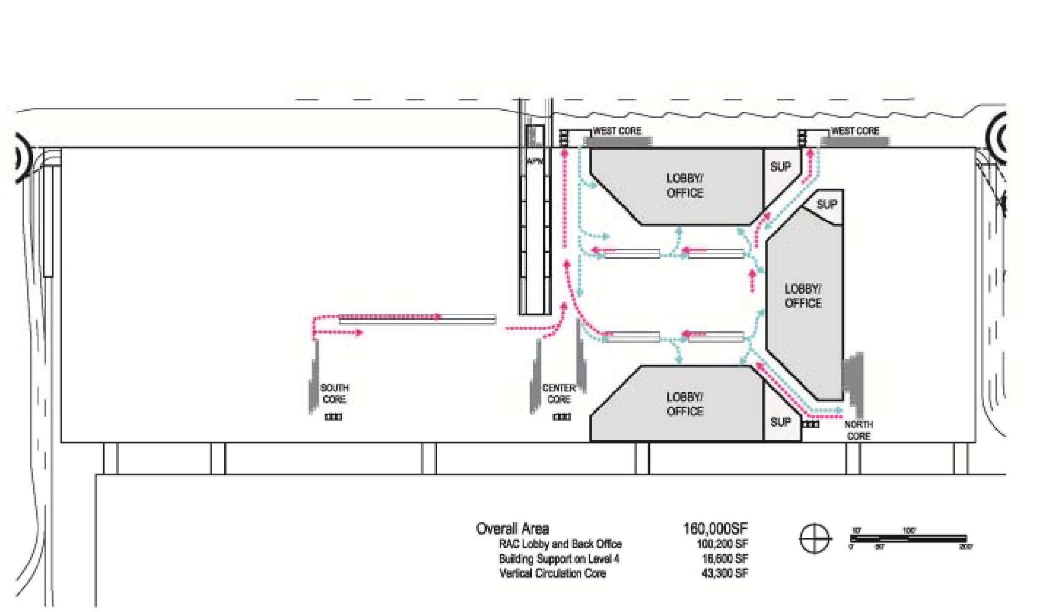
- Studies of concept 2 “Tilted Oval” scheme showing breakdown of brand allocation and circulation diagrams for bus and APM operations.



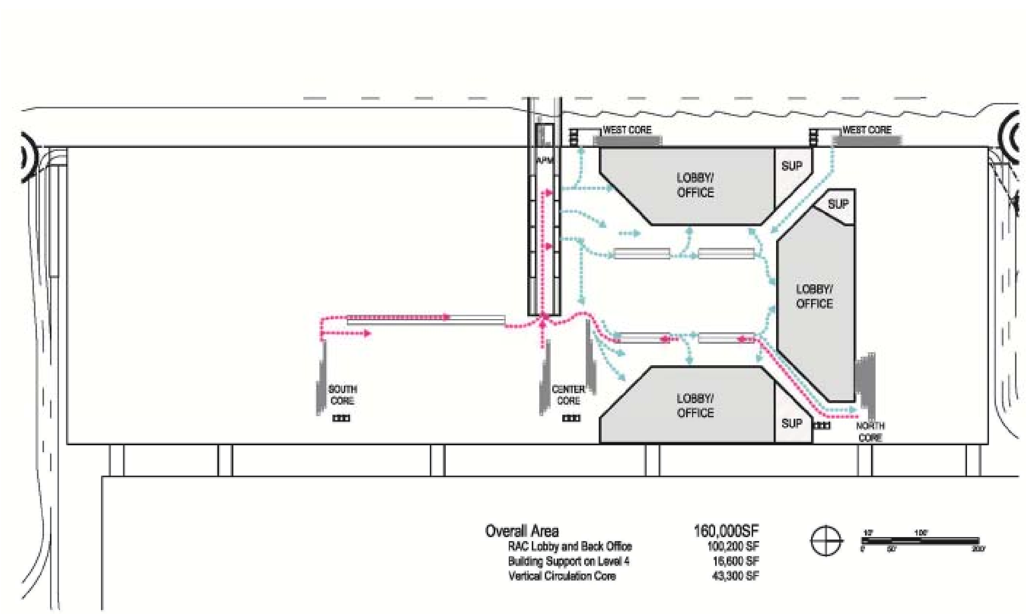
CSB design concept 3 overview



CSB design concept 3 size comparison and brand allocation

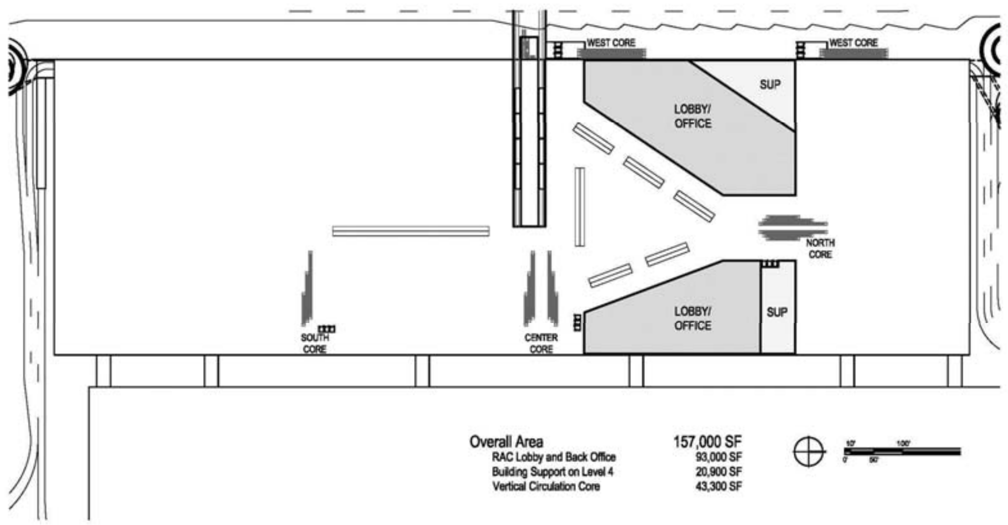


CSB design concept 3 circulation (Bus operation)

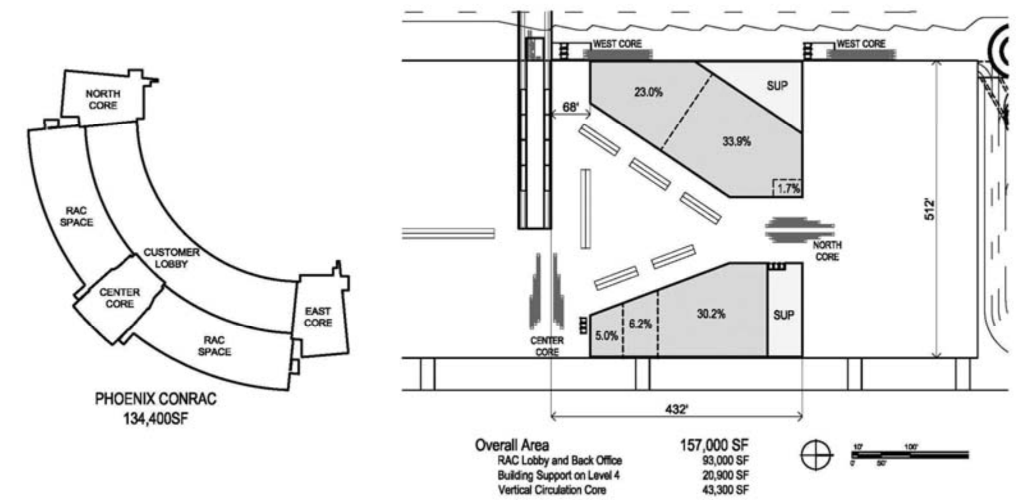


CSB design concept 3 circulation (APM operation)

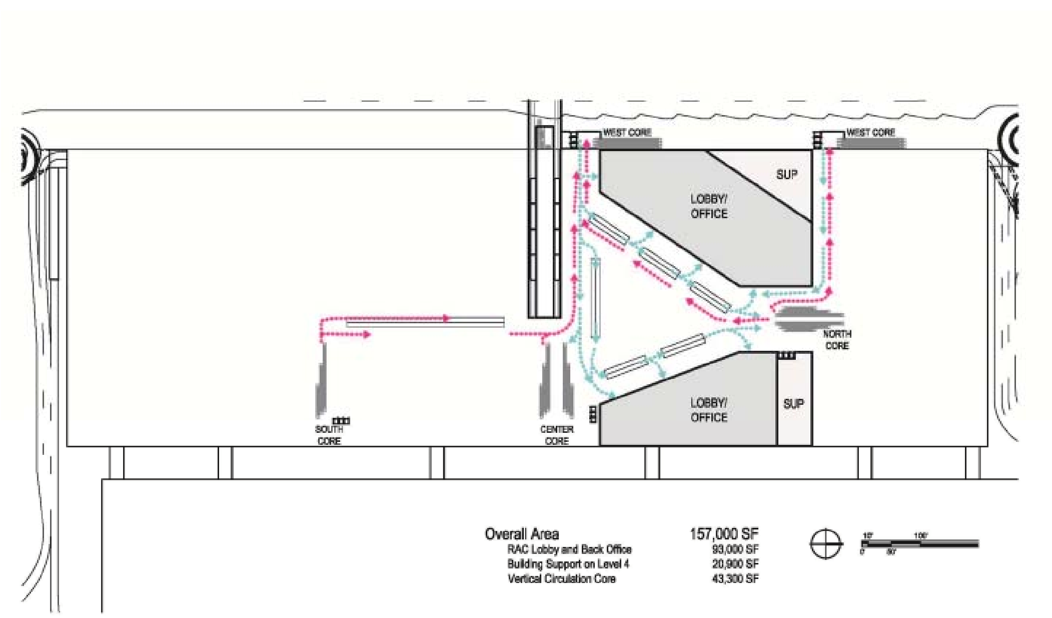
- Studies of concept 3 “U” scheme showing breakdown of brand allocation and circulation diagrams for bus and APM operations.



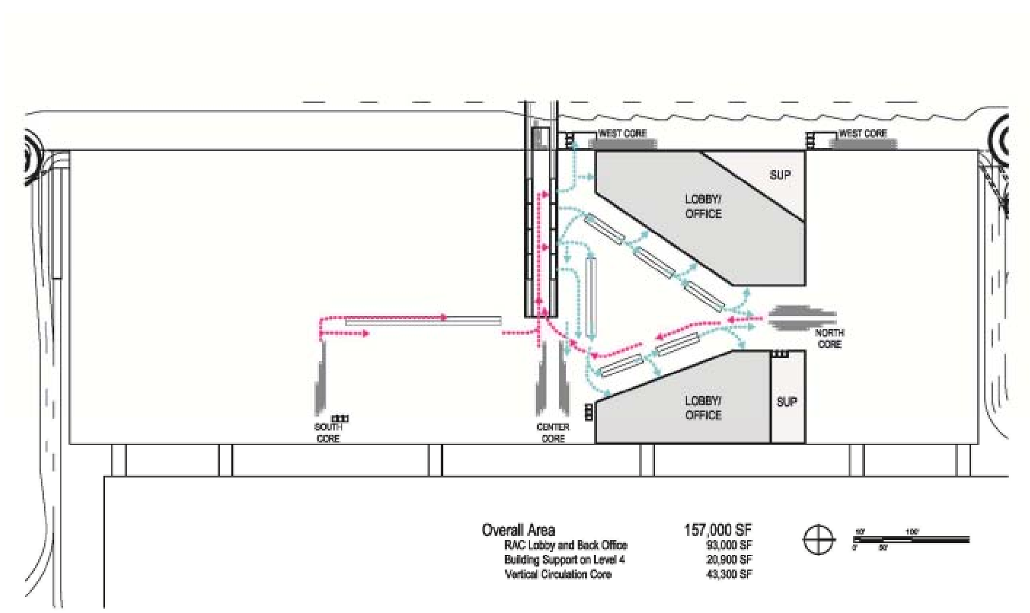
CSB design concept 4 overview



CSB design concept 4 size comparison and brand allocation

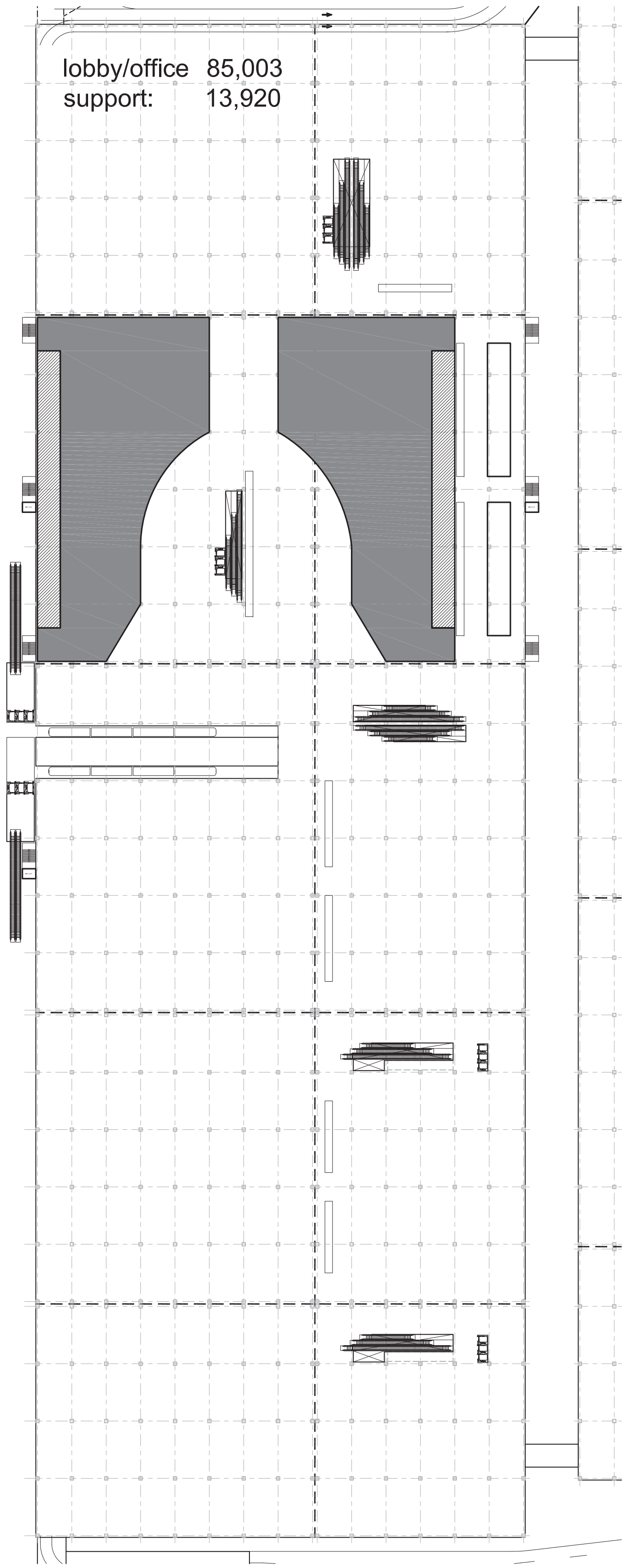


CSB design concept 4 circulation (Bus operation)

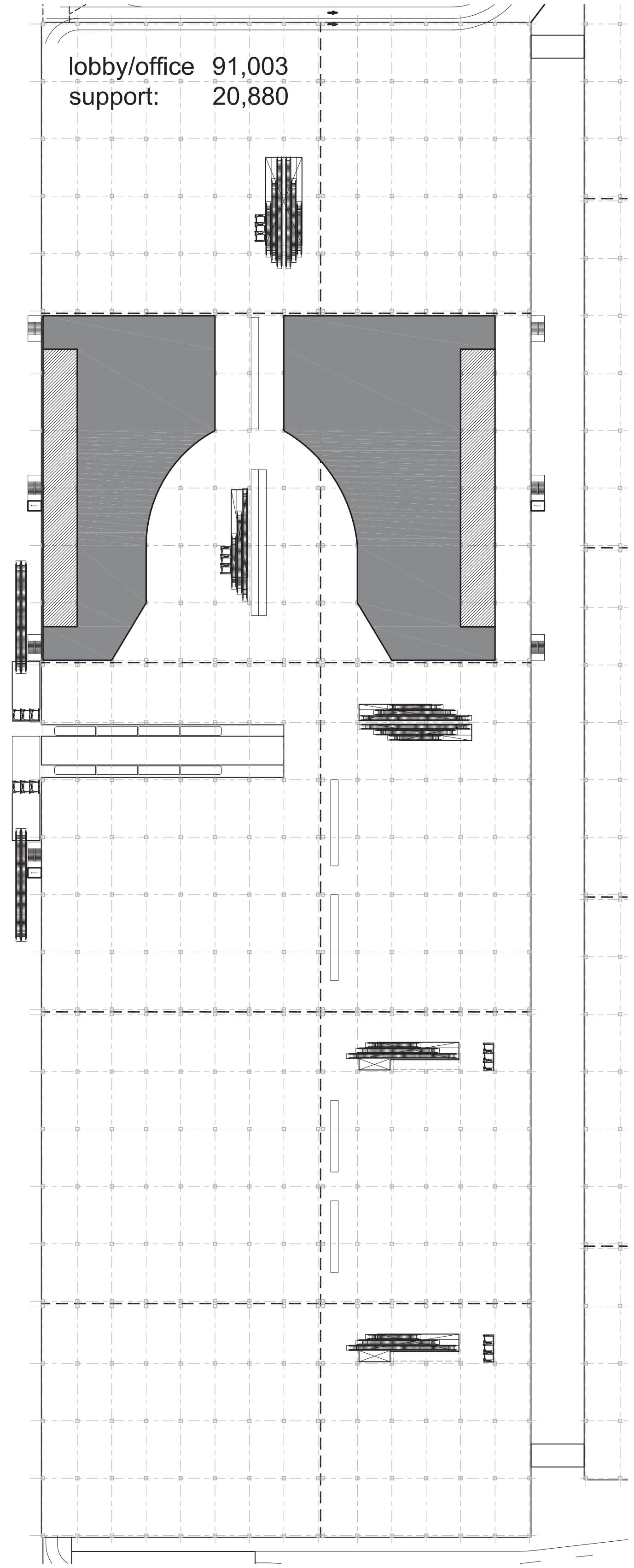


CSB design concept 4 circulation (APM operation)

- Studies of concept 4 "V" scheme showing breakdown of brand allocation and circulation diagrams for bus and APM operations.



One-way expressway ready escalators in courtyard,
return expressway with added offices

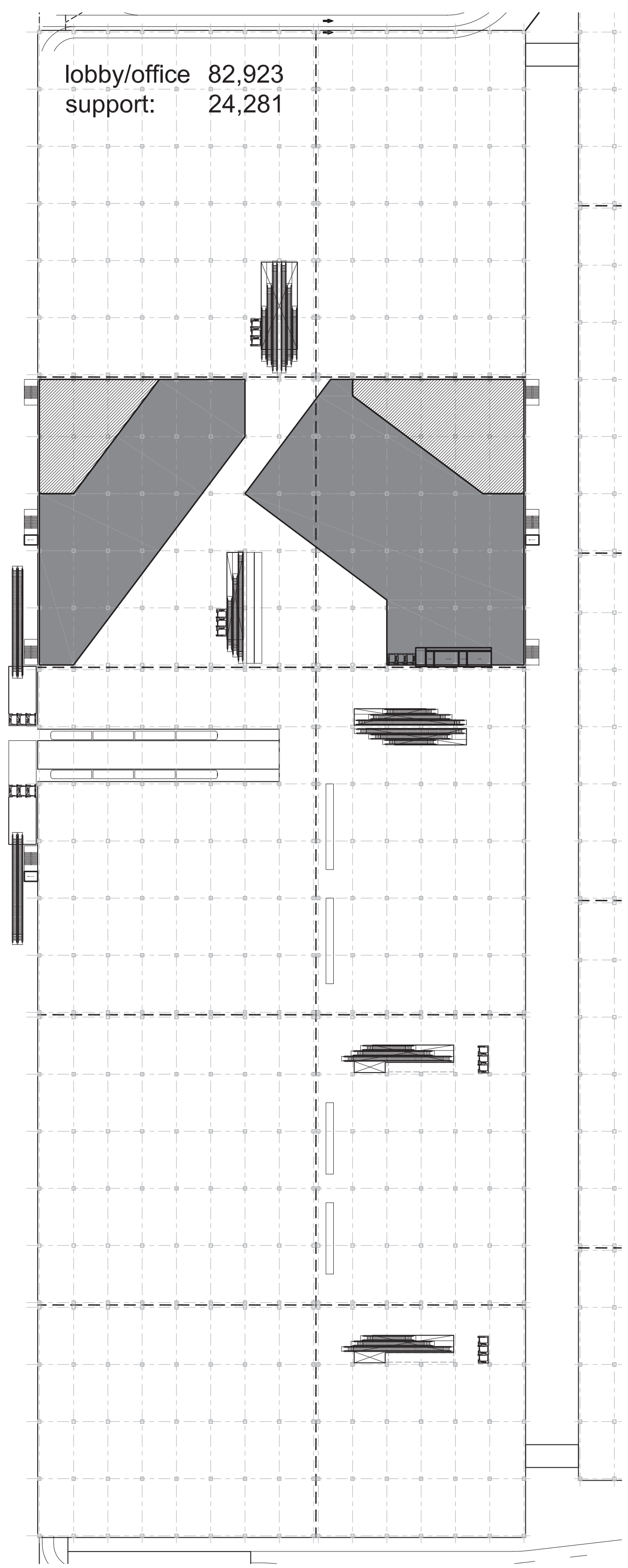


One-way expressway ready escalators in courtyard,
larger lobby area

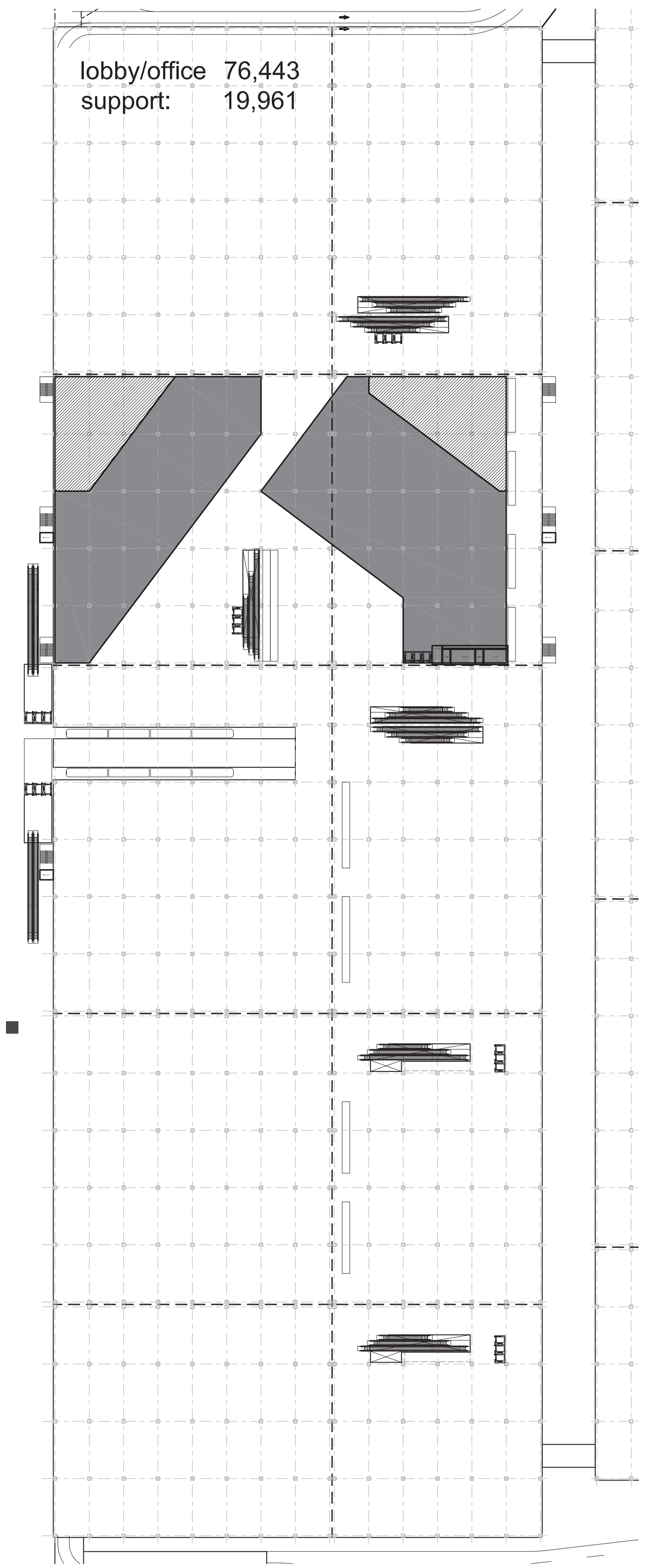
F. DESIGN CONSIDERATIONS:

-Design considerations for 5 cores
-Reduce roof-level lobby/office sf to approximately 90,000 combined, 20,000 sf support space
-Develop RAC level offices
-West core location centered adjacent to APM with access to APM mezzanine
-Brand Family allocation distributions – based on South Main QTA (original concept) and North Main QTA
-Option for small operator return traveller circulation from north core to APM via an east-side expressway
-Two south cores for returning customers only

- Two options for 5 core “Bell” scheme. This scheme locates the lobby entrances closer to APM and includes a core central to the courtyard. Options include moving sidewalks and additional offices along the east side return expressway.

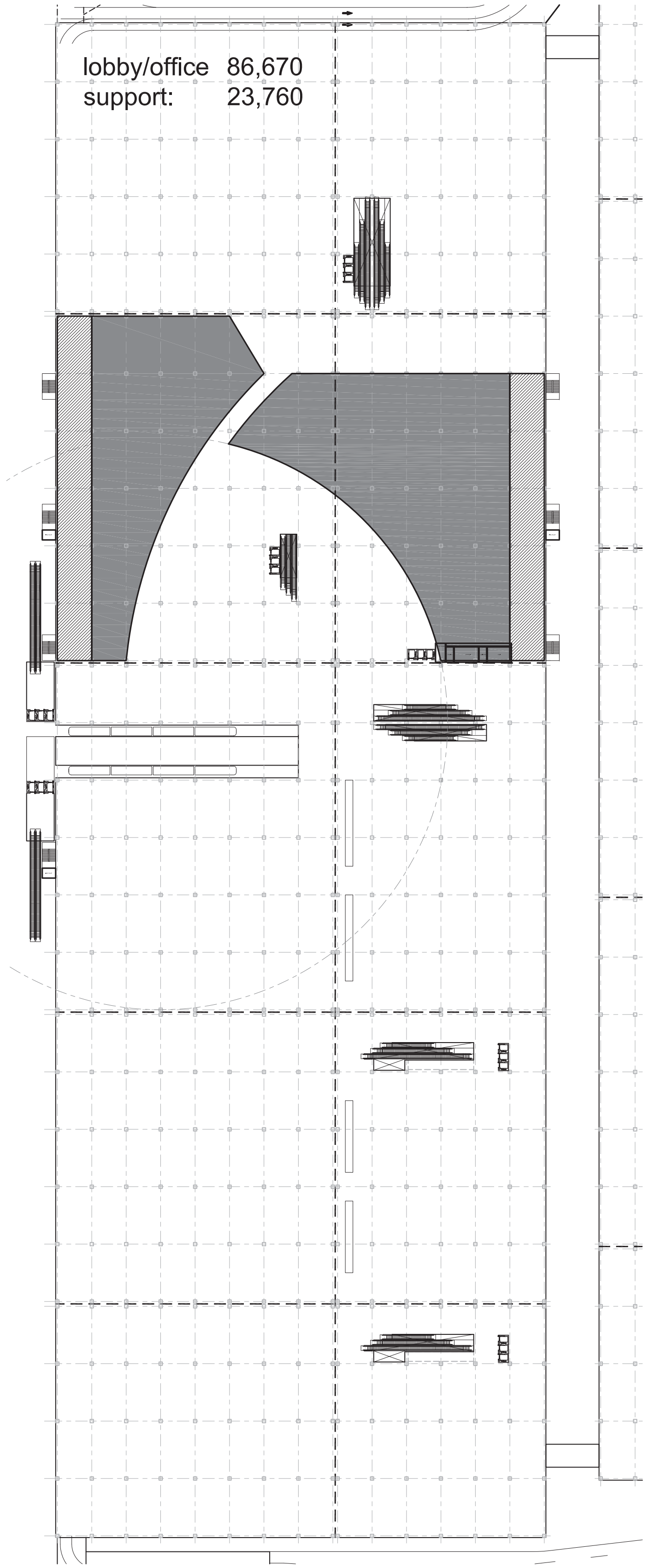


One-way expressway ready escalators in courtyard, north core moved closer to CSB courtyard, larger lobby area

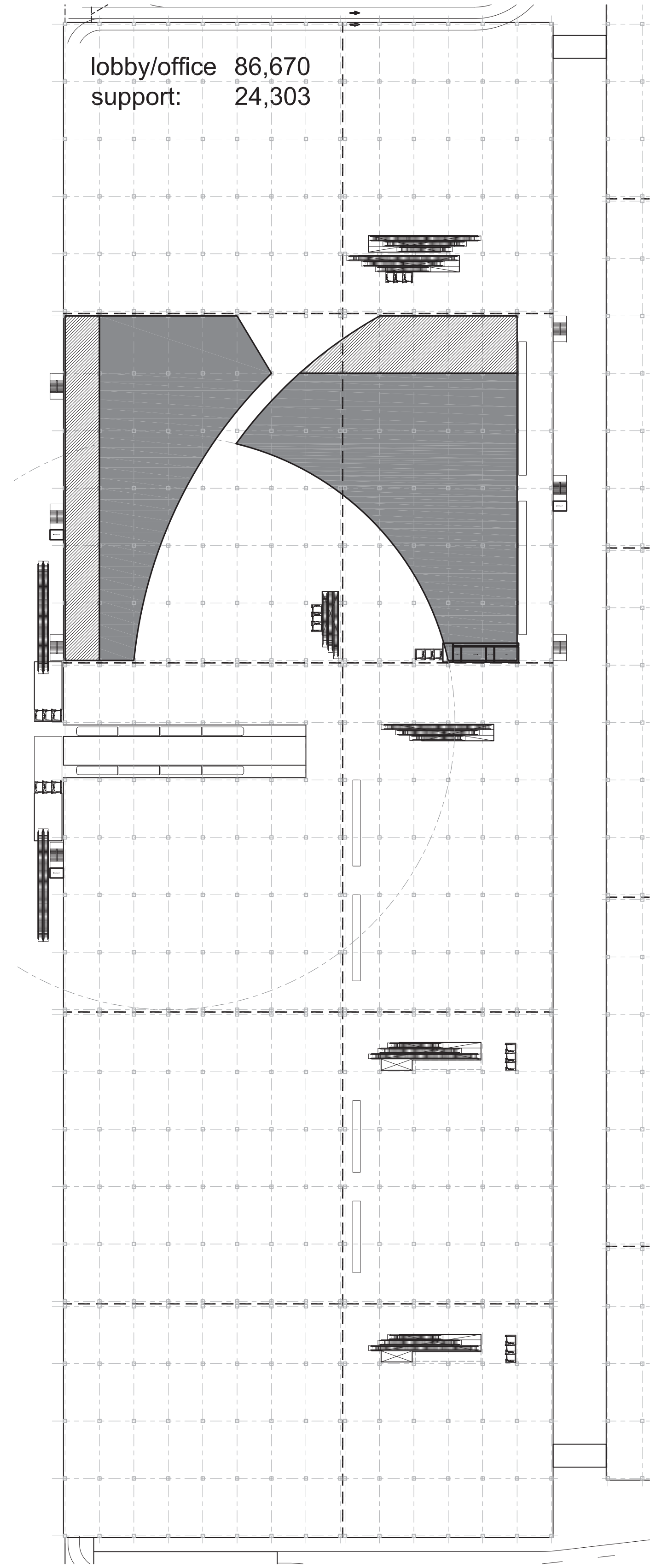


One-way expressway ready escalators in courtyard, rotated north core to direct return passengers to east side return expressway

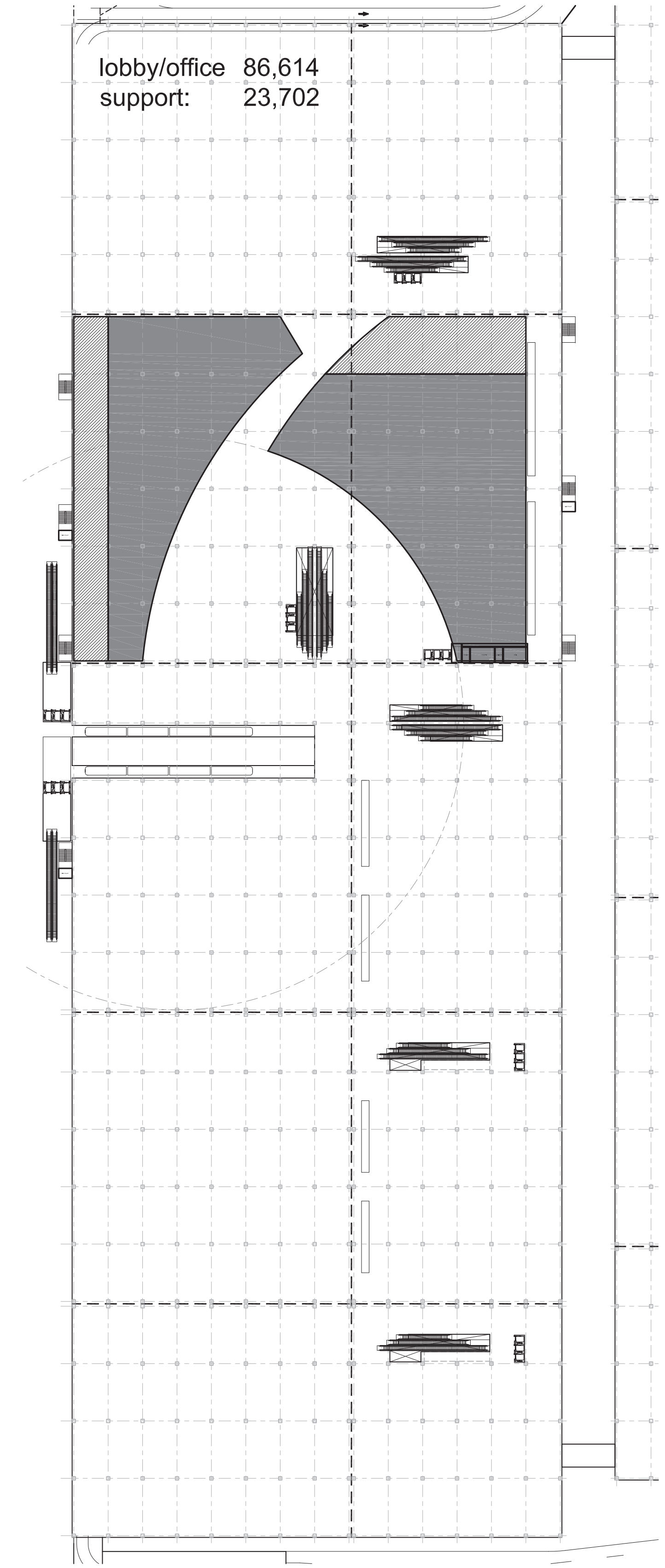
- Two options for this scheme minimize distance from the APM to lobby entrances and includes a core central to the courtyard.



One-way express ready escalators in courtyard

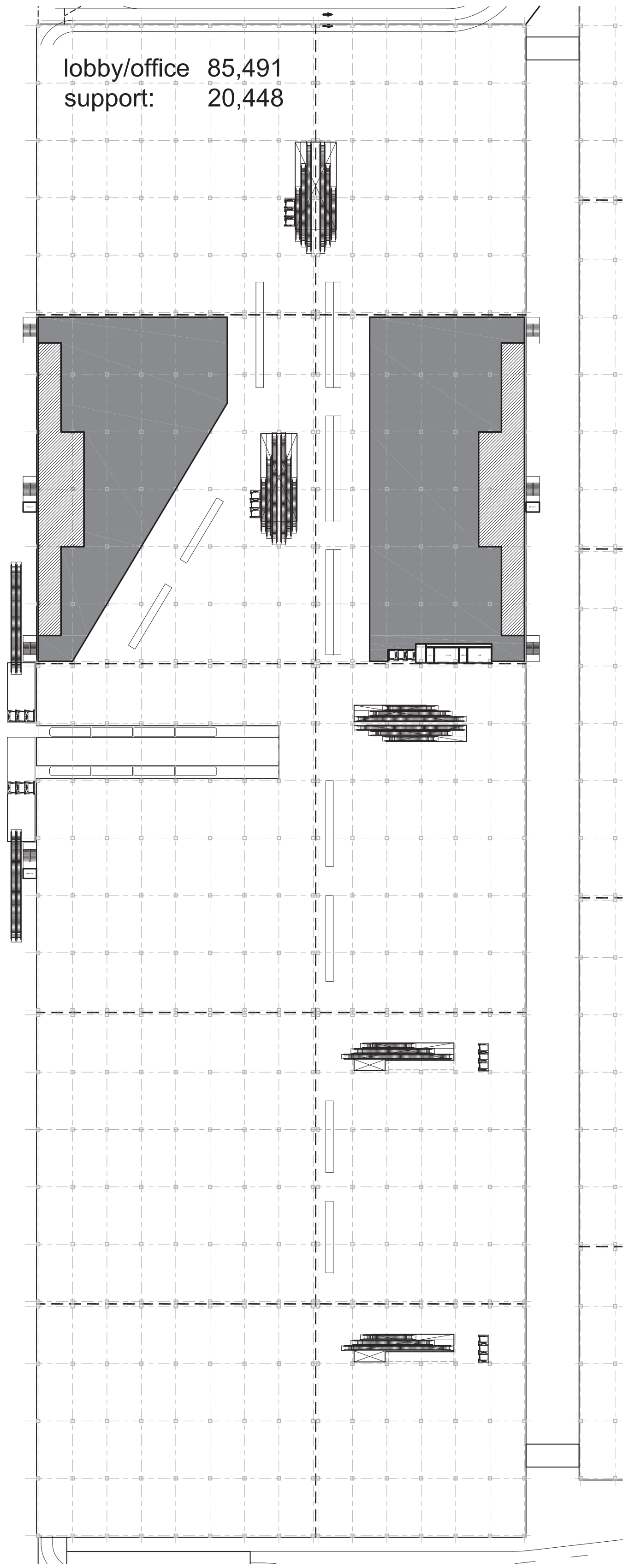


One-way express ready escalators in courtyard moved towards central core, rotated north core to direct return passengers to east side return expressway

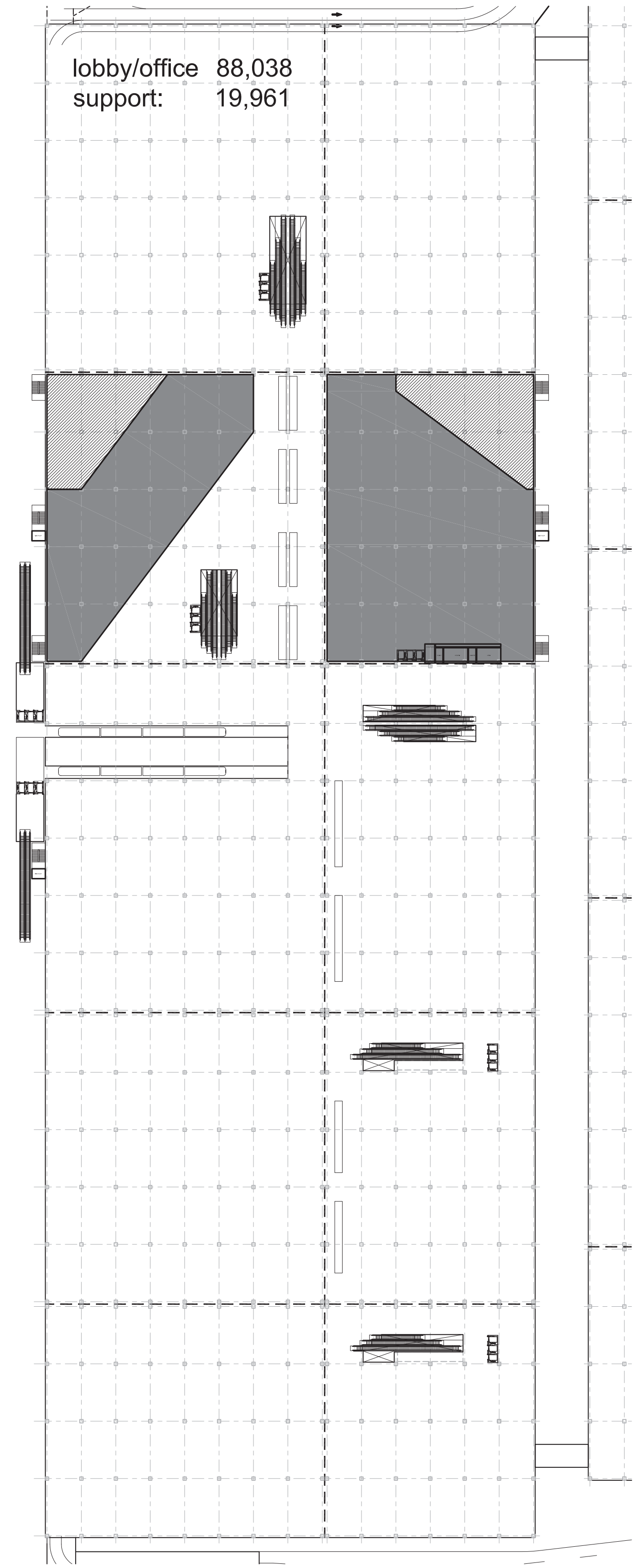


Two-way escalators in courtyard moved towards central core, rotated north core to direct return passengers to east side return expressway, widened north passageway

- Three options for 5 core "Bell" scheme. This scheme locates lobby entrances closer to APM and includes a core central to courtyard. Options include moving sidewalks and additional offices along east side return expressway.

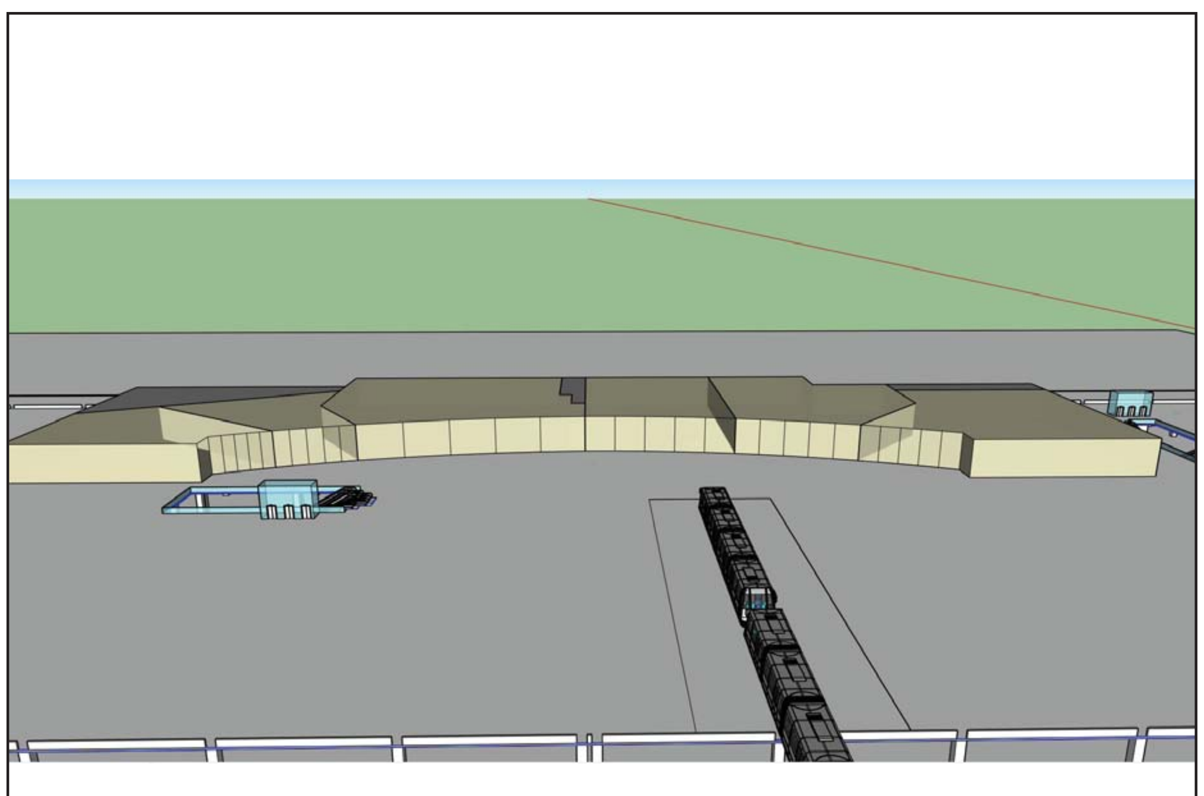


CSB elongated north -south for larger courtyard



CSB compressed north-south to locate closer to APM

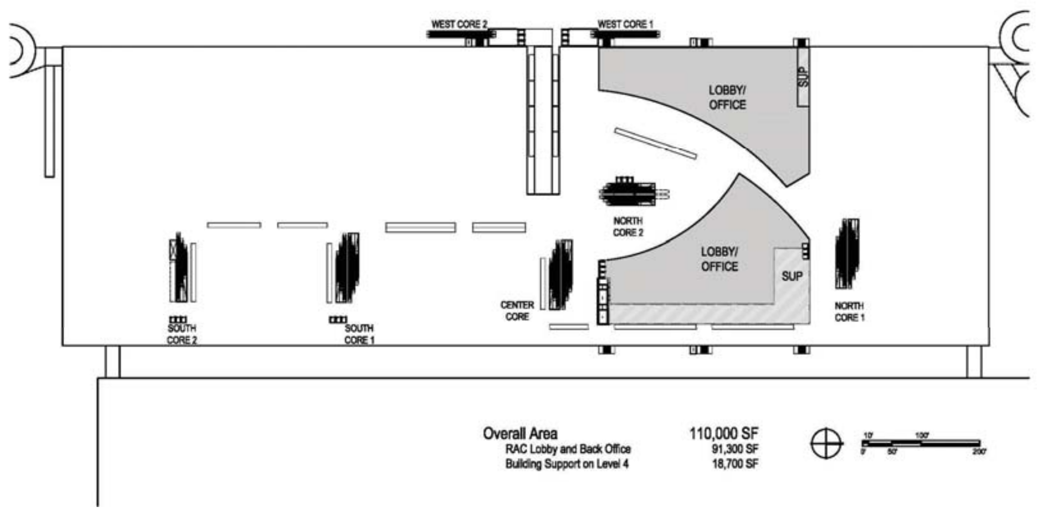
- Two options for the 5 core "V" scheme. This scheme uses moving sidewalks within the courtyard to facilitate north-south circulation.



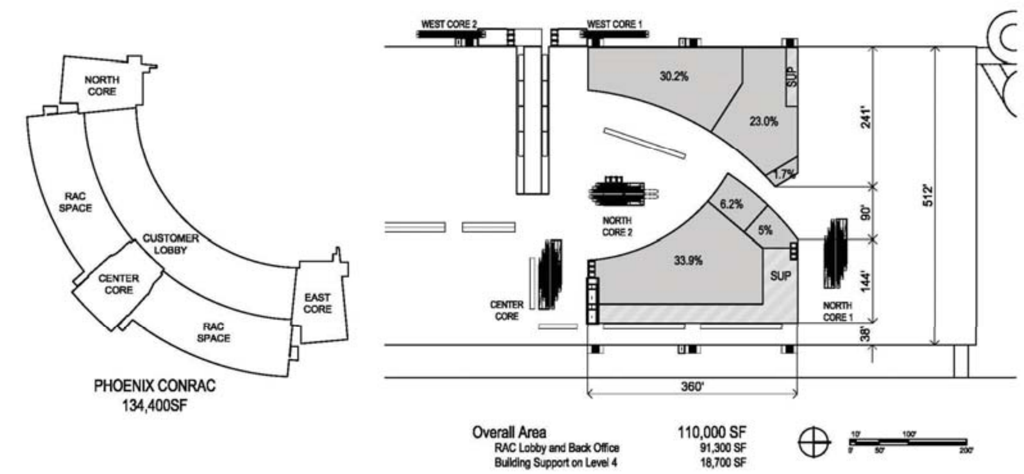
- Massing studies for 5 core CSB concepts.

G. DESIGN CONSIDERATIONS:

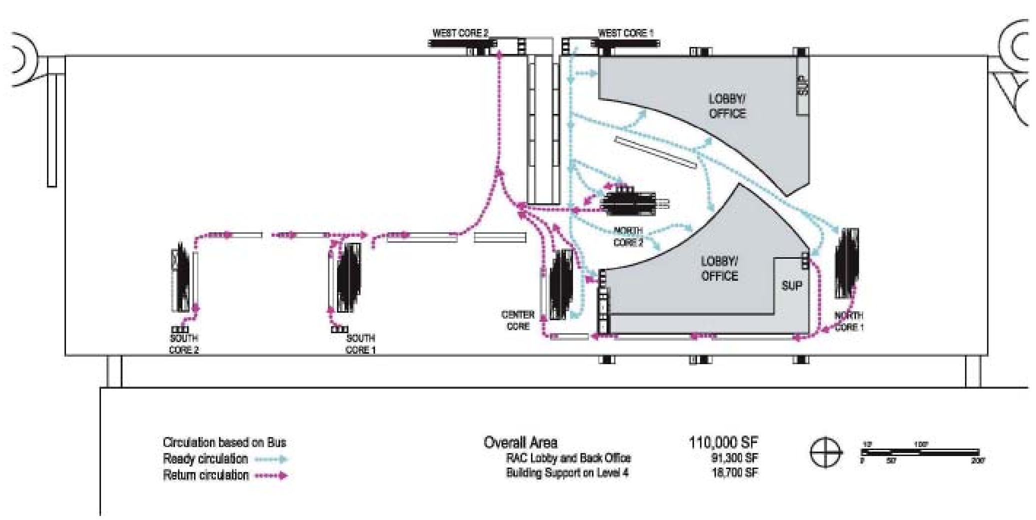
-Brand family allocation distributions based on south main QTA (original concept) and north main QTA
-Develop CSB based on 4 cores



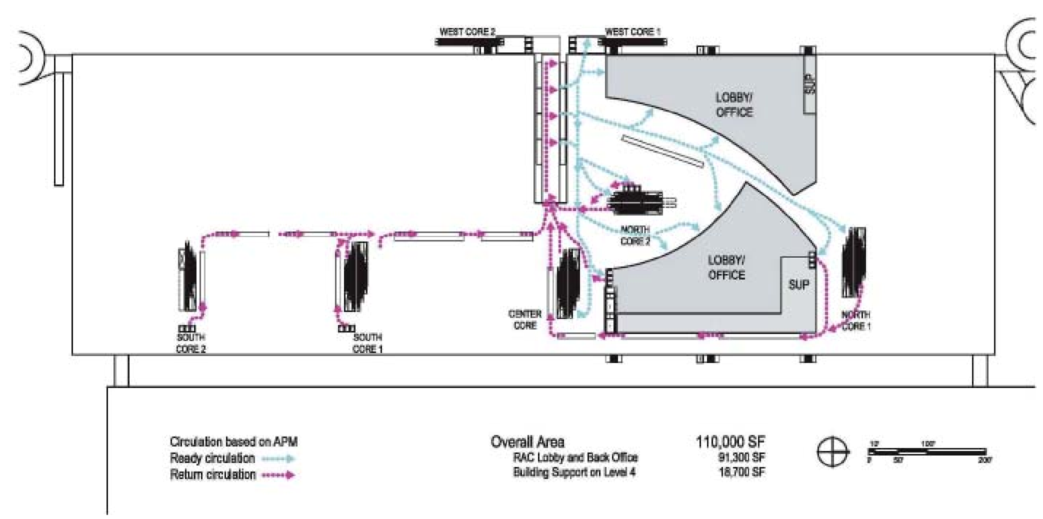
CSB design concept 1 overview



CSB design concept 1 size comparison and brand allocation

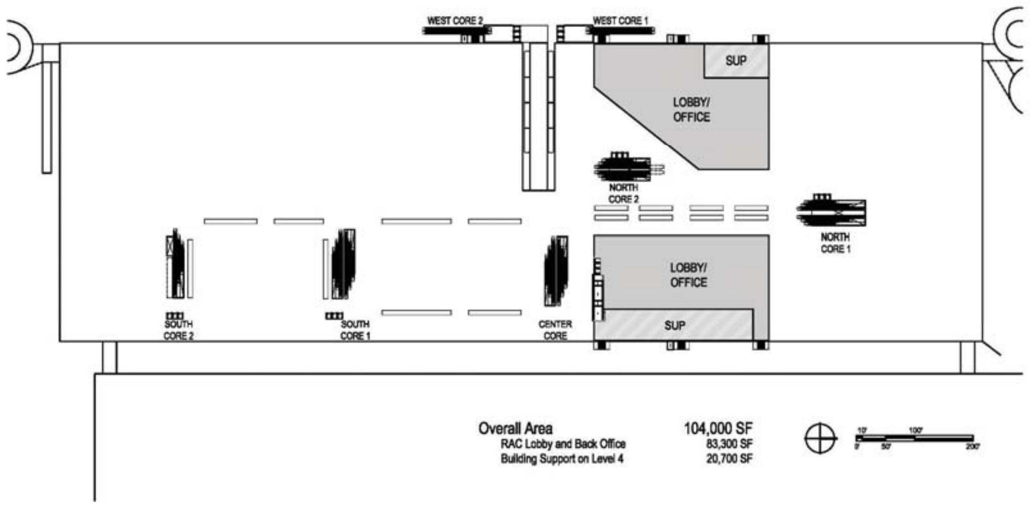


CSB design concept 1 circulation (Bus operation)

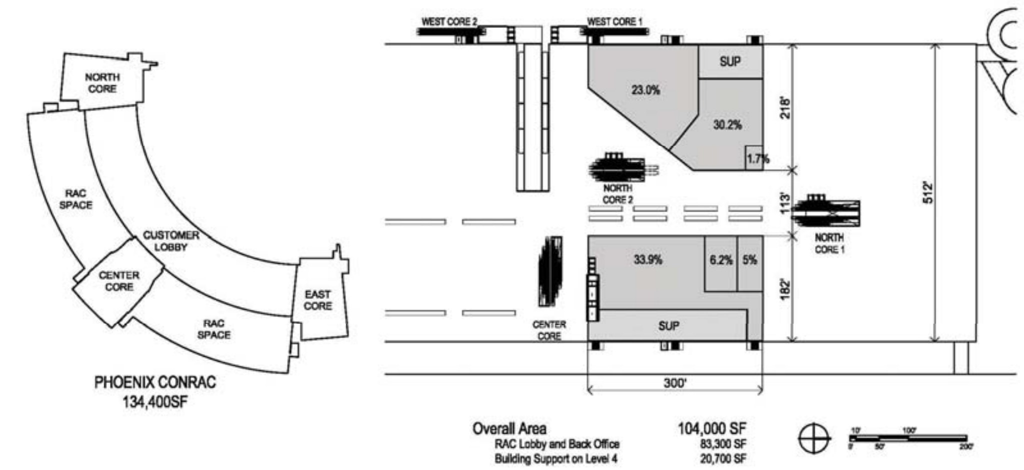


CSB design concept 1 circulation (APM operation)

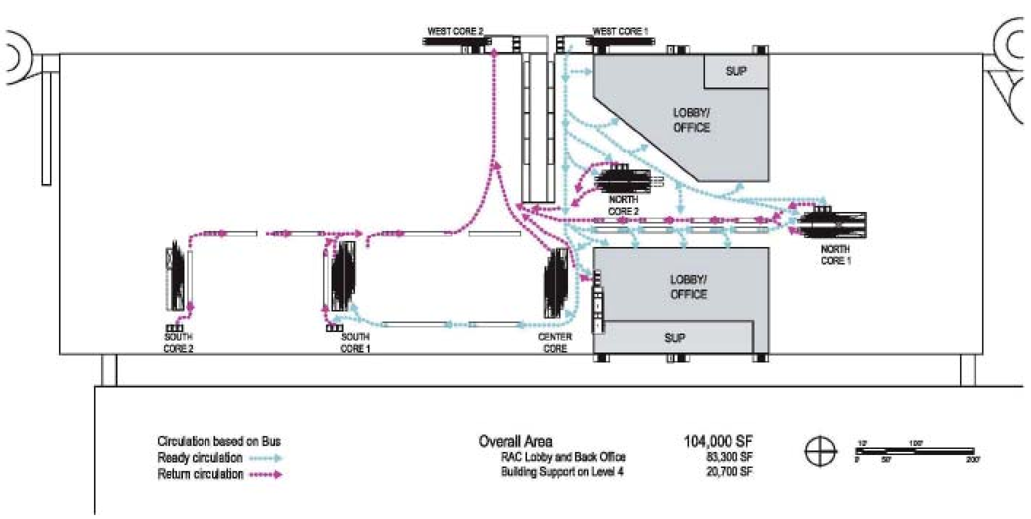
- Presentation slides for Concept 1 illustrating general layout, brand family allocation, and arrival and return circulation based on both APM and Bus access.



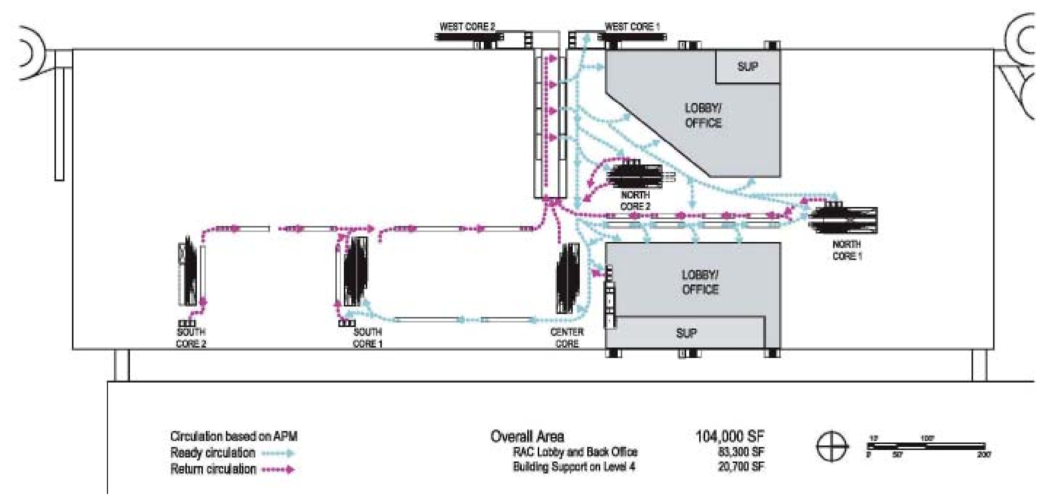
CSB design concept 2a overview



CSB design concept 2a size comparison and brand allocation

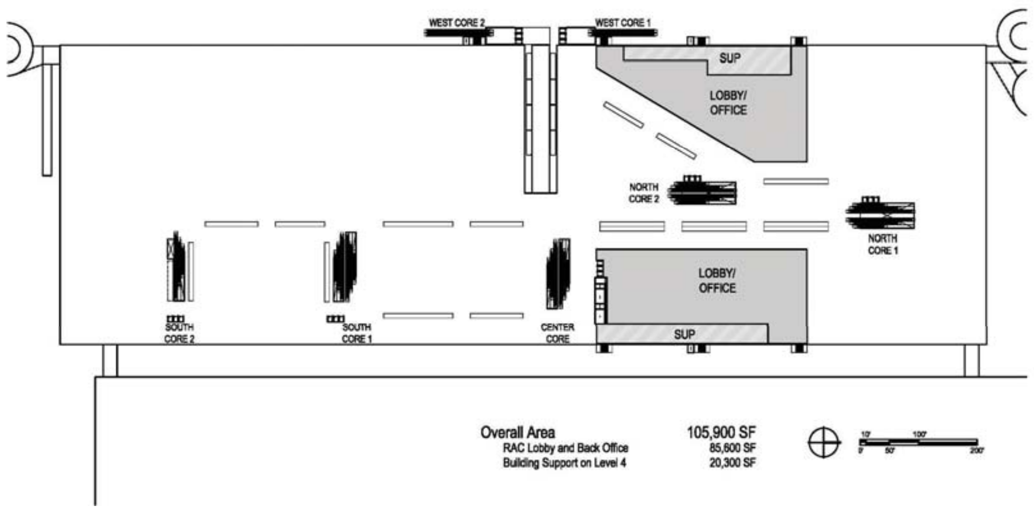


CSB design concept 2a circulation (Bus operation)

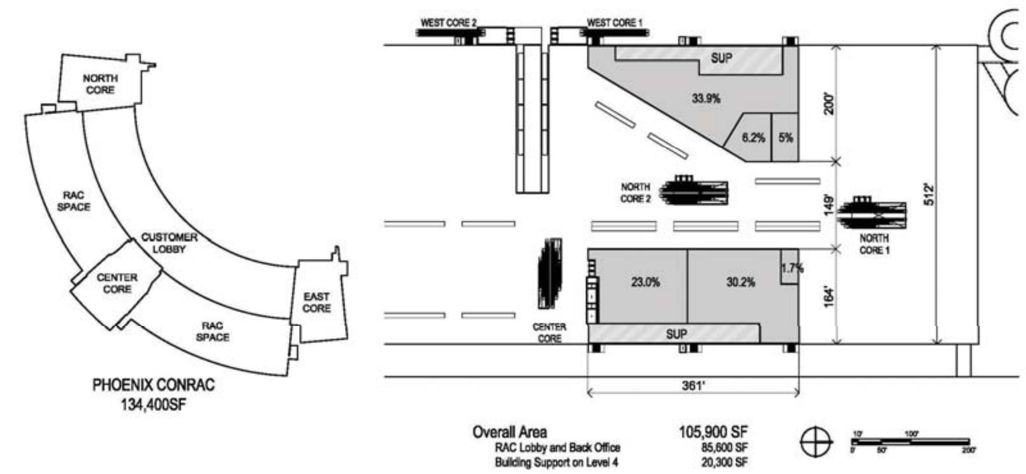


CSB design concept 2a circulation (APM operation)

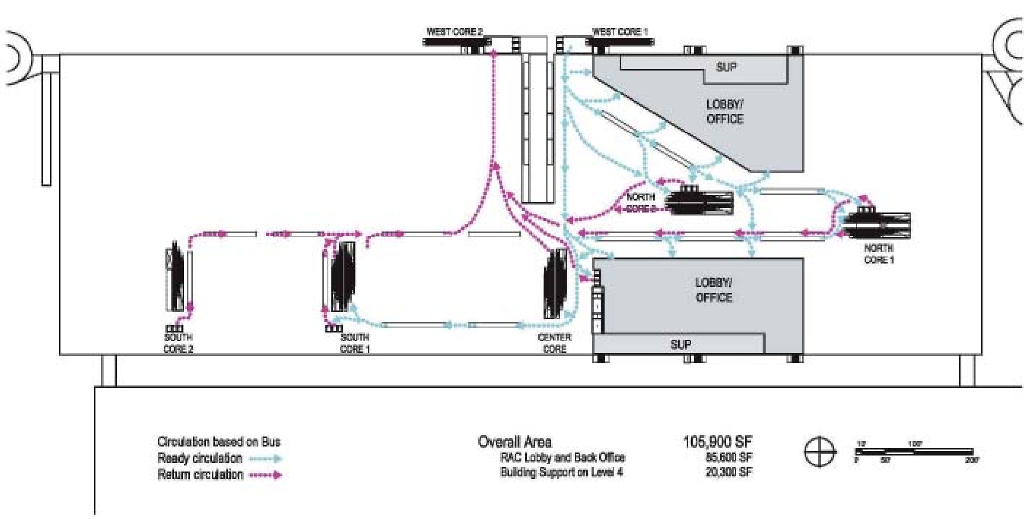
- Presentation slides for Concept 2a illustrating general layout, brand family allocation, and arrival and return circulation based on both APM and Bus access.



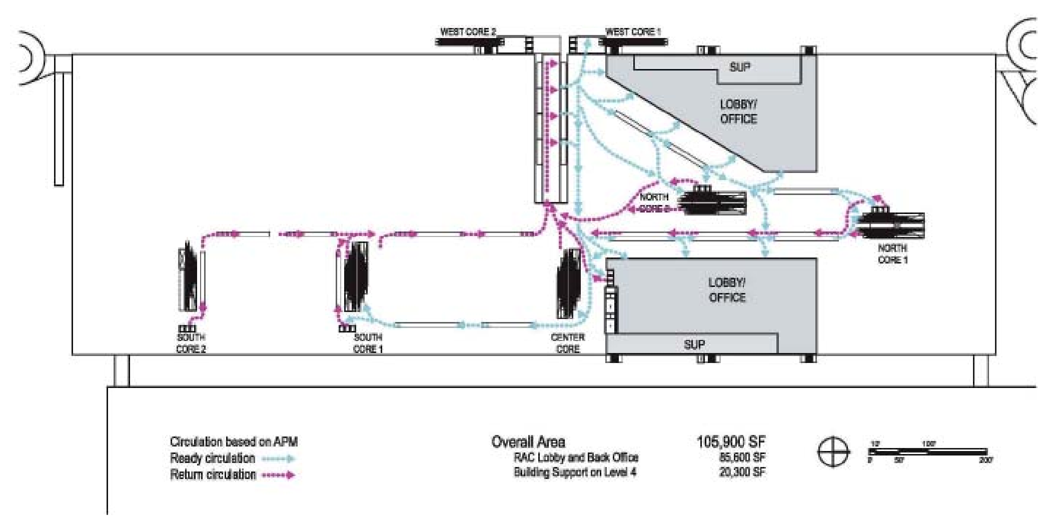
CSB design concept 2b overview



CSB design concept 2b size comparison and brand allocation

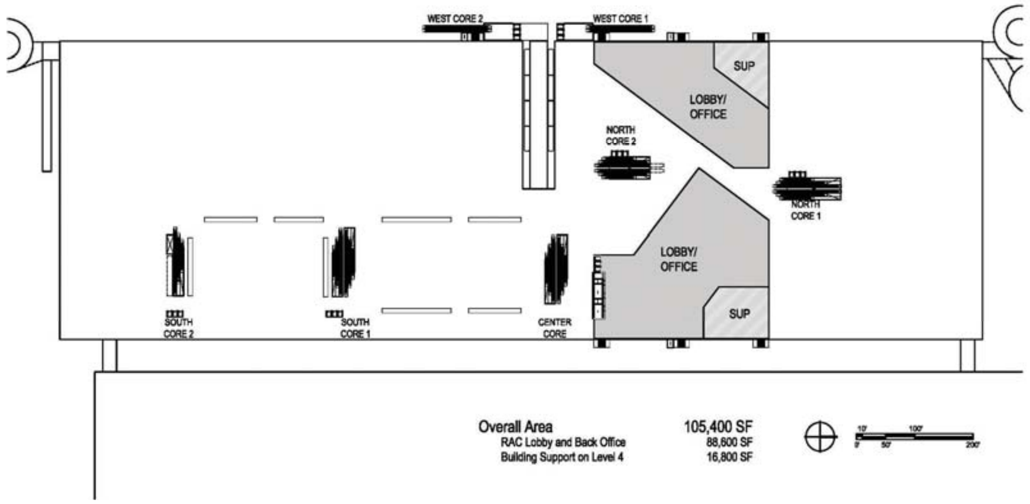


CSB design concept 2b circulation (Bus operation)

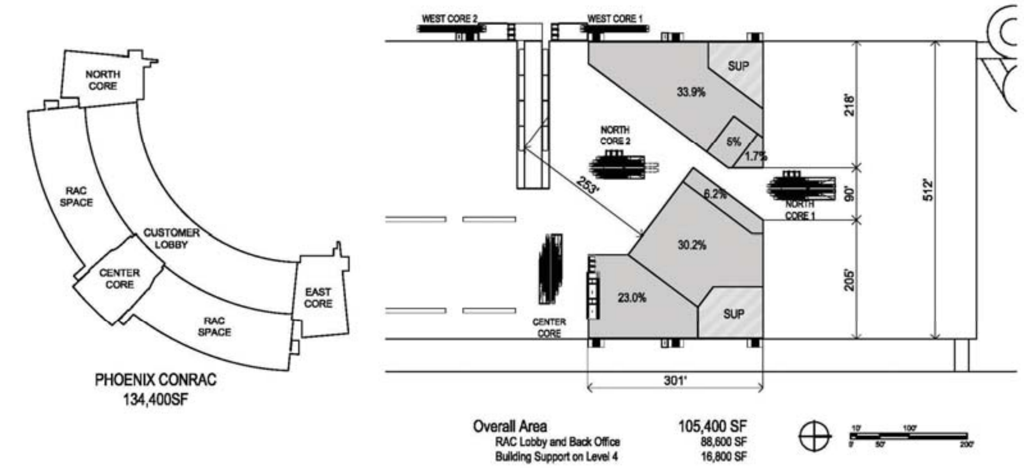


CSB design concept 2b circulation (APM operation)

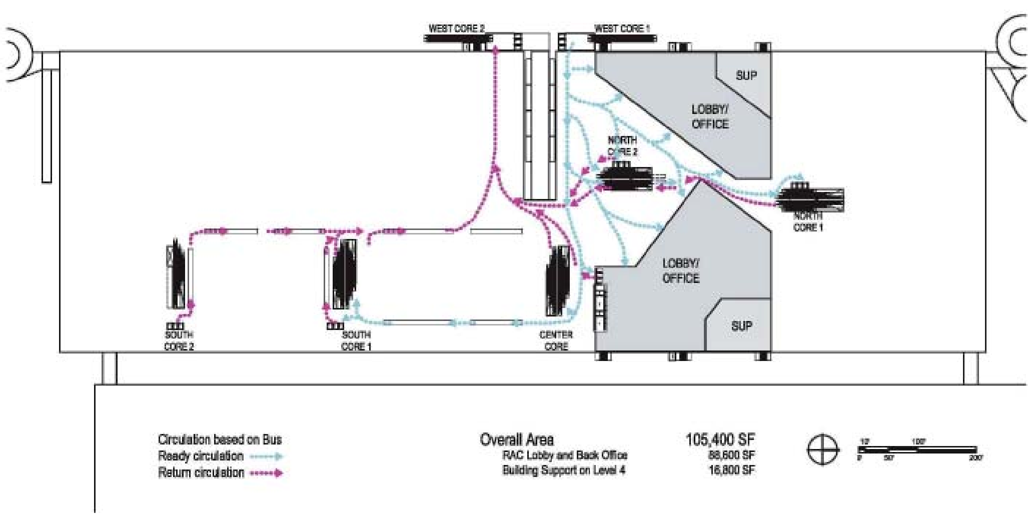
- Presentation slides for Concept 2b illustrating general layout, brand family allocation, and arrival and return circulation based on both APM and Bus access.



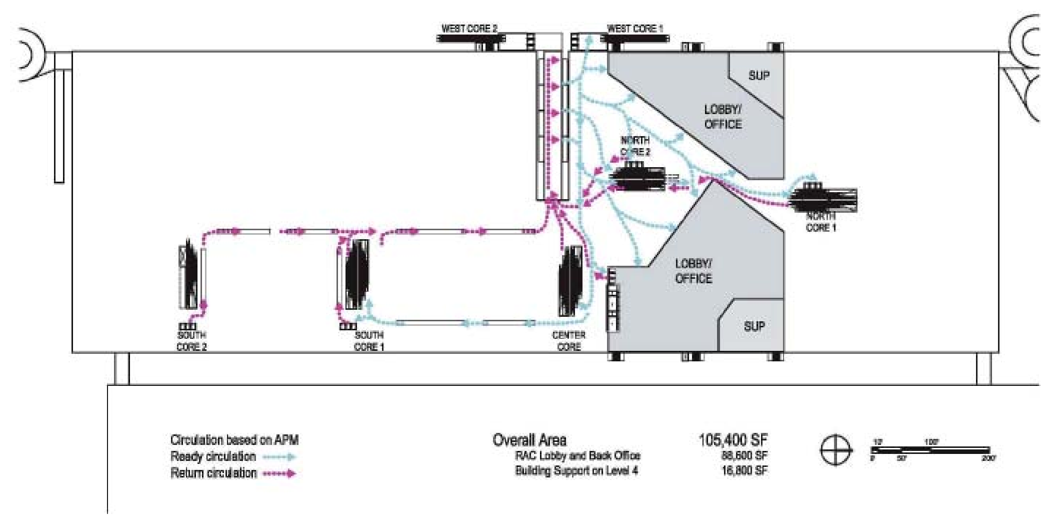
CSB design concept 3 overview



CSB design concept 3 size comparison and brand allocation

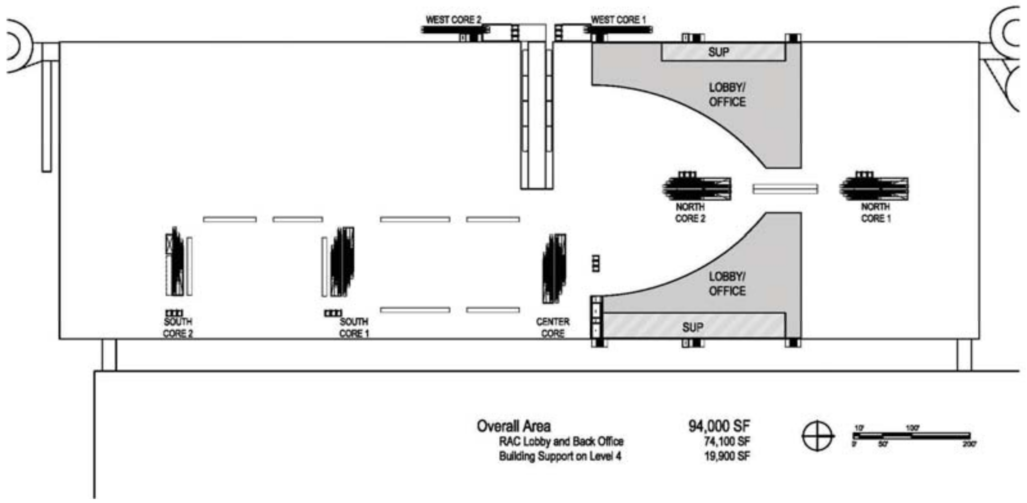


CSB design concept 3 circulation (Bus operation)

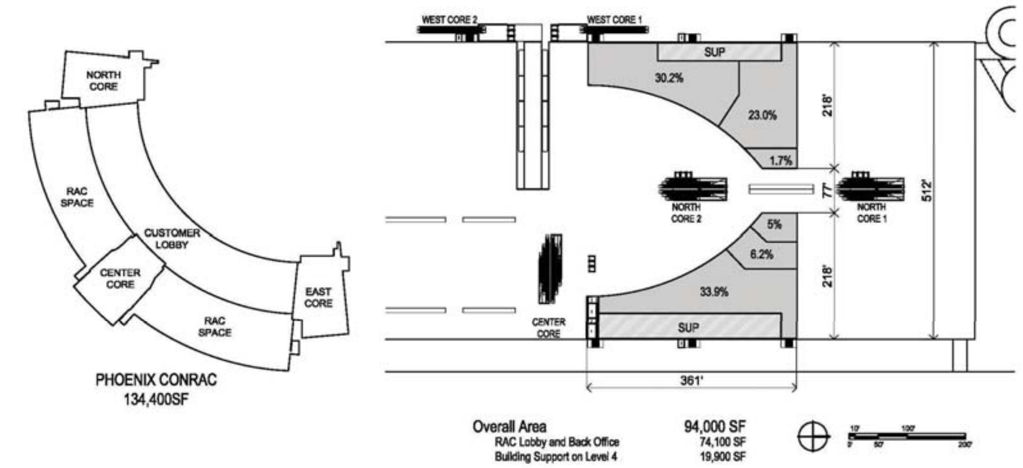


CSB design concept 3 circulation (APM operation)

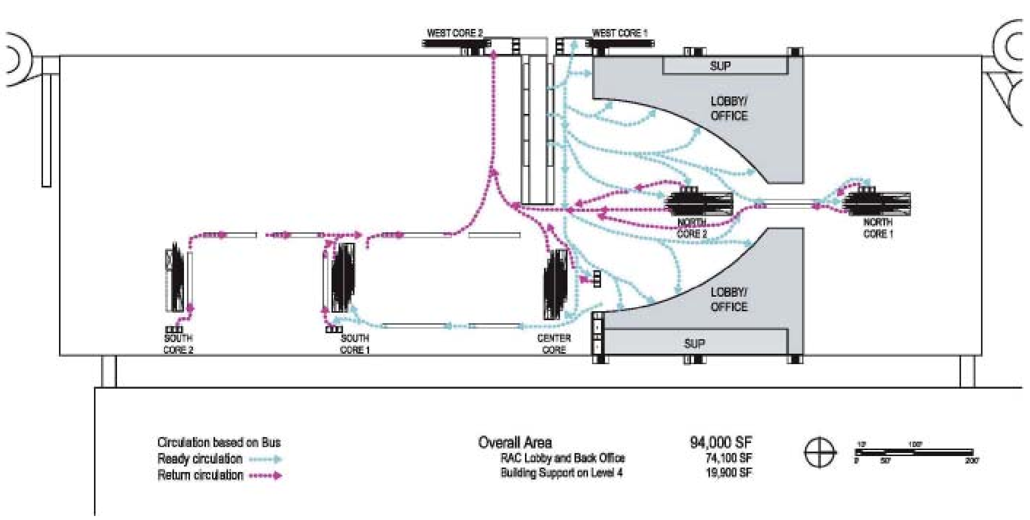
- Presentation slides for Concept 3 illustrating general layout, brand family allocation, and arrival and return circulation based on both APM and Bus access.



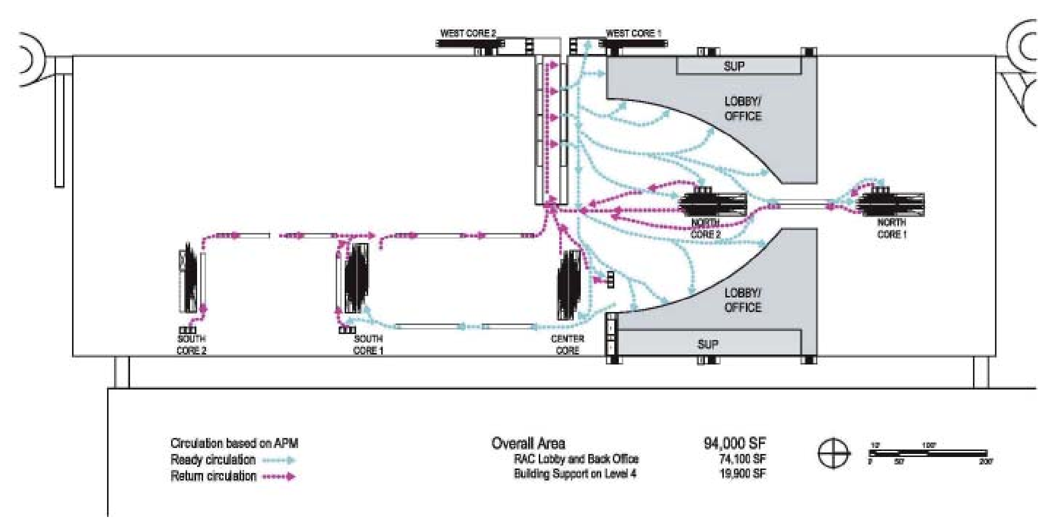
CSB design concept 4 overview



CSB design concept 4 size comparison and brand allocation

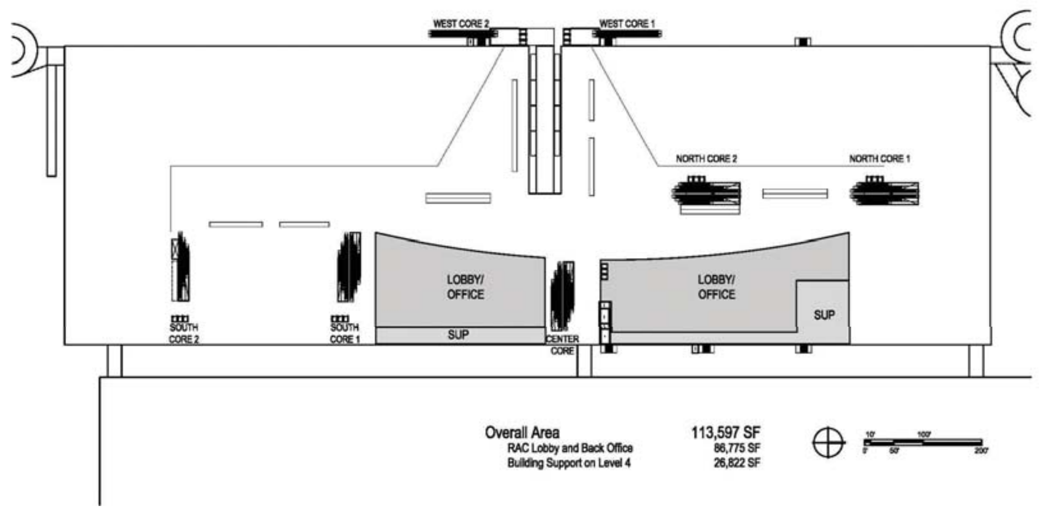


CSB design concept 4 circulation (Bus operation)

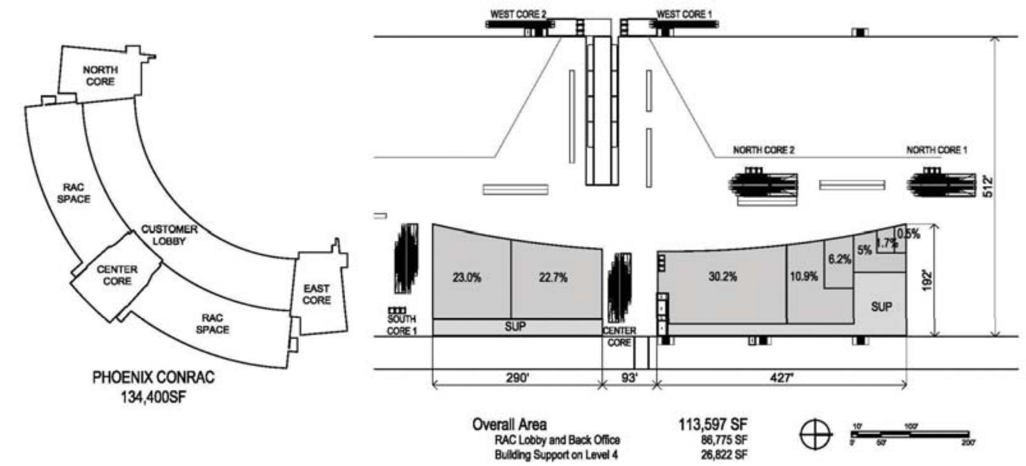


CSB design concept 4 circulation (APM operation)

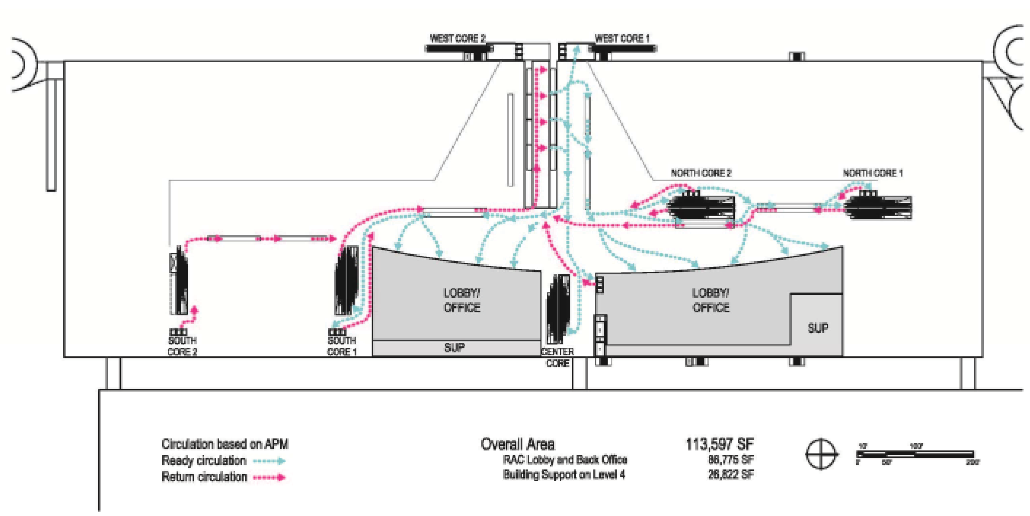
- Presentation slides for Concept 4 illustrating general layout, brand family allocation, and arrival and return circulation based on both APM and Bus access.



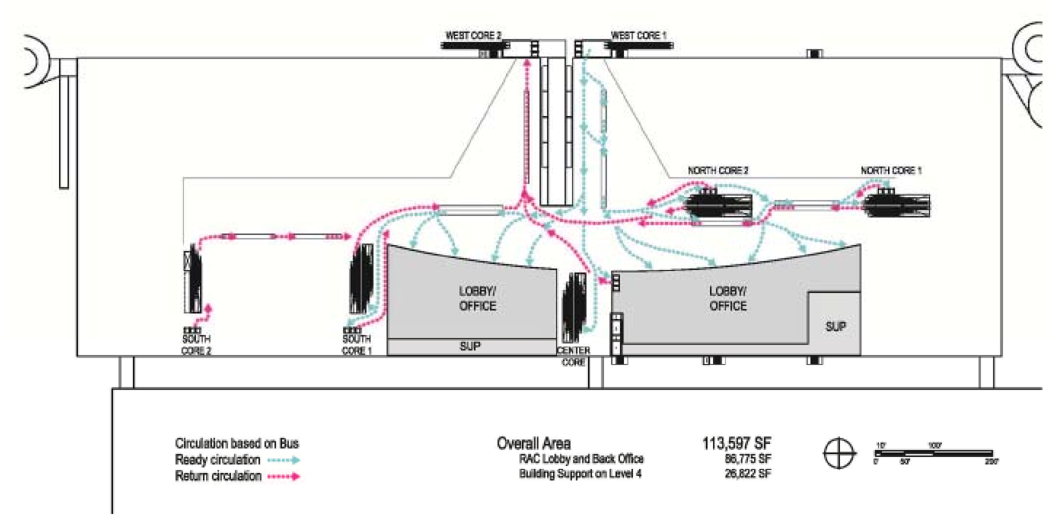
CSB design concept 5 overview



CSB design concept 5 size comparison and brand allocation

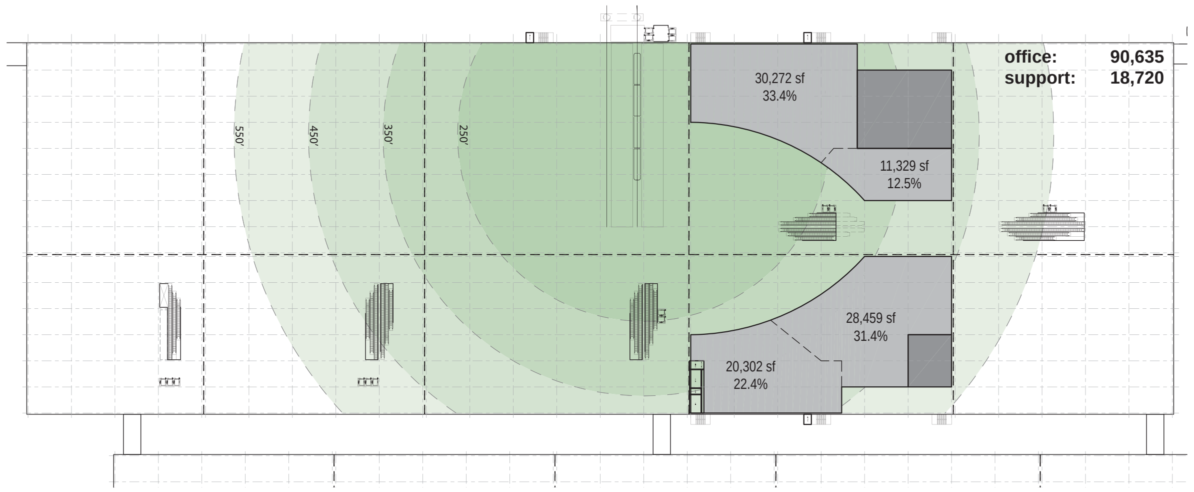


CSB design concept 5 circulation (Bus operation)

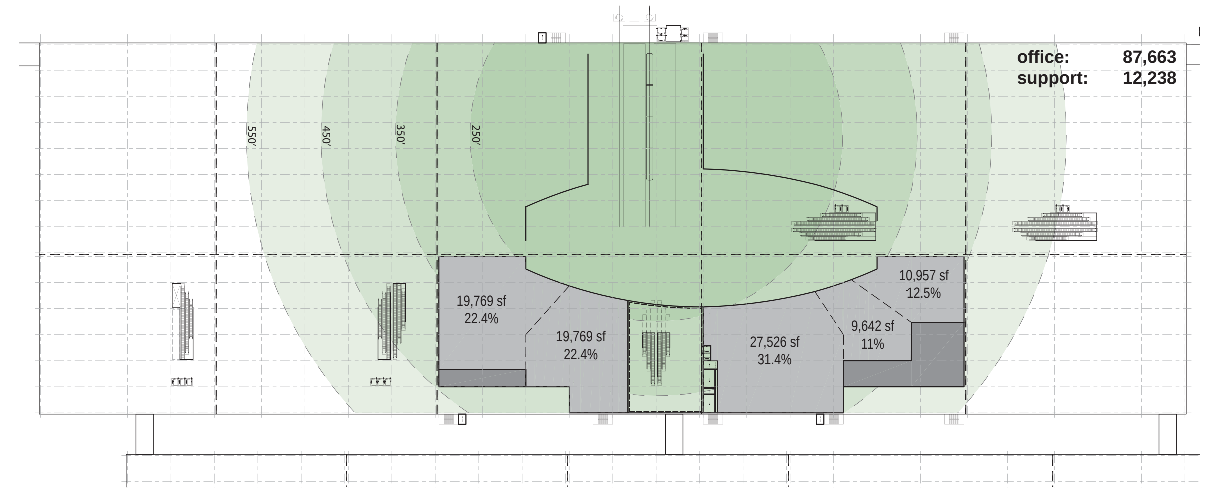


CSB design concept 5 circulation (APM operation)

- Presentation slides for Concept 5 illustrating general layout, brand family allocation, and arrival and return circulation based on both APM and Bus access.



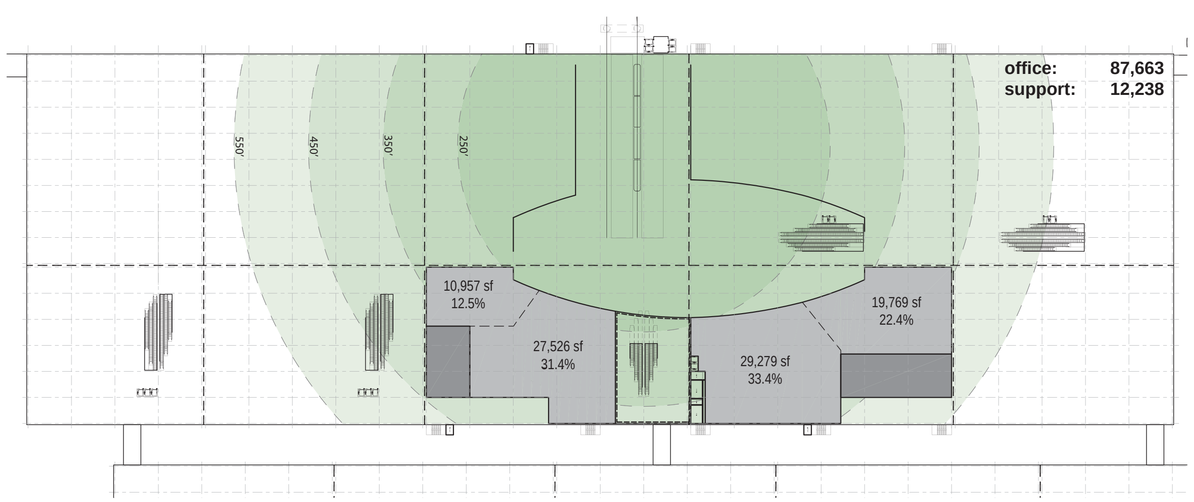
Scheme A with 5 cores (Main QTA at ConRAC SE position) - affects RAC garage and CSB allocation



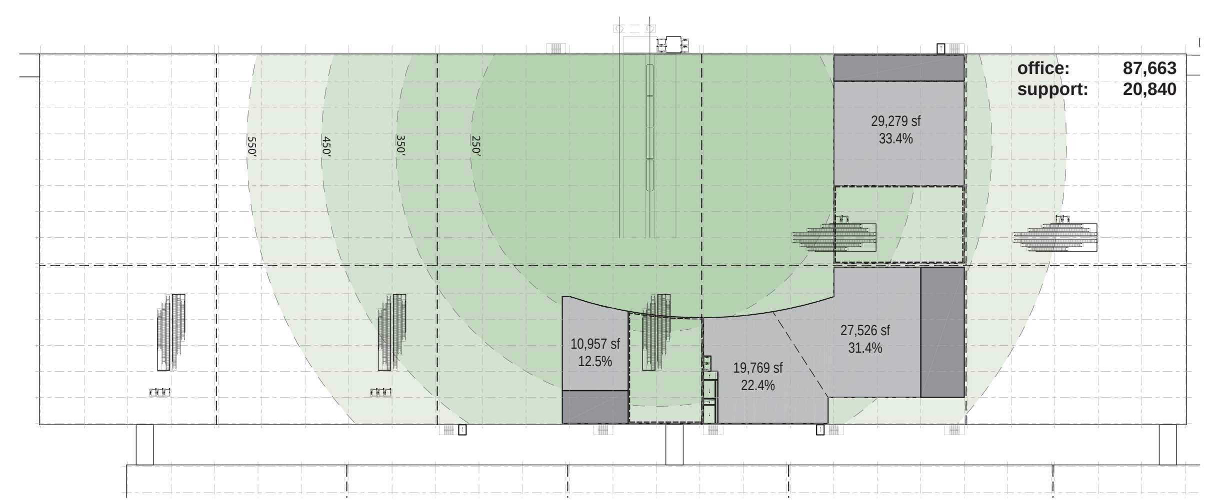
Scheme B.1 with 5 cores (Main QTA at ConRAC SE position) - affects RAC garage and CSB allocation

H. DESIGN CONSIDERATIONS:

-Organizing various rental agencies for optimal efficiency considering passenger access to CSB and agency lobby positioning relative to appropriate core for direct access to RAC level lobby and cars
-In addition to CSB positioning and layout, this required detailed studies of RAC organization which also affected positioning of QTA when considering vehicle flow and efficiency
-Options were for a north main QTA and a south main QTA

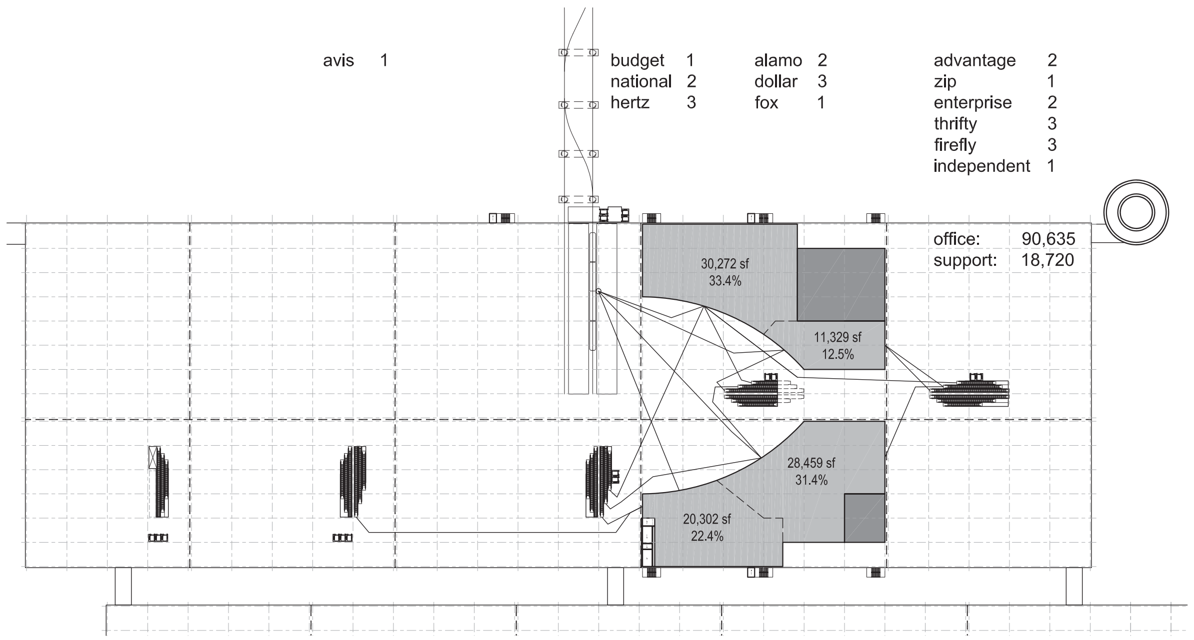


Scheme B.2 with 5 cores (Main QTA at ConRAC NE position) - affects RAC garage and CSB allocation

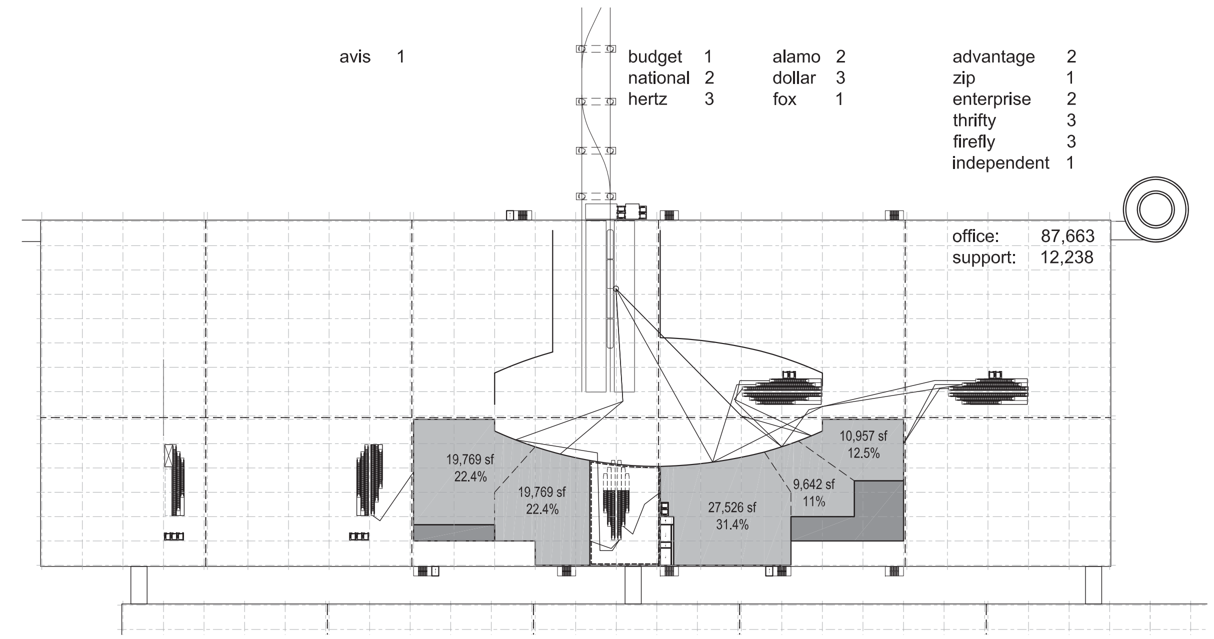


Scheme C with 5 cores (Main QTA at ConRAC NE position) - affects RAC garage and CSB allocation

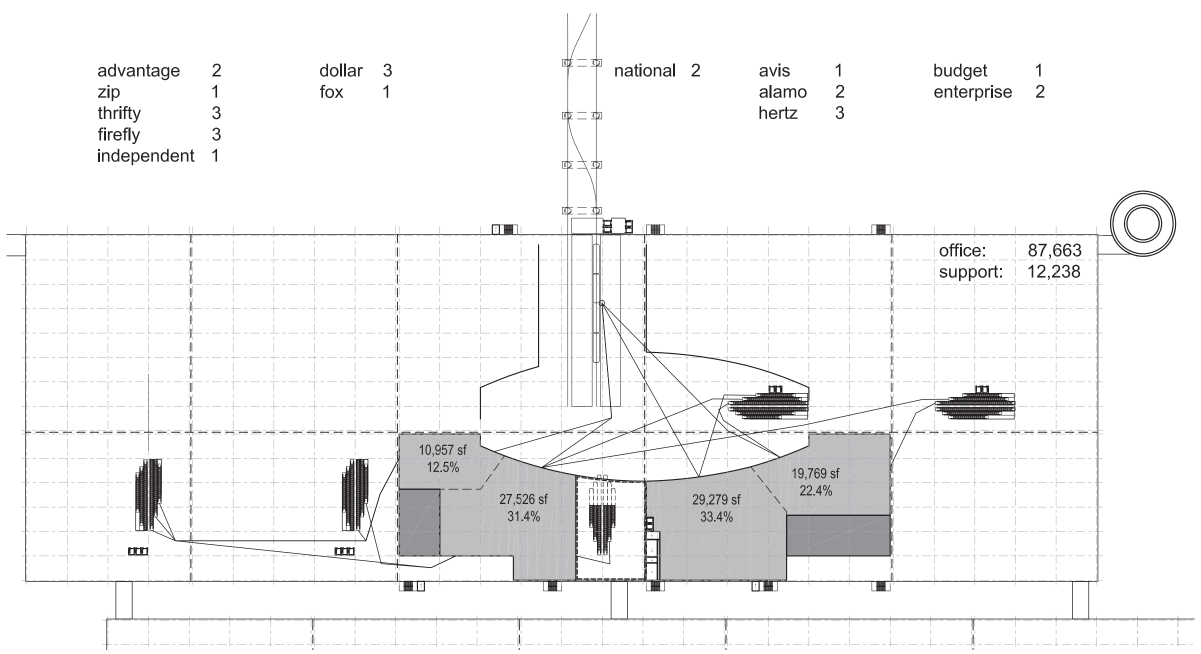
- Concentric circles centered about the north APM used as distance markers for graphic analysis to better understand CSB's relationship to APM arrival point.



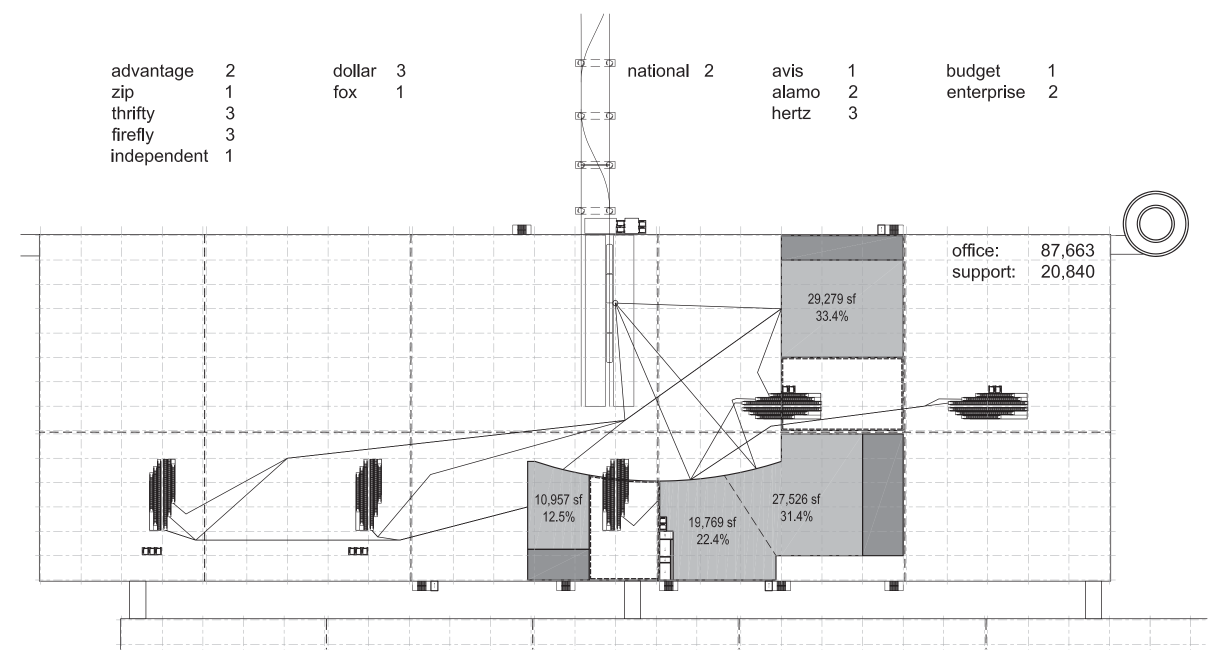
Scheme A - 5 core distance study



Scheme B.1 - 5 core distance study

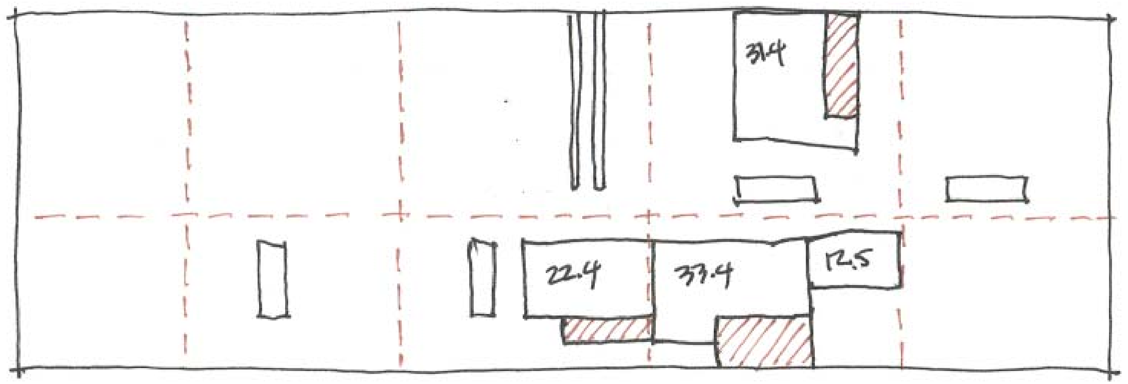


Scheme B.2 - 5 core distance study

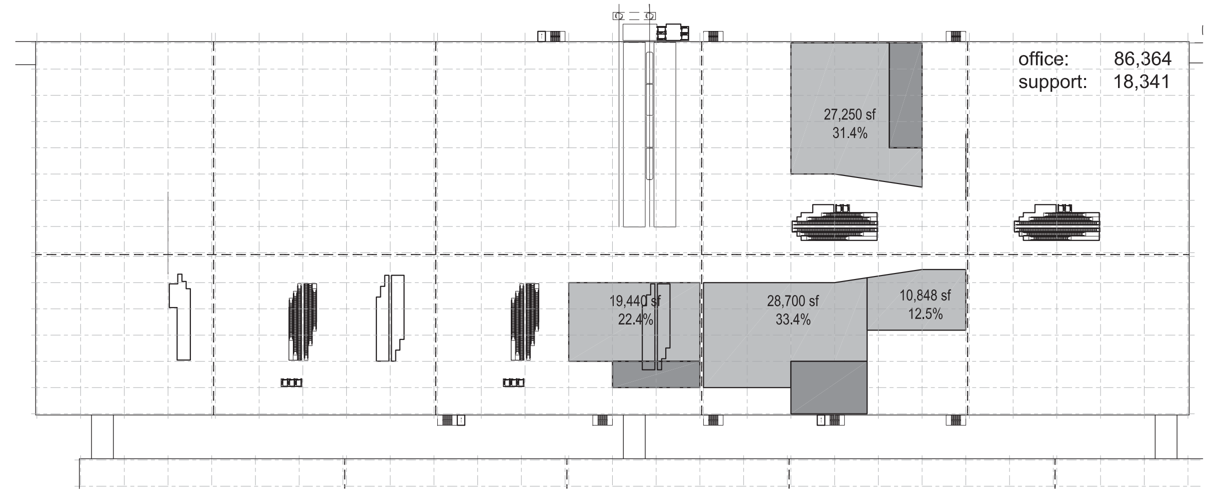


Scheme C - 5 core distance study

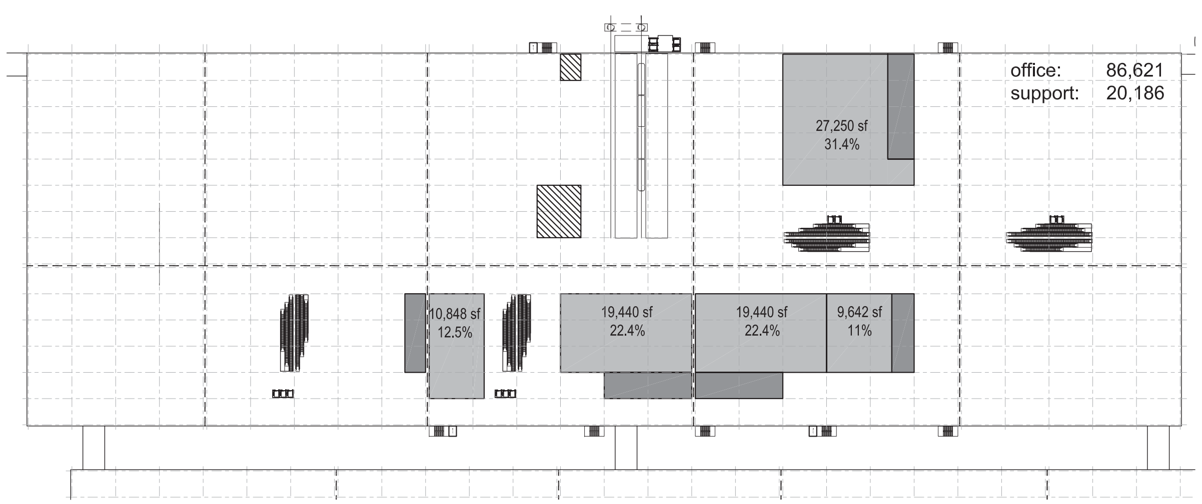
- 5 core options: Cores were assigned based on RAC garage positioning and measurements were taken from APM to CSB Lobby and from Lobby to appropriate core to understand walking distances for each rental agency.



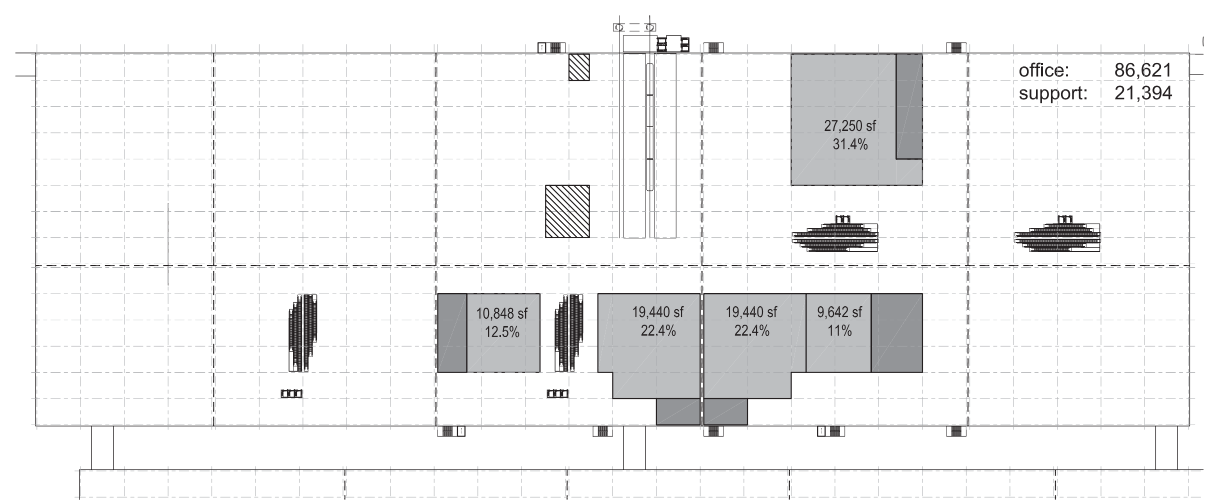
Concept sketch for new scheme A with 4 cores (Main QTA al ConRAC SE Position)



New scheme A with 4 cores (main QTA at ConRAC SE position)

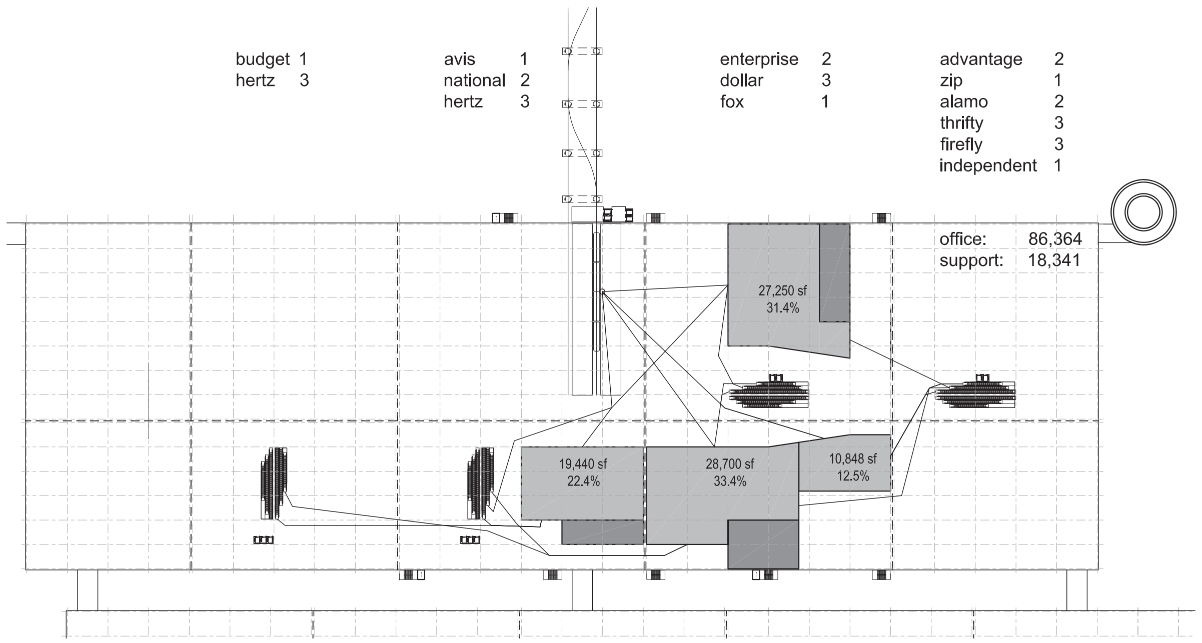


Scheme D option with 4 cores (main QTA at ConRAC NE position)

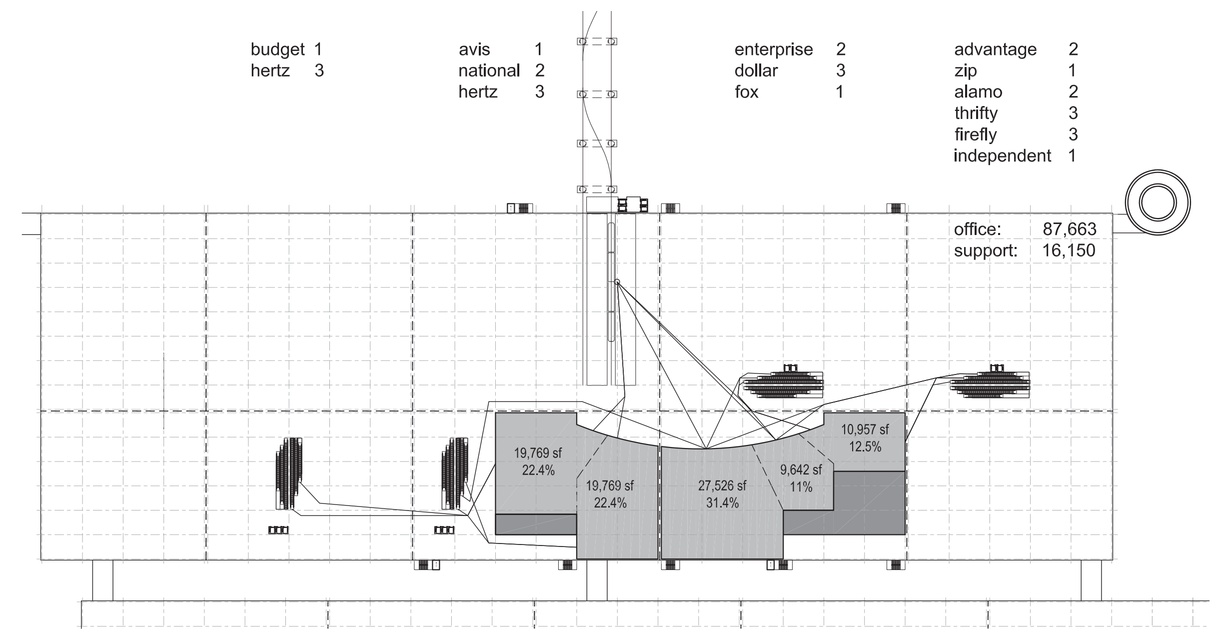


Scheme D final with 4 cores (main QTA at ConRAC NE position)

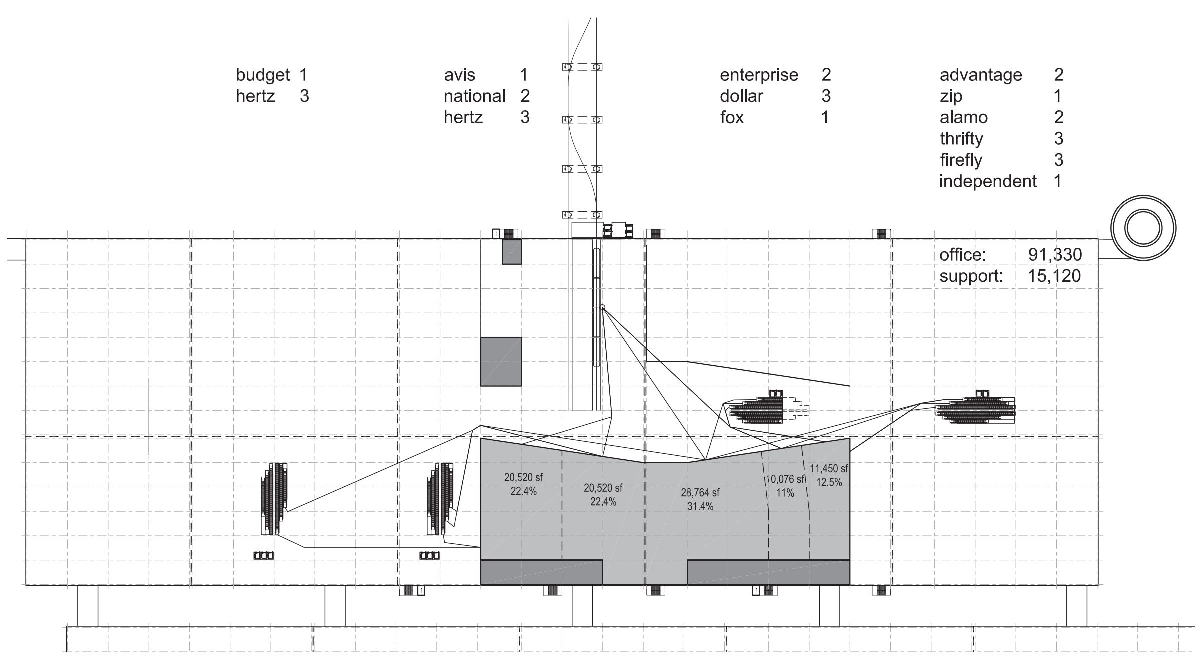
- 4 core studies were created - in some cases replacing previous schemes with new plans and in other cases adapting plan with 5 core to a 4 core version.



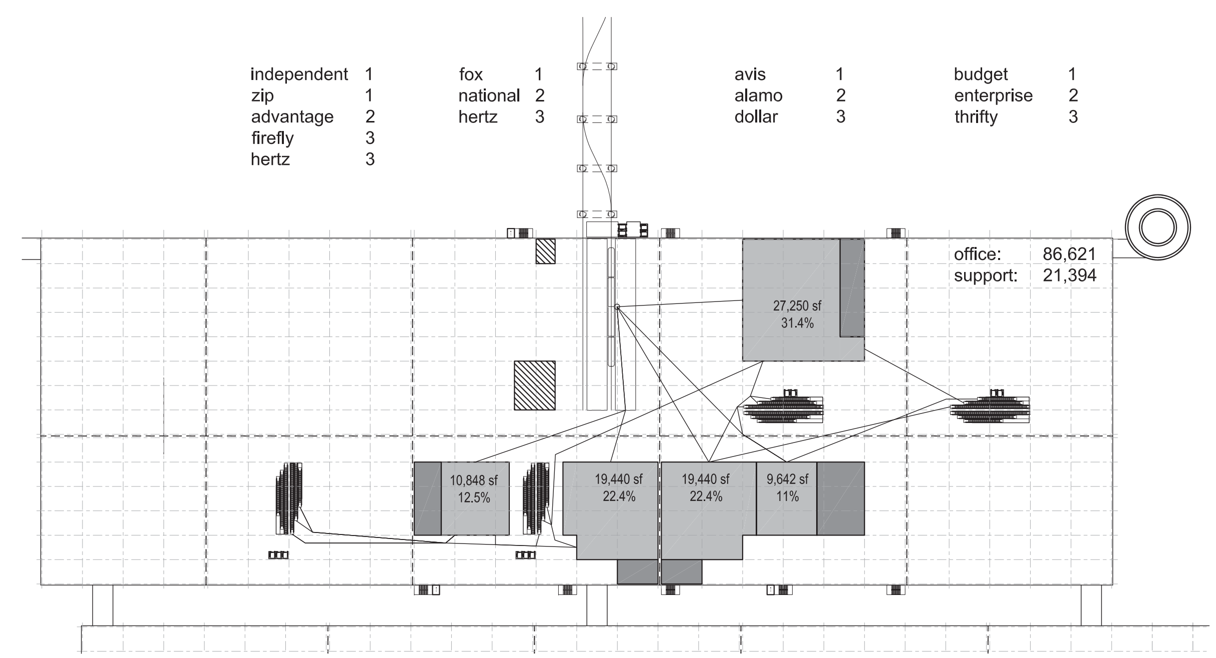
Scheme A - 4 core distance study



Scheme B - 4 core distance study



Scheme C - 4 core distance study



Scheme D - 4 core distance study

- 4 core options: Cores were assigned based on RAC garage positioning and measurements were taken from APM to CSB Lobby and from Lobby to appropriate core to understand walking distances for each rental agency.

Distance to Lobby

scheme	ADVAN (sm) 2.2		AVIS 14.5		BUDGET 7.8		ZIP (sm) 0.1		ALAMO 12.3		NATION 9.8		ENTER 9.3		HERTZ 22.4		DOLLAR 7.3		THRIFTY 3.7		FIREFLY (sm) 0.4		FOX (sm) 5.3		INDEP (sm) 5.0		Average
	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	
A	296	651.2	319	4625.5	319	2488.2	296	29.6	346	4255.8	346	3390.8	346	3217.8	167	3740.8	167	1219.1	167	617.9	167	66.8	296	1568.8	296	1480	274
B.1	372	818.4	336	4872	336	2620.8	372	37.2	294	3616.2	294	2881.2	294	2734.2	288	6451.2	340	2482	340	1258	340	136	372	1971.6	372	1860	317
B.2 flip	350	770	351	5089.5	351	2737.8	350	35	297	3653.1	297	2910.6	297	2762.1	294	6585.6	294	2146.2	294	1087.8	294	117.6	350	1855	350	1750	315
C flip	291	640.2	284	4118	284	2215.2	291	29.1	321	3948.3	321	3145.8	321	2985.3	246	5510.4	246	1795.8	246	910.2	246	98.4	291	1542.3	291	1455	284
4-core A	403	886.6	245	3552.5	245	1911	403	40.3	186	2287.8	186	1822.8	186	1729.8	283	6339.2	283	2065.9	283	1047.1	403	161.2	403	2135.9	403	2015	260
4-core B	369	811.8	238	3451	238	1856.4	369	36.9	280	3444	280	2744	280	2604	231	5174.4	331	2416.3	331	1224.7	369	147.6	369	1955.7	369	1845	277
4-core C	401	882.2	302	4379	302	2355.6	401	40.1	273	3357.9	273	2675.4	273	2538.9	222	4972.8	341	2489.3	341	1261.7	401	160.4	401	2125.3	401	2005	292
4-core D flip	388	853.6	266	3857	266	2074.8	388	38.8	186	2287.8	186	1822.8	186	1729.8	233	5219.2	341	2489.3	341	1261.7	388	155.2	388	2056.4	388	1940	258
4-core E flip	417	917.4	293	4248.5	293	2285.4	417	41.7	186	2287.8	186	1822.8	186	1729.8	230	5152	230	1679	230	851	417	166.8	417	2210.1	417	2085	255

Distance to Core

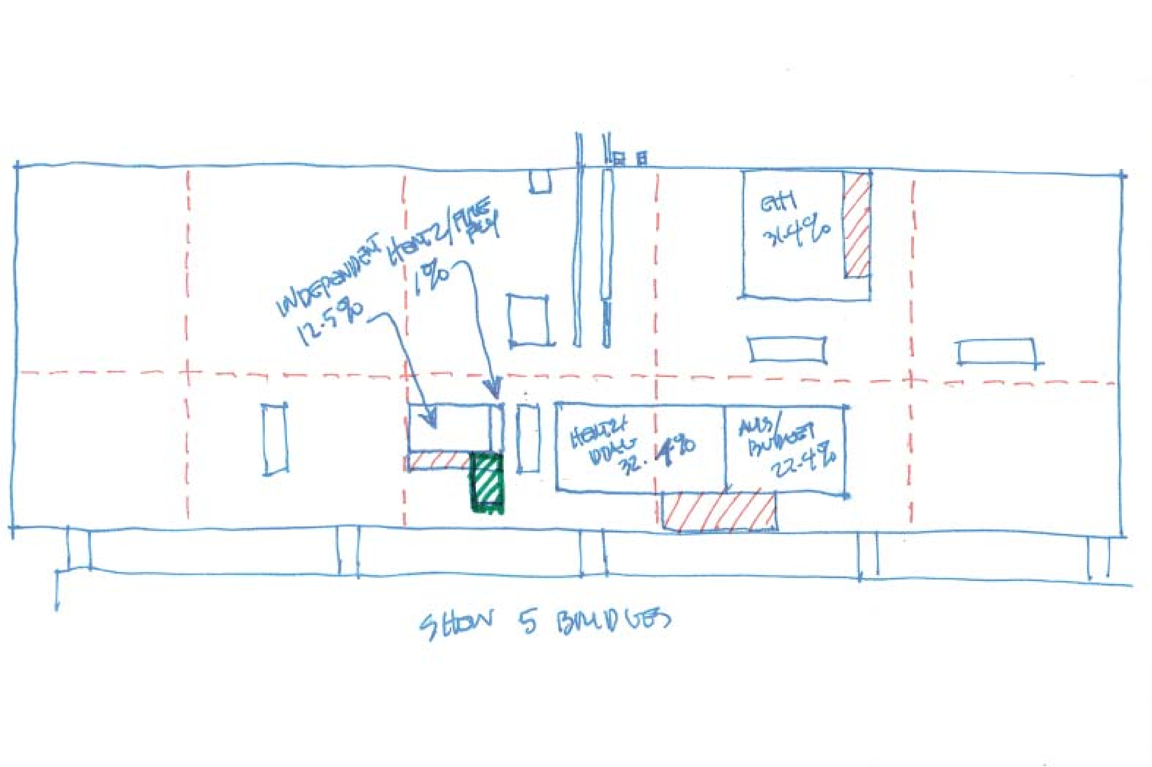
scheme	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	dist	mult	Average
A	106	233.2	453	6568.5	71	553.8	95	9.5	167	2054.1	253	2479.4	156	1450.8	327	7324.8	139	1014.7	411	1520.7	411	164.4	128	678.4	95	475	245
B.1	139	305.8	101	1464.5	304	2371.2	110	11.0	148	1820.4	95	931.0	391	3636.3	51	1142.4	171	1248.3	319	1180.3	319	127.6	147	779.1	110	550.0	156
B.2 flip	458	1007.6	135	1957.5	120	936	451	45.1	316	3886.8	85	833	610	5673	173	3875.2	206	1503.8	480	1776	480	192	151	800.3	451	2255	247
C flip	549	1207.8	141	2044.5	405	3159	544	54.4	143	1758.9	76	744.8	429	3989.7	138	3091.2	716	5226.8	981	3629.7	1015	406	241	1277.3	544	2720	293
4-core A	145	319	97	1406.5	401	3127.8	120	12	163	2004.9	523	5125.4	168	1562.4	477	10685	143	1043.9	367	1357.9	166	66.4	188	996.4	120	600	283
4-core B	146	321.2	104	1508	349	2722.2	120	12	397	4883.1	498	4880.4	142	1320.6	334	7481.6	160	1168	320	1184	166	66.4	146	773.8	120	600	269
4-core C	168	369.6	66	957	304	2371.2	145	14.5	371	4563.3	509	4988.2	116	1078.8	363	8131.2	168	1226.4	279	1032.3	189	75.6	176	932.8	145	725	265
4-core D flip	245	539	101	1464.5	366	2854.8	248	24.8	69	848.7	454	4449.2	168	1562.4	258	5779.2	174	1270.2	299	1106.3	257	102.8	92	487.6	249	1245	217
4-core E flip	190	418	91	1319.5	272	2121.6	197	19.7	69	848.7	454	4449.2	168	1562.4	400	8960	465	3394.5	465	1720.5	186	74.4	197	1044.1	197	985	269

hertz	A	620	hertz	C	222
		334			505
		954.0			727.0
		/2			/2
		477.0			**363.5**
hertz	B	226	hertz	D	84
		443			432
		669.0			516.0
		/2			/2
		334.5			**258.0**
			hertz	E	43
					235
					523
					801.0
					/3
					400.5

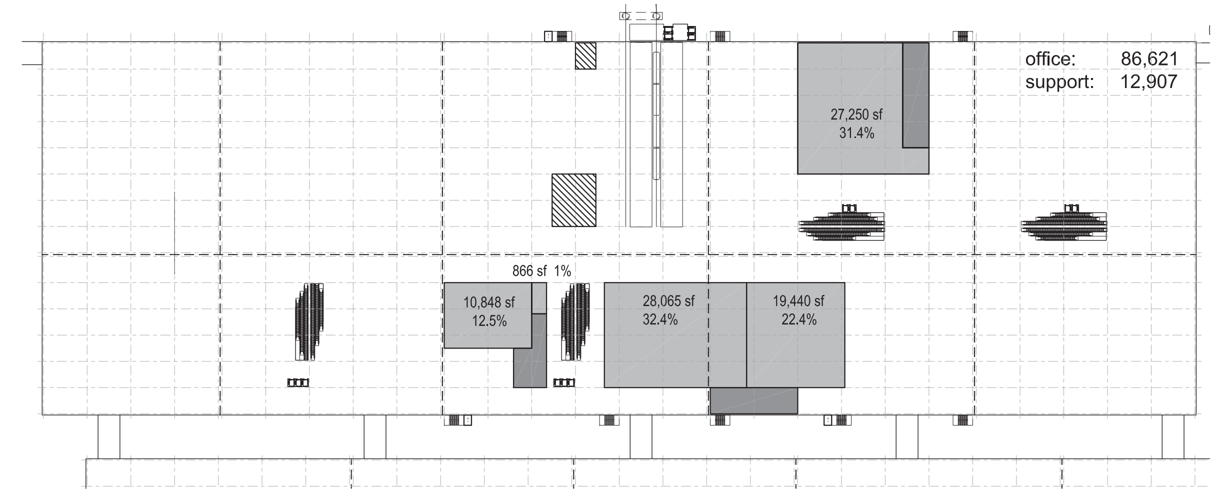
scheme totals	
A	519
B.1	473
B.2 flip	562
C flip	577
4-core A	543
4-core B	546
4-core C	557
4-core D flip	475
4-core E flip	524

- Walking distances tabulated with a spreadsheet that used Revenue and Transaction Share factor to weight measurements and understand average distances by CSB scheme.

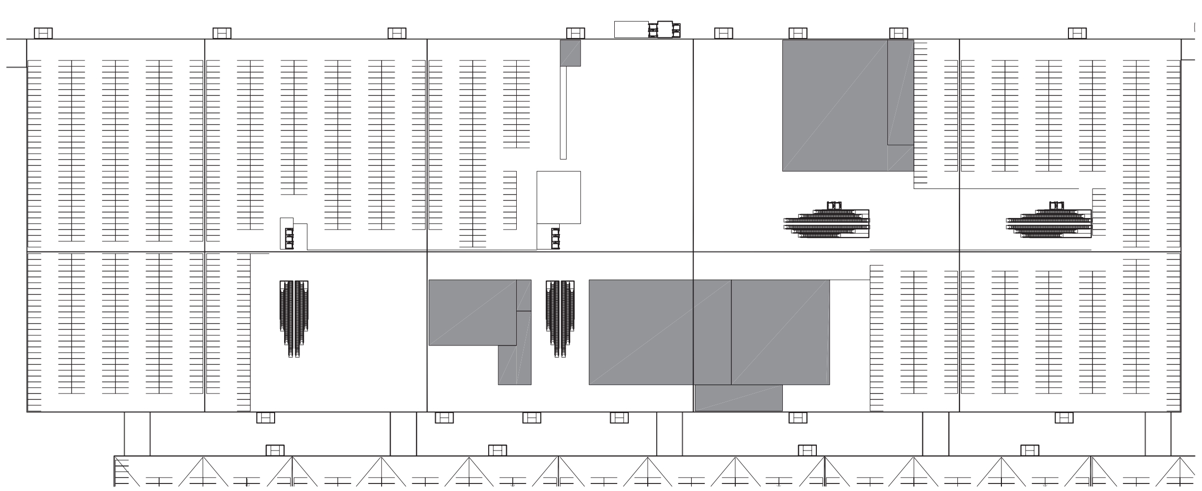
Schemes marked with "flip" switch the allocation based on moving the Main QTA to the ConRAC NE position.



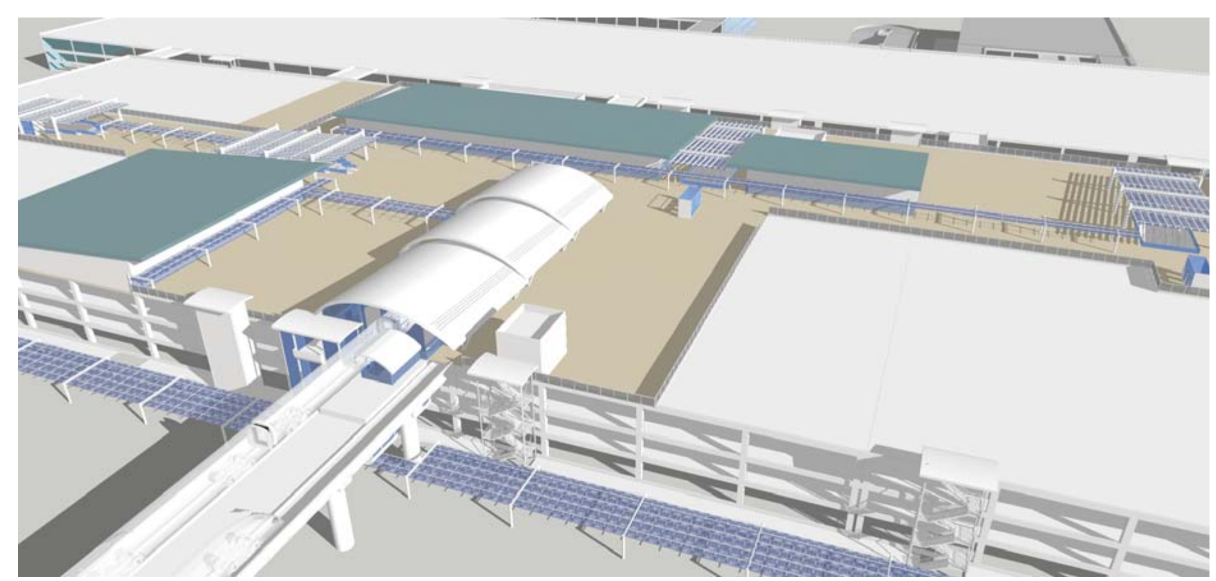
Concept sketch for CSB scheme



CAD plan for CSB scheme



Roof Level layout illustrating CSB, updated south cores, egress stairs, parking and screen walls



Massing model of CSB scheme looking east

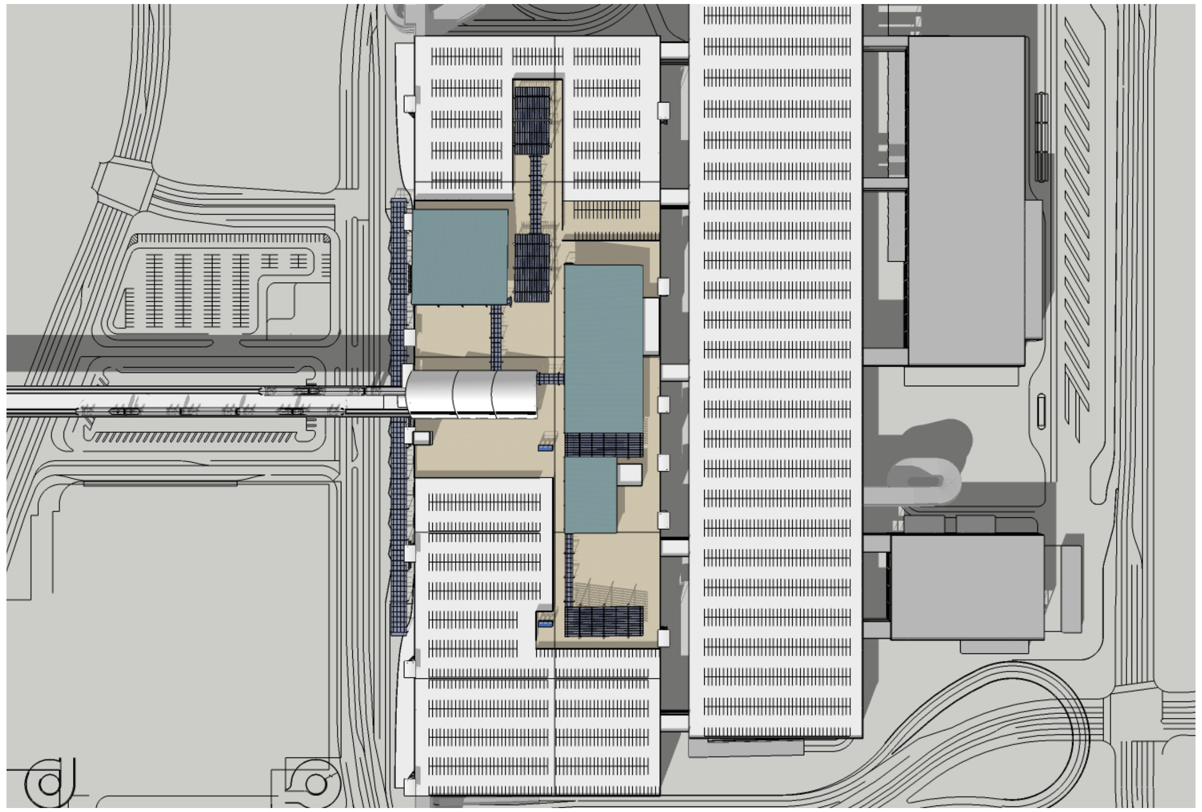
I. DESIGN SUMMARY:

The CSB layout is divided into three buildings with flexibility to expand independently of each other to accommodate brand families' future growth.

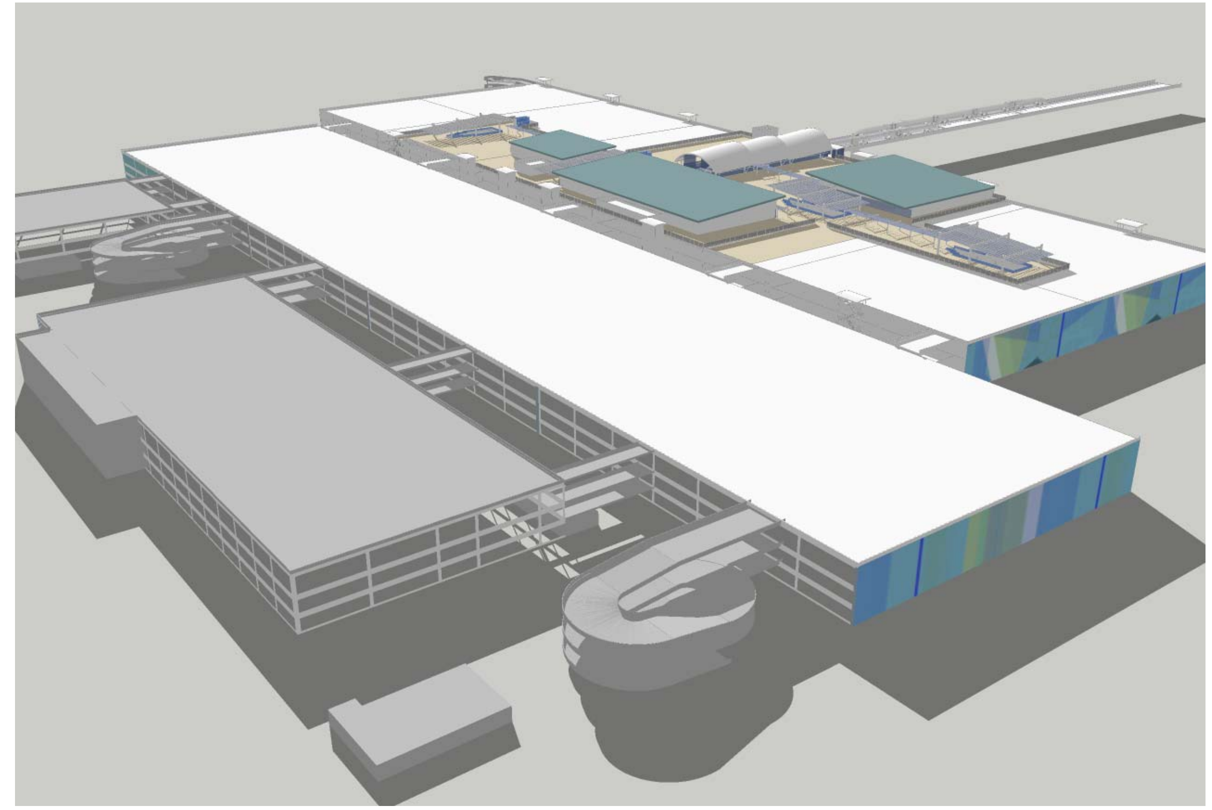
Four cores are strategically configured and located adjacent to CSB lobbies on level four and corresponding Ready/Return allocations on the RAC level. This arrangement allows customers to travel directly from the APM, to the lobbies, to the adjacent cores and directly to their rental cars, preventing backtracking.

The roof level provides parking for employees and customers with drop-off/ pick-up areas. Five bridges connect the CSB roof level to the Idle Storage Building.

On level one, the bus plaza is sheltered with a continuous canopy and seating is provided.

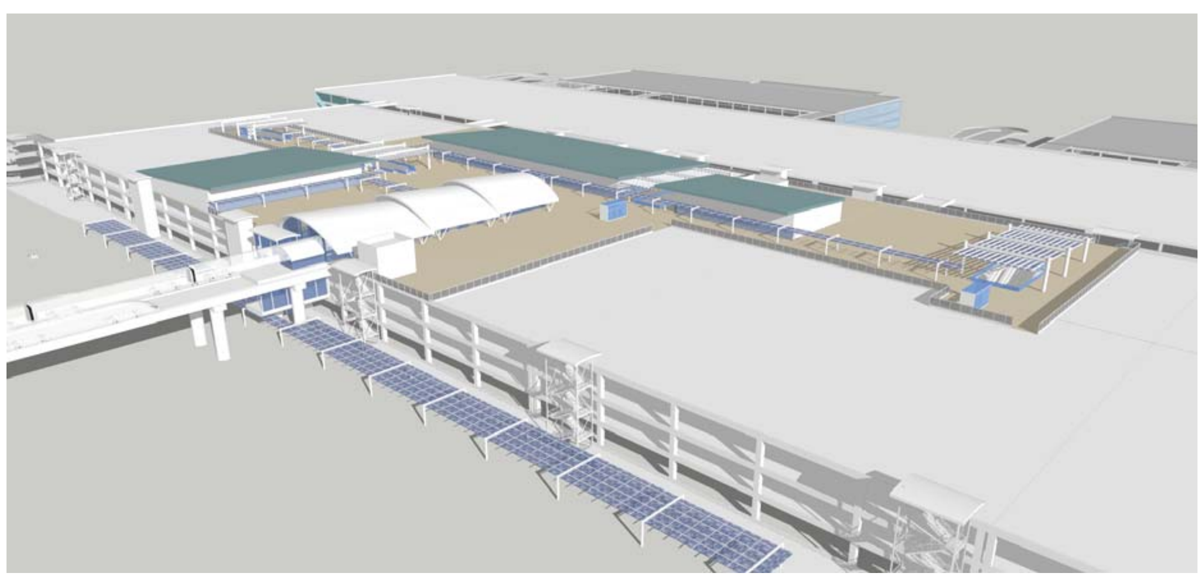


Overhead view of CSB, adjacent Idle Storage and QTAs

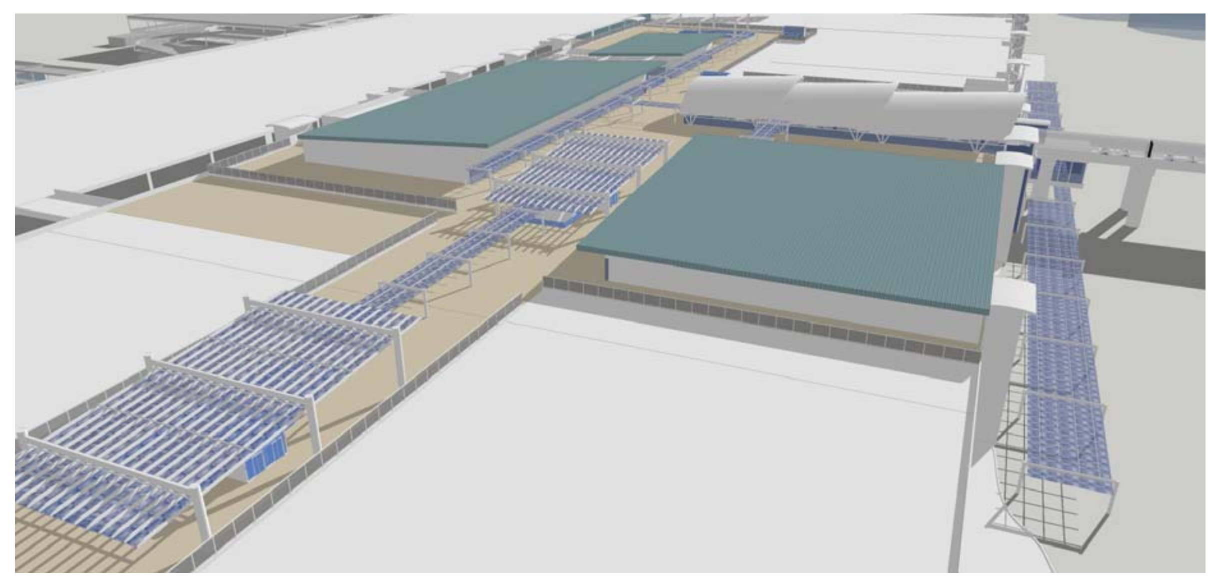


Massing model of CSB scheme looking southwest

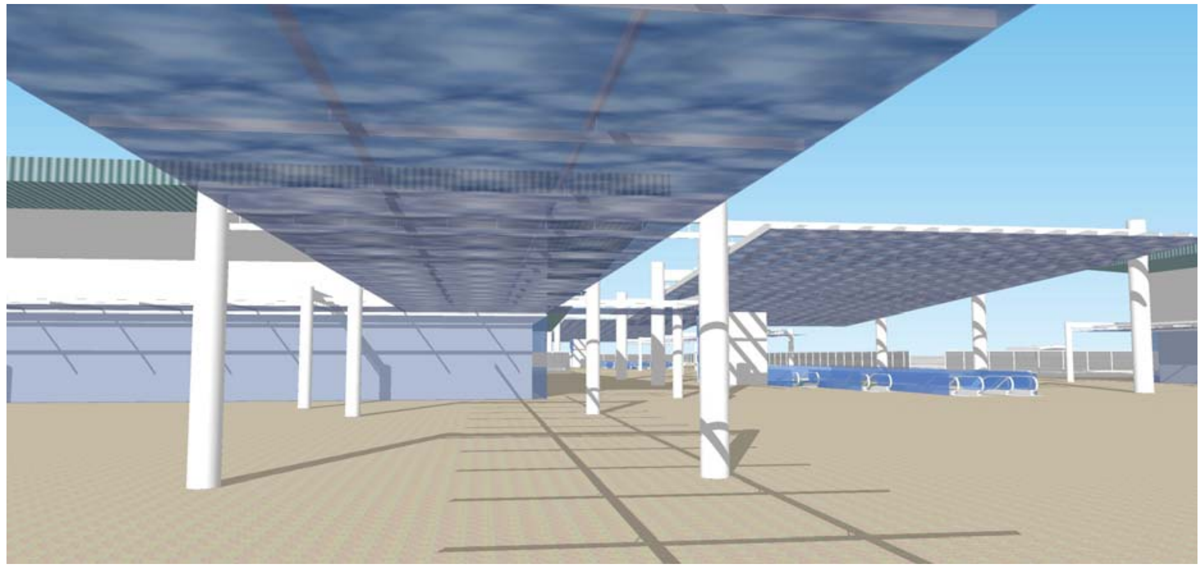
- Views of ConRAC and QTAs.



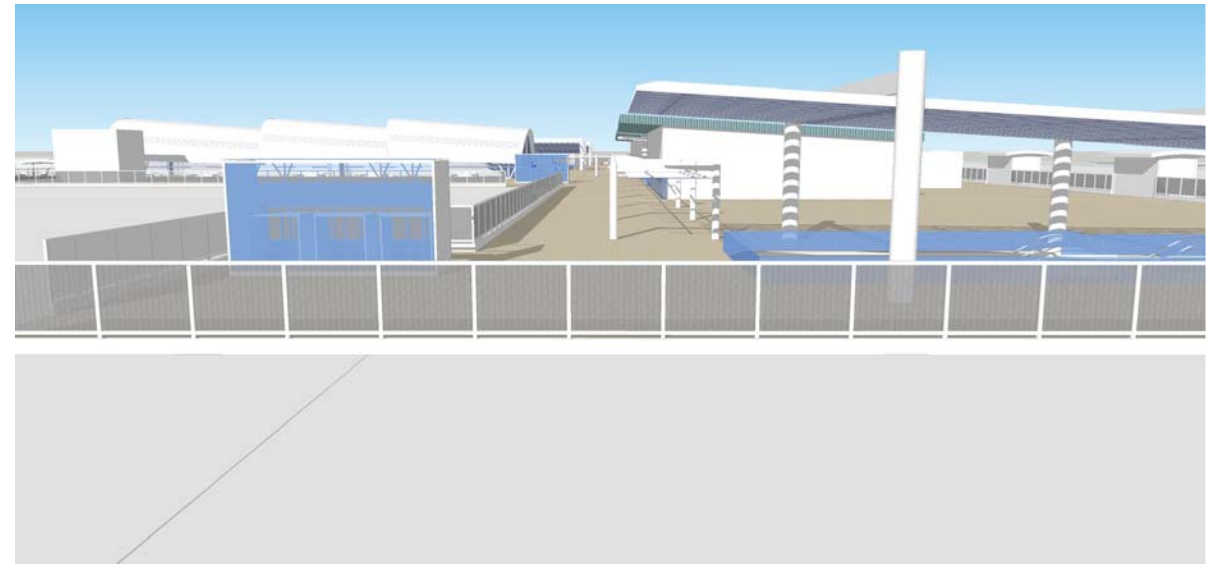
Massing model of CSB scheme looking northeast



Massing model of CSB scheme looking south

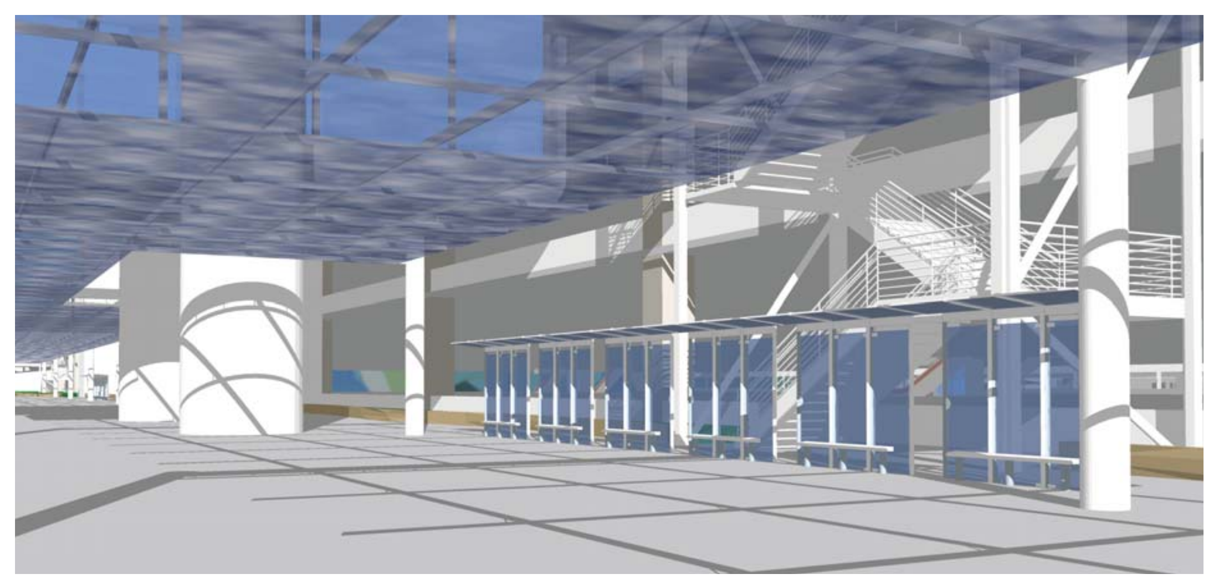


View looking north at CSB and north core from outside of APM enclosure



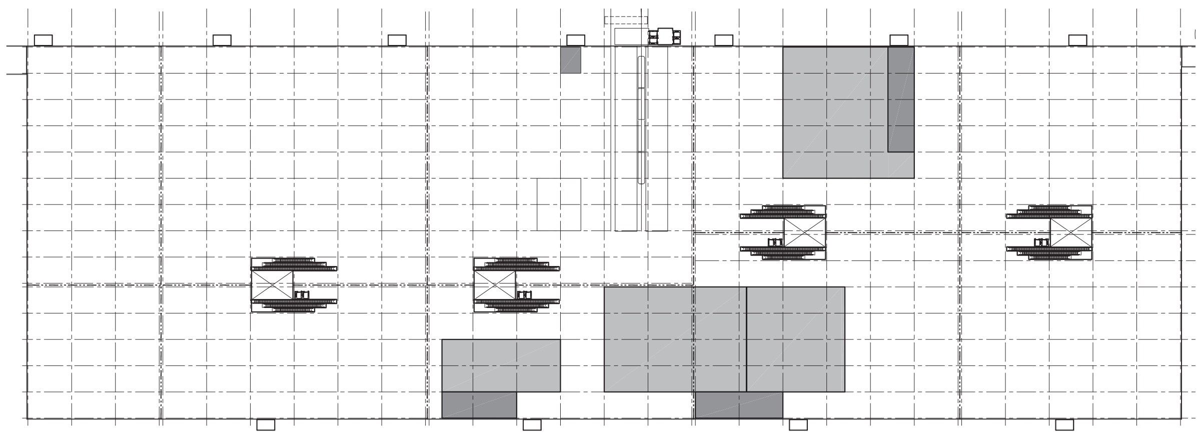
View looking north at CSB from Roof Level parking

View of west side of ConRAC at bus drop-off

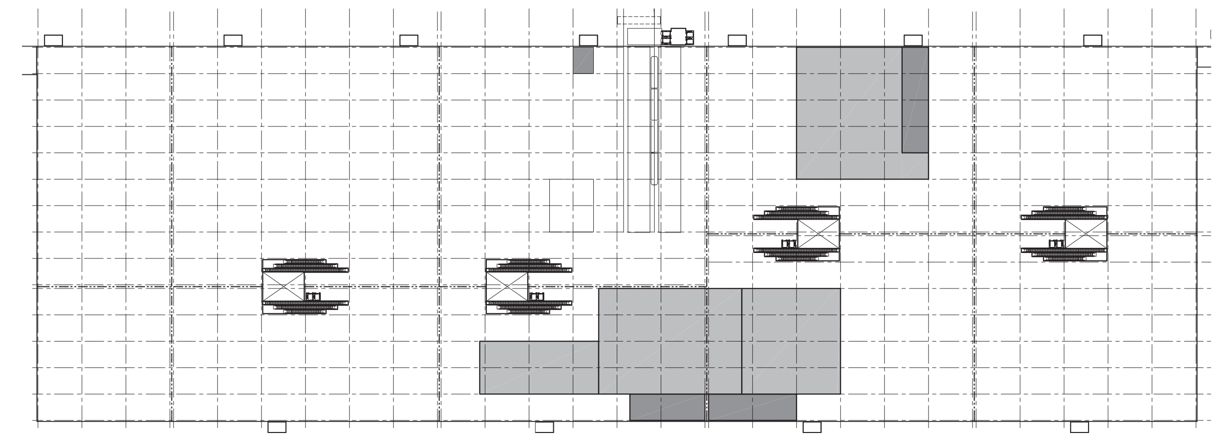


View of bus drop-off area under canopies

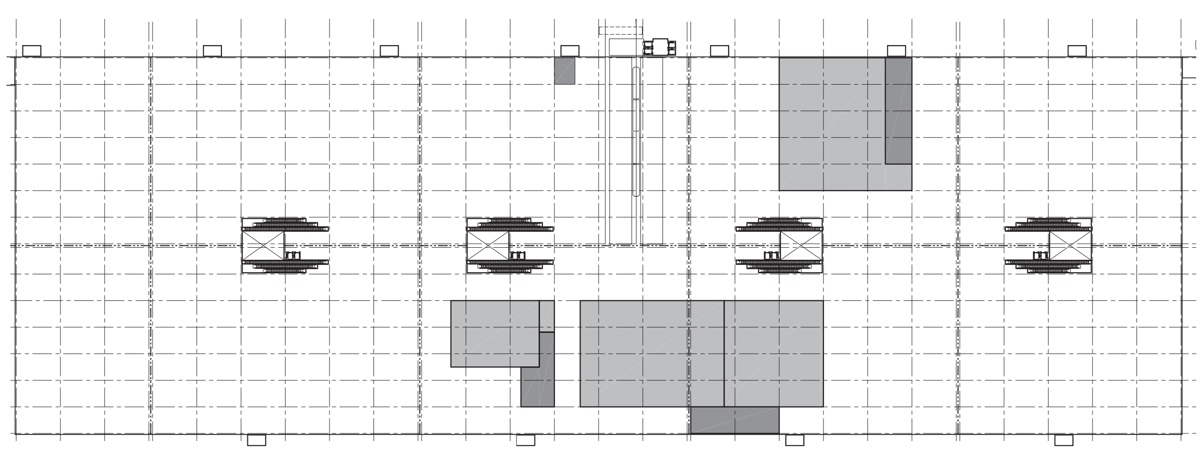
- Views of ConRAC and bus plaza.



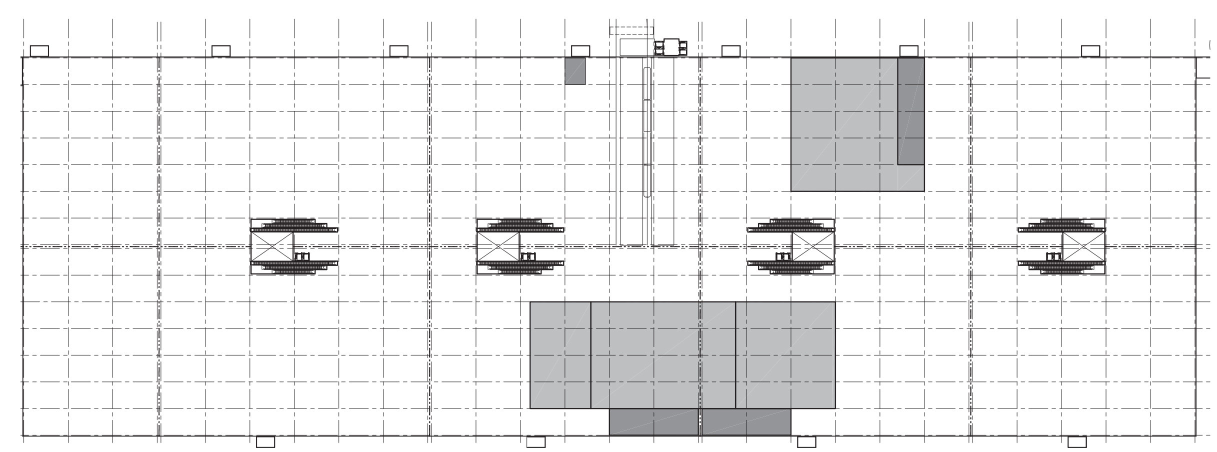
CAD plan of scheme with two south cores rotated 90 degrees



CAD plan of scheme with two south cores rotated 90 degrees and east CSB buildings combined



CAD plan for scheme with cores aligned



CAD plan for scheme with cores aligned and east CSB buildings combined

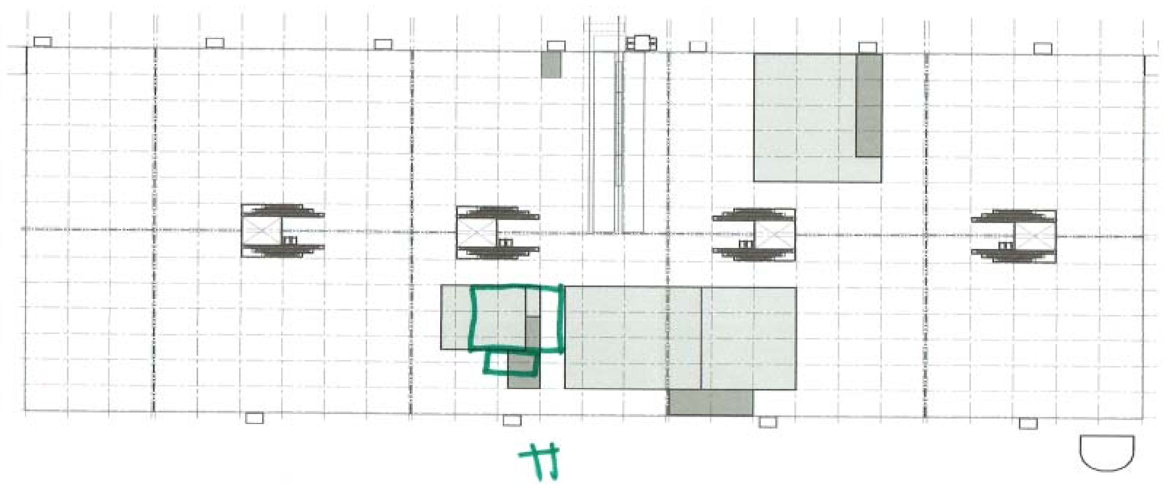
J. DESIGN SUMMARY:

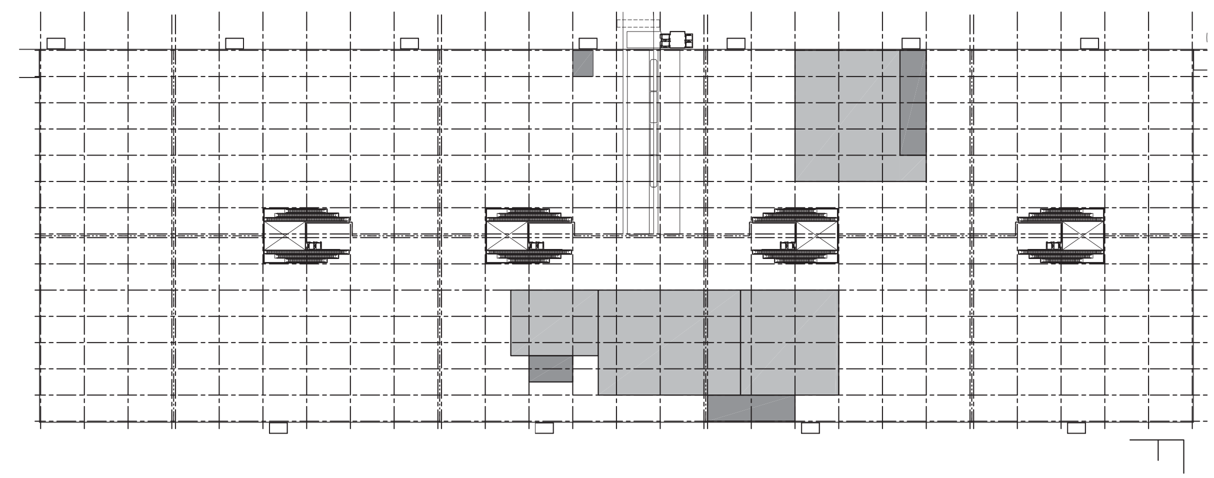
The preferred CSB layout is a group of two buildings. The east CSB buildings from the previous scheme were combined into one and shifted northward to be closer to the APM where patrons will be arriving. Each CSB building maintains the ability to expand.

The two southern cores are rotated and aligned with the north and central cores. This alignment creates a clear circulation spine.

Canopies with photovoltaic panels are integrated with the roof level parking.

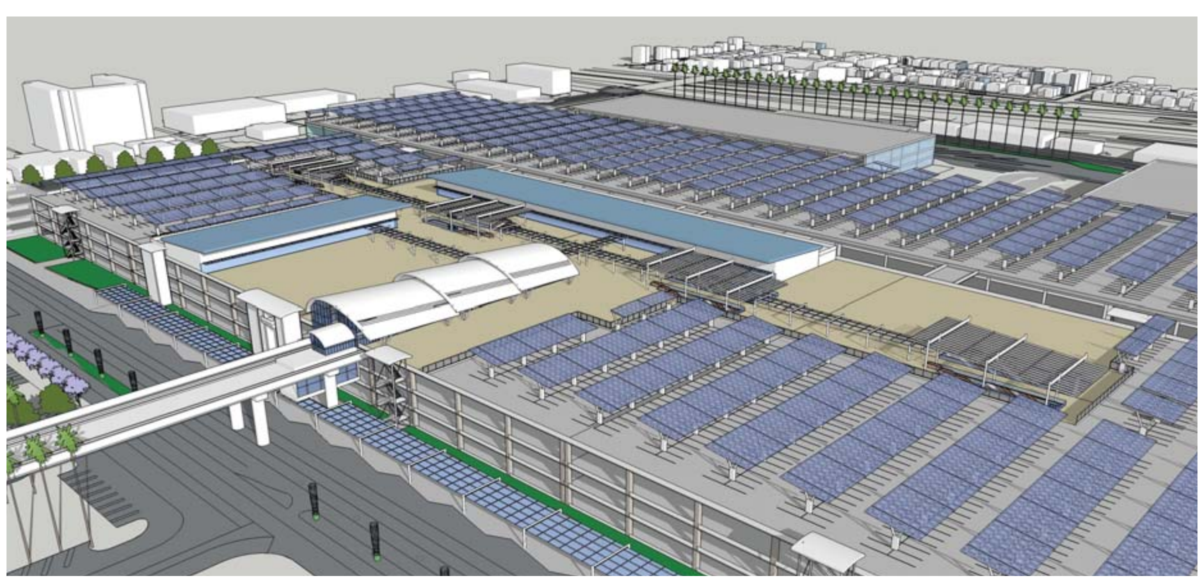
The preferred CSB layout is culmination of all of the information collected and studies produced to-date, feedback from industry groups, LAWA and the design team resulting in a concept focused on equal opportunity, operational efficiency, and optimal customer experience.





Concept sketch for the current preferred CSB scheme

CAD plan for the current preferred CSB scheme

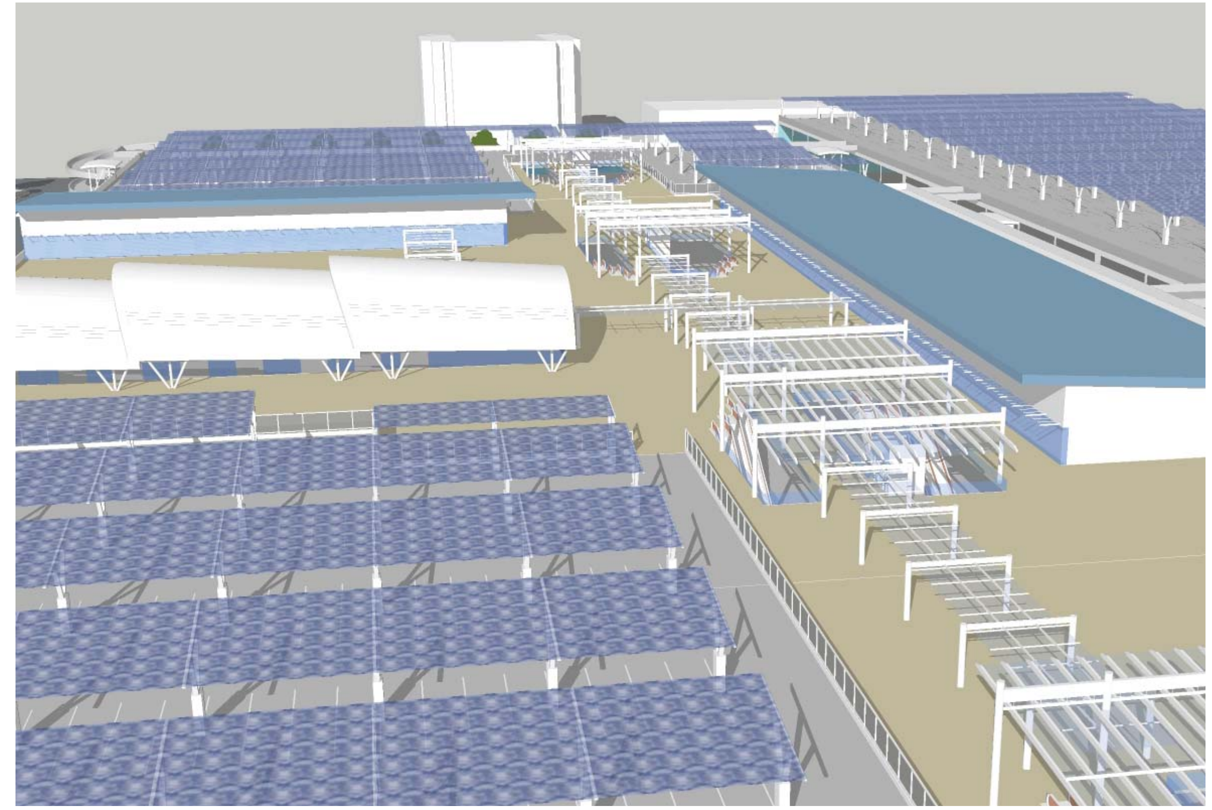


Massing model of preferred CSB scheme looking east

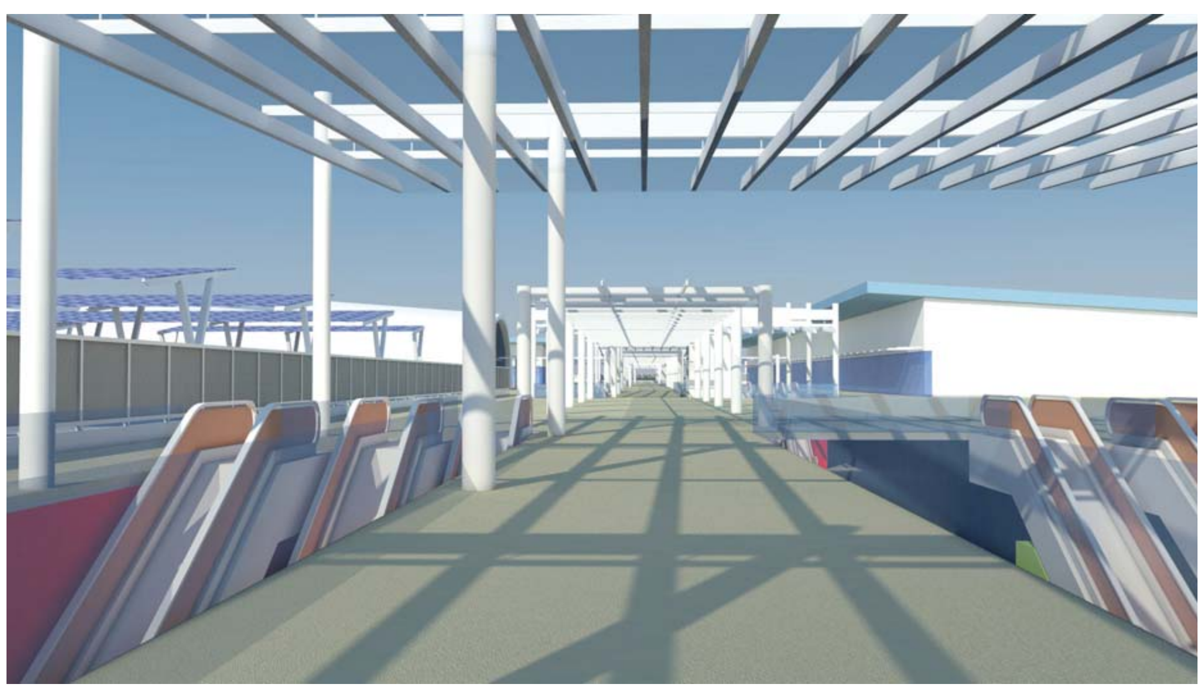
Massing model of preferred CSB scheme looking southwest

- Views of ConRAC and QTAs.

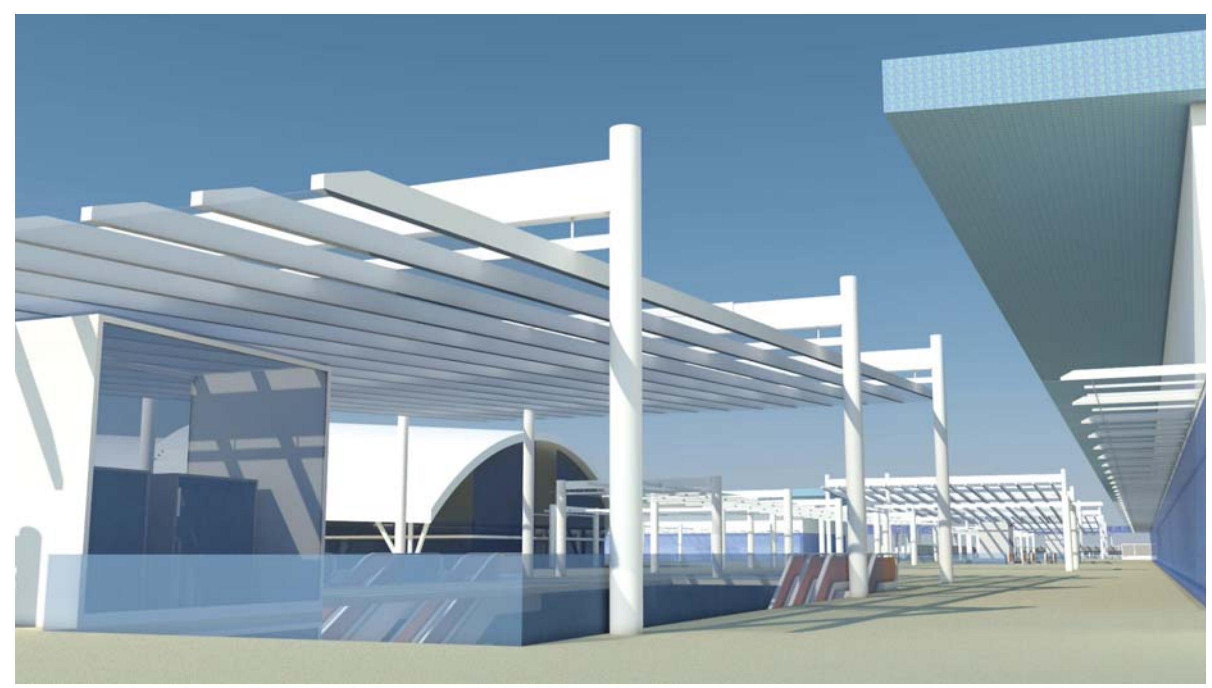
Overhead view of CSB, adjacent Idle Storage and QTAs



View of preferred CSB scheme looking north



View looking north through circulation spine



View looking north towards APM

- Views of ConRAC.

3. WALKING DISTANCE COMPARISON

A study was conducted to determine the overall walking distance required at LAX from the arrival point at the airport terminal (disembark airplane) to departure point at the airport ConRAC (access point to rental car). Averages were taken for the airport terminal structures nearest and farthest points as well as the nearest and farthest ready/ return stalls. This information was then compared to other airports.

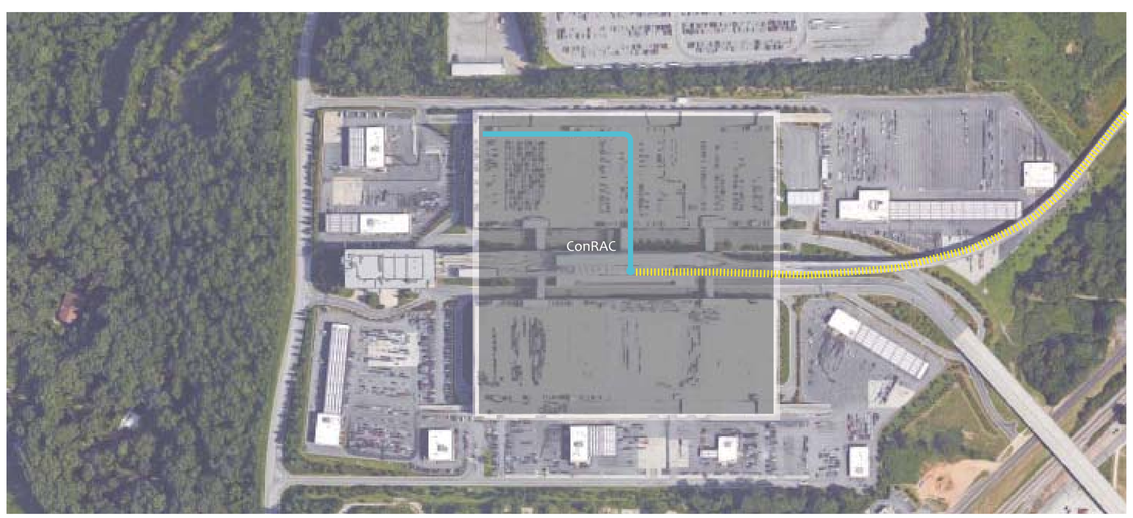
Moving sidewalks were not considered in this effort due to their operative unreliability and lack of redundancy. Vertical circulation was also not measured because it is relatively insignificant to the total distance.

The distances were compared at ConRAC facilities of the following airports:

-ATL Hartsfield Jackson Atlanta International Airport; Atlanta, Georgia
-ORD O'Hare International Airport; Chicago, Illinois
-MIA Miami International Airport; Miami, Florida
-FLL Fort Lauderdale-Hollywood International Airport; Broward County, Florida
-PDX Portland International Airport; Portland, Oregon
-BNA Nashville International Airport; Nashville, Tennessee
-AUS Austin-Bergstrom International Airport; Austin, Texas
-BUR Bob Hope Airport; Burbank, CA
-PVD T.F. Green Airport; Warwick, Rhode Island
-LAX Los Angeles International Airport; Los Angeles, CA

Our conclusion was that the walking distances from LAX International Terminal to the nearest Ready/Return stall was reduced by use of the APM. With the aim to minimize walking distances, the CSB was positioned to be close to the APM with cores within brand family access and the RAC levels distributed to corresponding cores. The aim was to keep the customer travelling in the same direction to the CSB lobby, core and rental stall.

Facility	2014 FAA Enplanements	Terminal/Transit Node Farthest to RAC Lobby (feet)	Terminal/Transit Node Nearest to RAC Lobby (feet)	RAC Lobby to Ready/Return Closest (feet)	RAC Lobby to Ready/Return Farthest feet)	Terminal/Transit Node Nearest to Ready/ Return Nearest (feet)	Terminal/Transit Node Farthest to Ready/ Return Farthest (feet)	Terminal/Transit Node Farthest to Ready/ Return Farthest (miles)
ATL	46,604,273	2,400	1,300	0	900	1,300	3,300	0.63
ORD	33,843,426	2,130	335	0	660	335	2,790	0.53
MIA	19,471,466	4,050	1,000	275	840	1,275	4,890	0.93
FLL	12,031,860	1,045	305	0	800	305	1,845	0.35
PDX	7,878,760	3,450	1,475	0	625	1,475	4,075	0.77
BNA	5,396,958	1,710	0	720	1,570	720	3,280	0.62
AUS	5,219,982	2,091	685	0	915	685	3,006	0.57
BUR	1,928,491	3,330	1,515	0	720	1,515	4,050	0.77
PVD	1,764,828	2,610	1,530	0	750	1,530	3,360	0.64

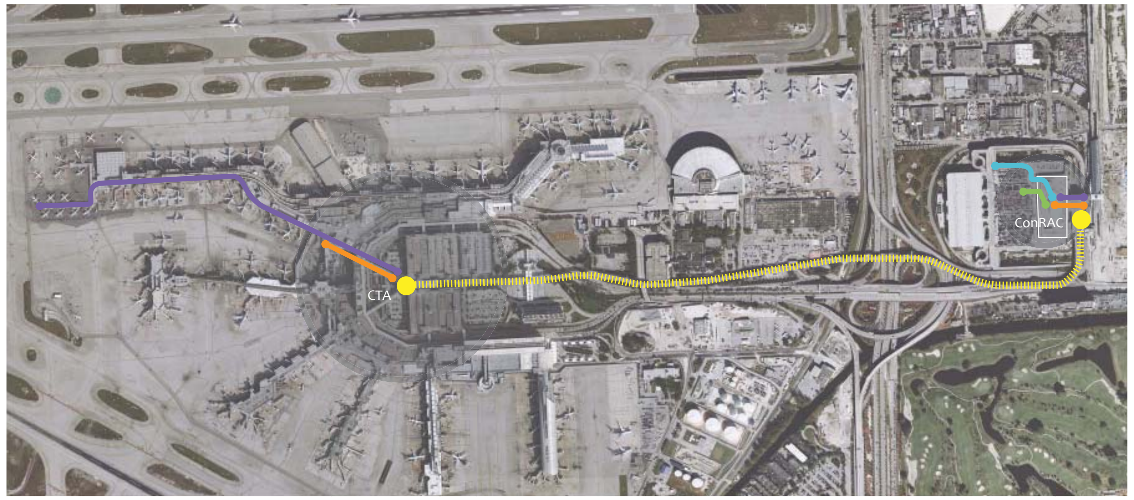


Terminal/Transit Node Farthest to RAC Lobby = 2,400 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,300 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 900 feet
APM Route

Walking distance comparison - ATL

Terminal/Transit Node Farthest to RAC Lobby = 2,400 feet
Terminal/Transit Node Nearest to RAC Lobby = 1,300 feet
RAC Lobby to Ready/Return Closest = 0 feet
RAC Lobby to Ready/Return Farthest = 900 feet
APM Route

Walking distance comparison - ATL



Terminal/Transit Node Farthest to RAC Lobby	=	4,050 feet
Terminal/Transit Node Nearest to RAC Lobby	=	1,000 feet
RAC Lobby to Ready/Return Closest	=	275 feet
RAC Lobby to Ready/Return Farthest	=	840 feet
APM Route		

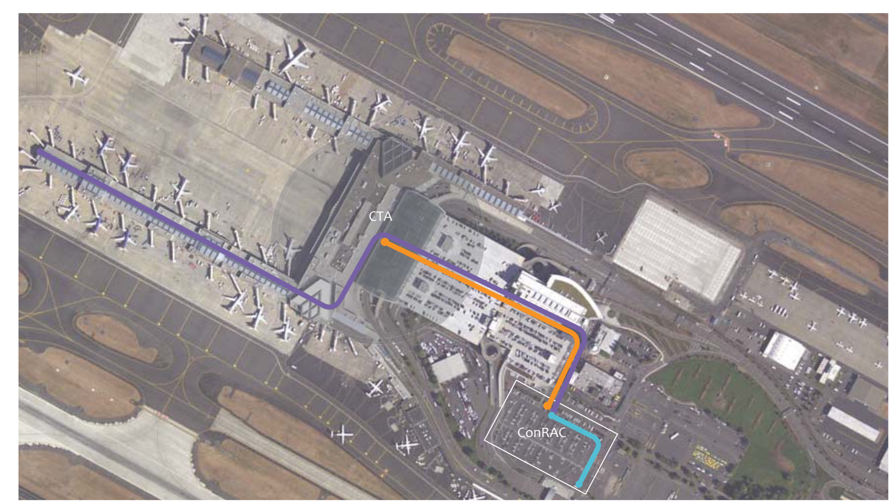
Walking distance comparison - MIA

Terminal/Transit Node Farthest to RAC Lobby	=	2,130 feet
Terminal/Transit Node Nearest to RAC Lobby	=	355 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	660 feet
APM Route		

Walking distance comparison - ORD

Terminal/Transit Node Farthest to RAC Lobby	=	1,045 feet
Terminal/Transit Node Nearest to RAC Lobby	=	305 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
Bus Route		

Walking distance comparison - FLL



Terminal/Transit Node Farthest to RAC Lobby	=	3,450 feet
Terminal/Transit Node Nearest to RAC Lobby	=	1,475 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	625 feet

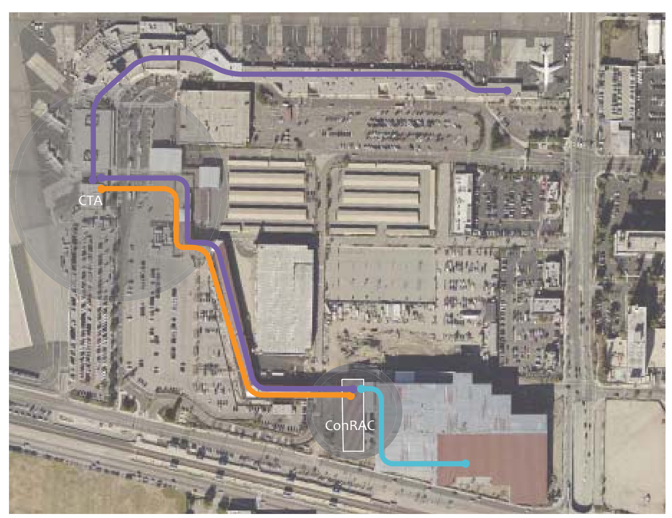
Walking distance comparison - PDX

Terminal/Transit Node Farthest to RAC Lobby	=	1,710 feet
Terminal/Transit Node Nearest to RAC Lobby	=	0 feet
RAC Lobby to Ready/Return Closest	=	720 feet
RAC Lobby to Ready/Return Farthest	=	1,570 feet

Walking distance comparison - BNA

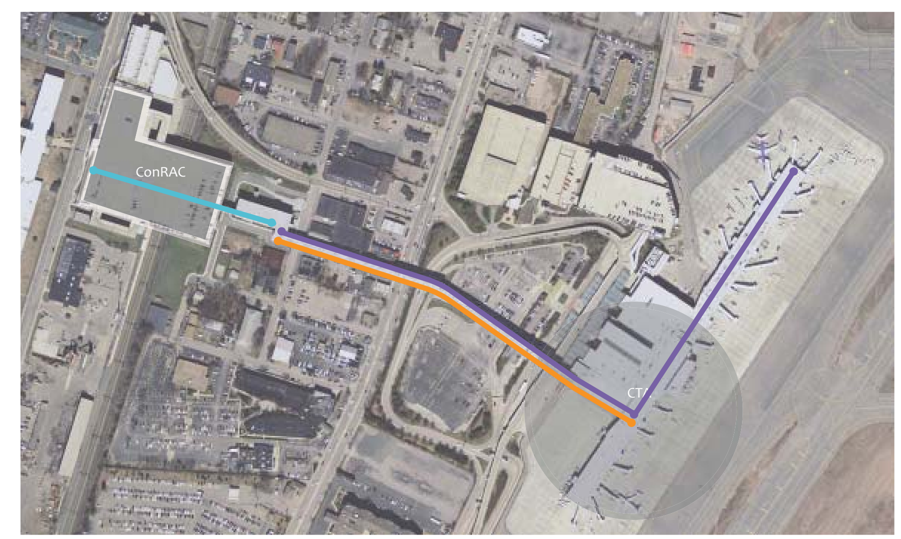
Terminal/Transit Node Farthest to RAC Lobby	=	2,090 feet
Terminal/Transit Node Nearest to RAC Lobby	=	685 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	915 feet

Walking distance comparison - AUS



Terminal/Transit Node Farthest to RAC Lobby	=	3,330 feet
Terminal/Transit Node Nearest to RAC Lobby	=	1,515 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	720 feet

Walking distance comparison - BUR



Terminal/Transit Node Farthest to RAC Lobby	=	2,610 feet
Terminal/Transit Node Nearest to RAC Lobby	=	1,530 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	750 feet

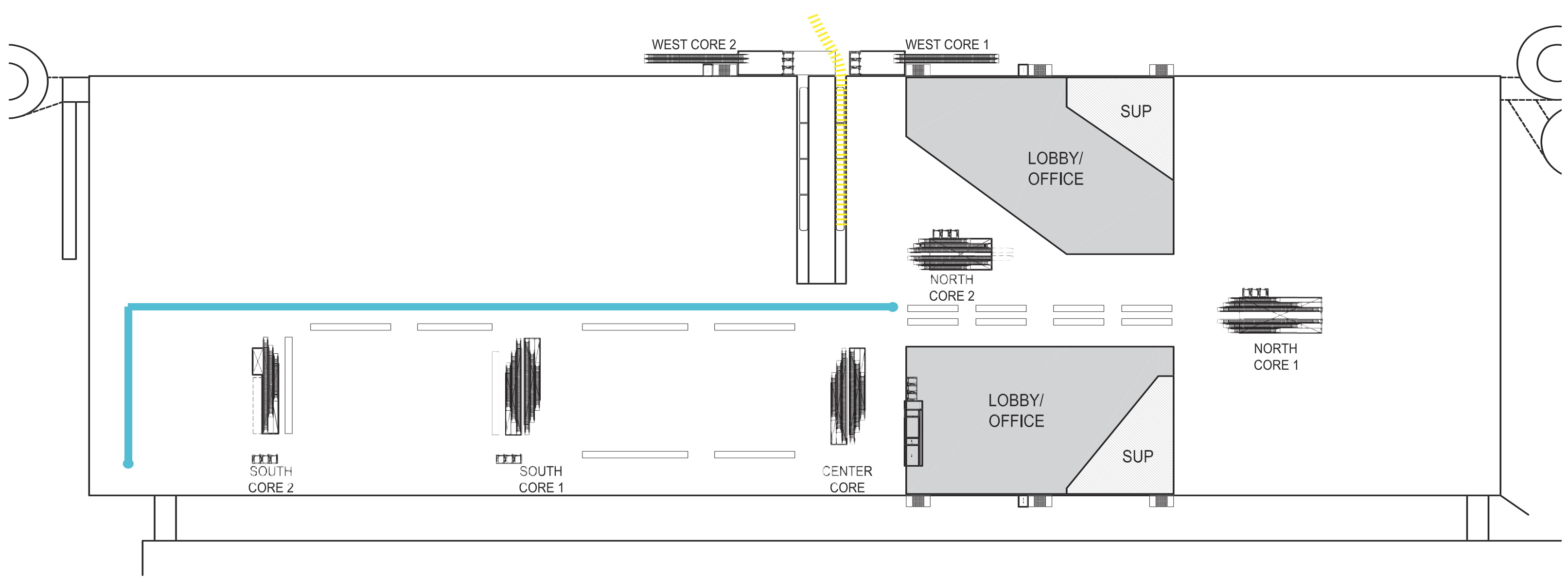
Walking distance comparison - PVD

Terminal/Transit Node Farthest to RAC Lobby	=	2,550 feet
Terminal/Transit Node Nearest to RAC Lobby	=	650 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
APM Route		

Walking distance comparison - LAX

Terminal/Transit Node Farthest to RAC Lobby	=	2,550 feet
Terminal/Transit Node Nearest to RAC Lobby	=	650 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
APM Route		

Walking distance comparison - LAX



Terminal/Transit Node Farthest to RAC Lobby	=	2,550 feet
Terminal/Transit Node Nearest to RAC Lobby	=	650 feet
RAC Lobby to Ready/Return Closest	=	0 feet
RAC Lobby to Ready/Return Farthest	=	800 feet
APM Route		

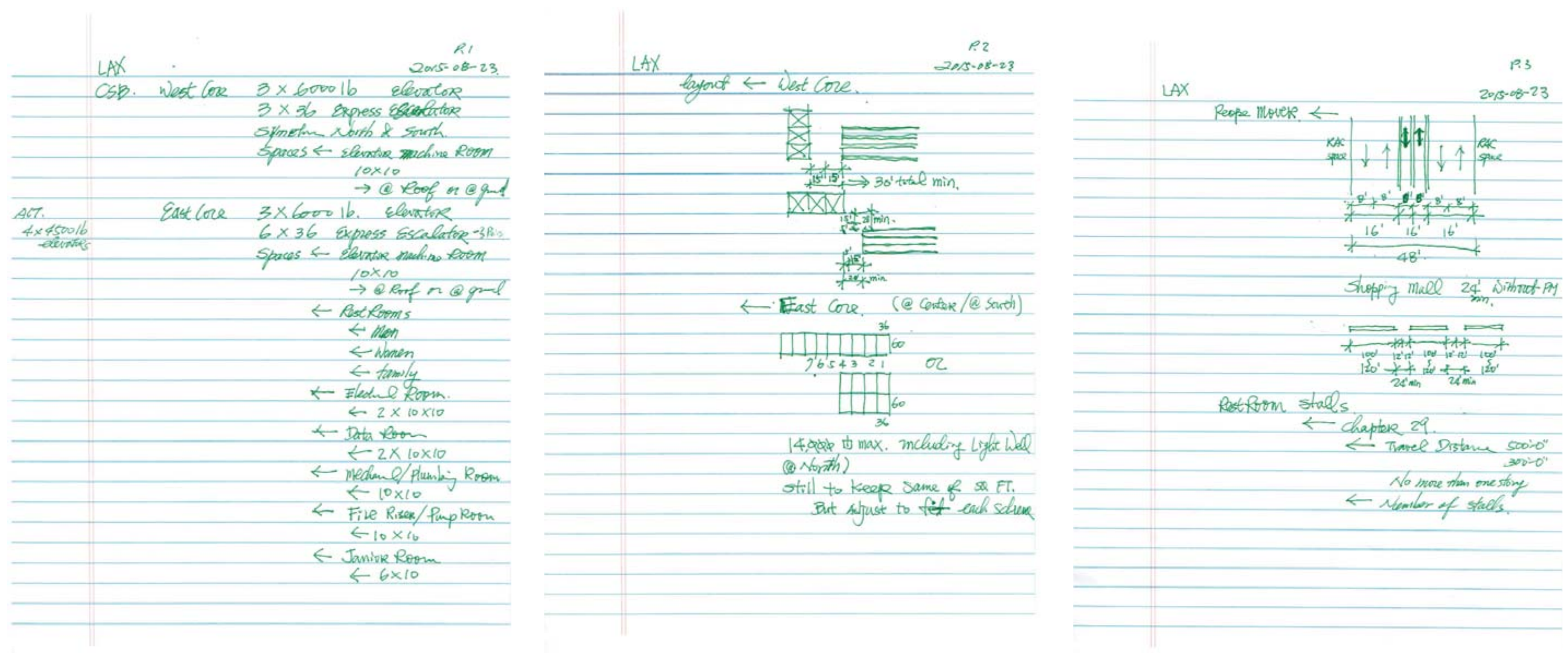
Walking distance comparison - LAX

4. CORE & ALLOCATION STUDY

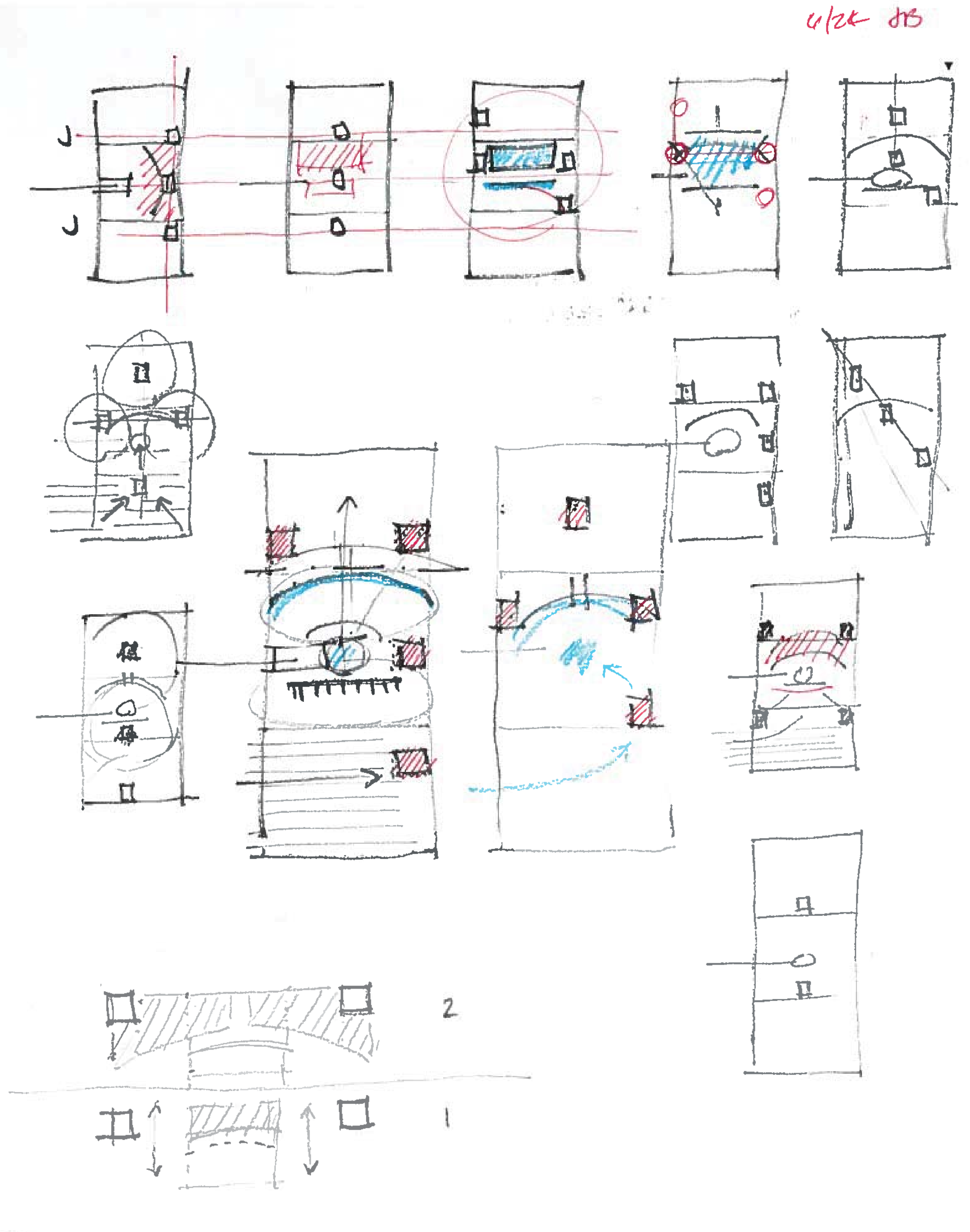
Core design is one of the more complex design challenges in marrying the CSB to the RAC garage. The following are key design factors and elements to include in designing and positioning the Cores:

- The Cores are CSB and RAC level destination points and need to be highly visible
- Cores are the vertical transition points for the traveling public, but also become a location with opportunities for bringing natural daylight through to the garage lower levels, and also critical utilities for the operation of the RAC garage
- The design and location have to be such that the pedestrian and vehicular traffic can flow as smoothly and directly as possible
- The core locations at the garage levels would include access to utilities such as Data, Electrical, Mechanical and Plumbing, Storage, Restrooms, and RAC level offices
- The type, size, quantity, and configuration of the elevators and escalators have to be reviewed with vertical transportation specialists to provide equipment that will easily meet the circulation needs both currently and based on future projections
- The equipment location becomes extremely complex in coordinating with the RAC structure that has to take into account building expansion joints, seismic, column and beam size locations, and moment frames and sheer walls

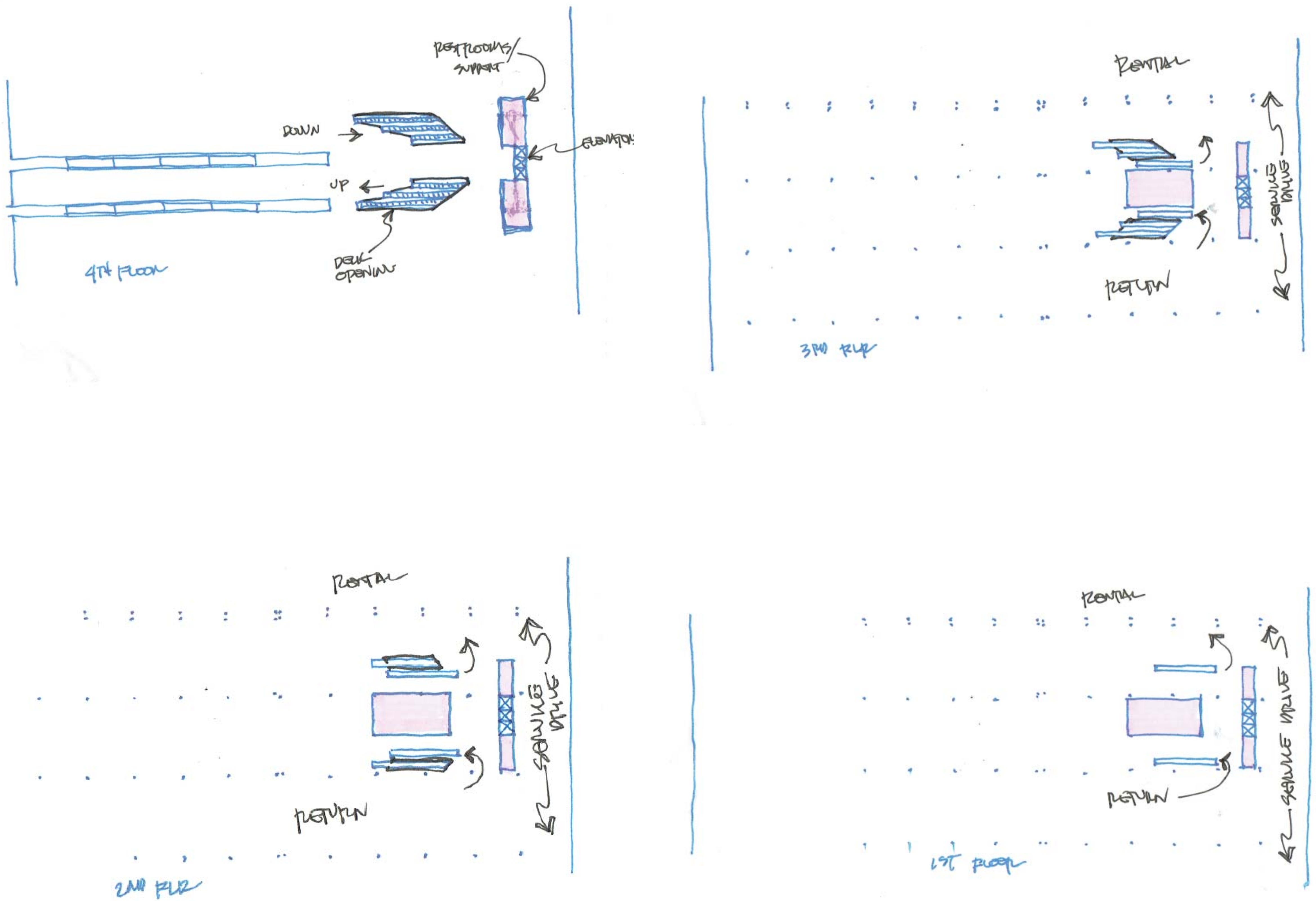
Design considerations also included enclosed versus open-air cores, core quantity, location, and direction, express one-way ready cores and one-way return cores, and elevator only options. Throughout the CSB design an ongoing dialogue coordinating the CSB design, operation, and allocation along with the RAC garage's allocation and relationship with the QTA and Idle Storage so that the cores settle into a form and position for optimal efficiency



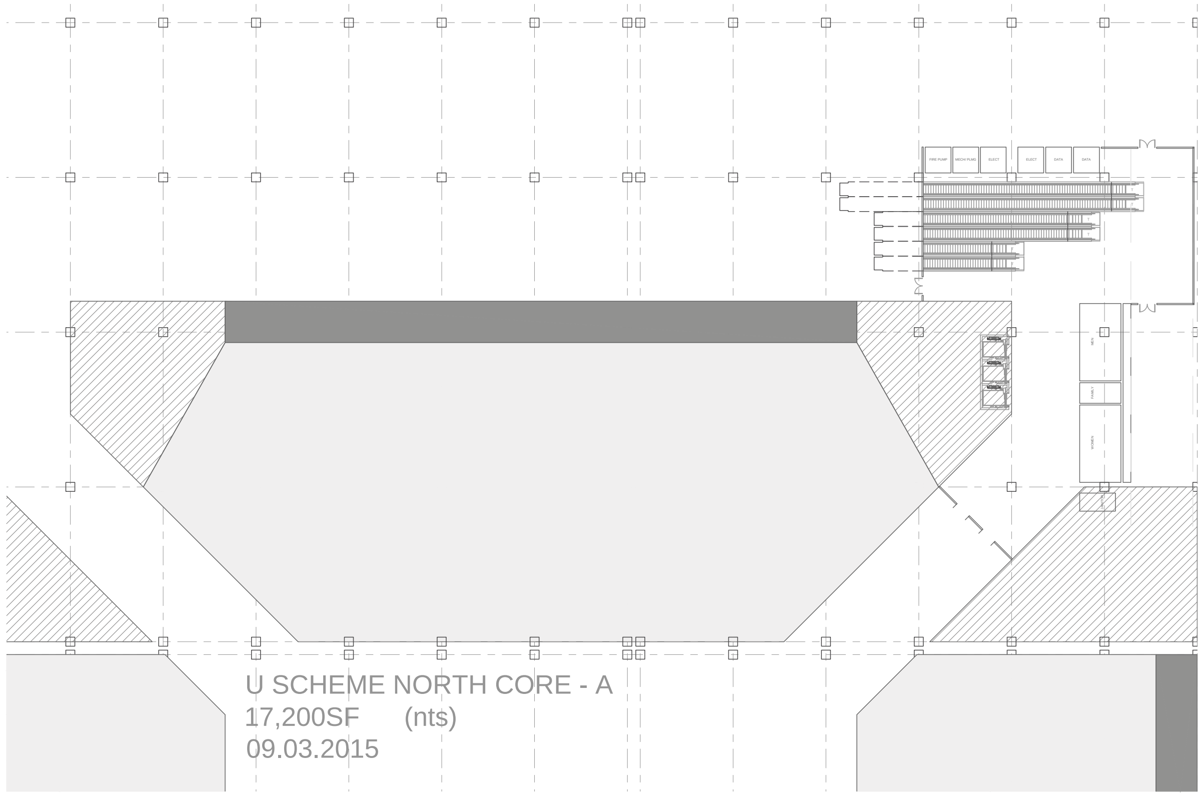
■ Initial guidelines for operational clearances, equipment and fixtures.



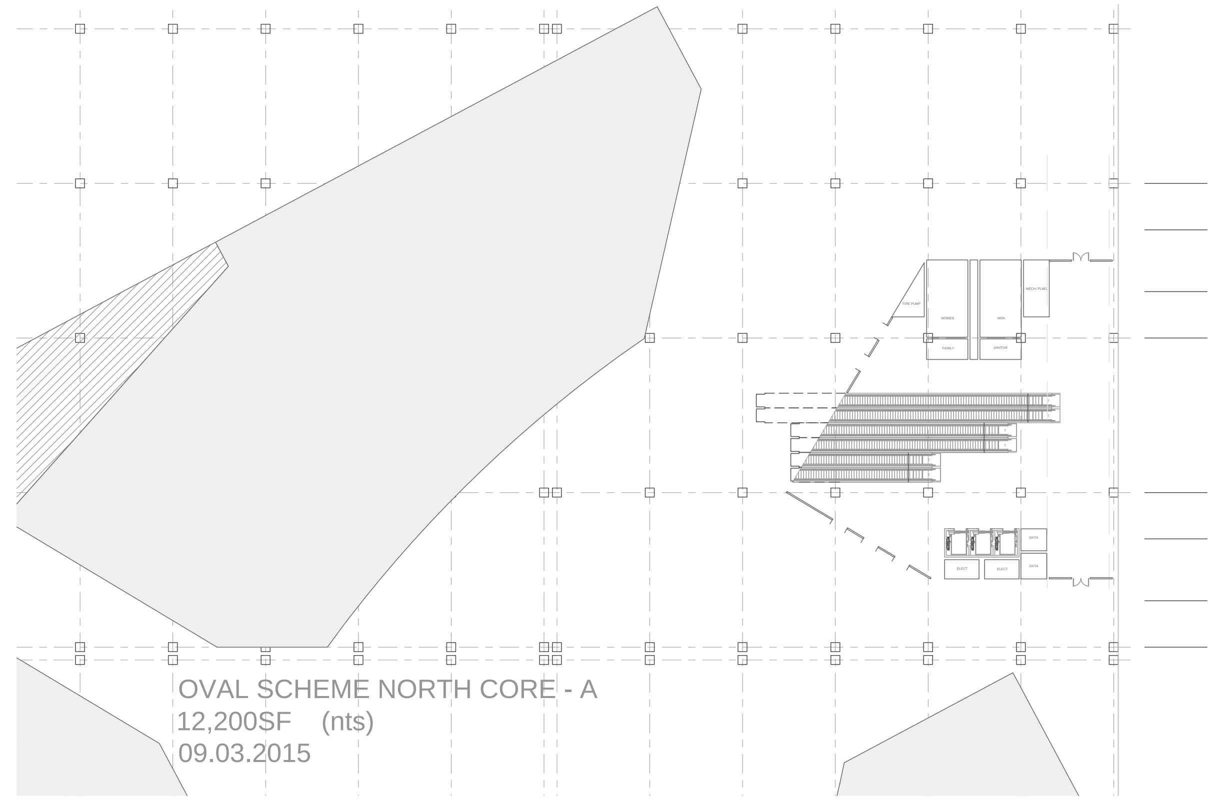
- Initial design studies were based on a 3 core design with all cores being located along east side of the RAC Garage. As design developed, core locations were added and adjusted to provide more direct access, shorter walking distances, and coordinate with CSB and APM structures and RAC garage allocations.



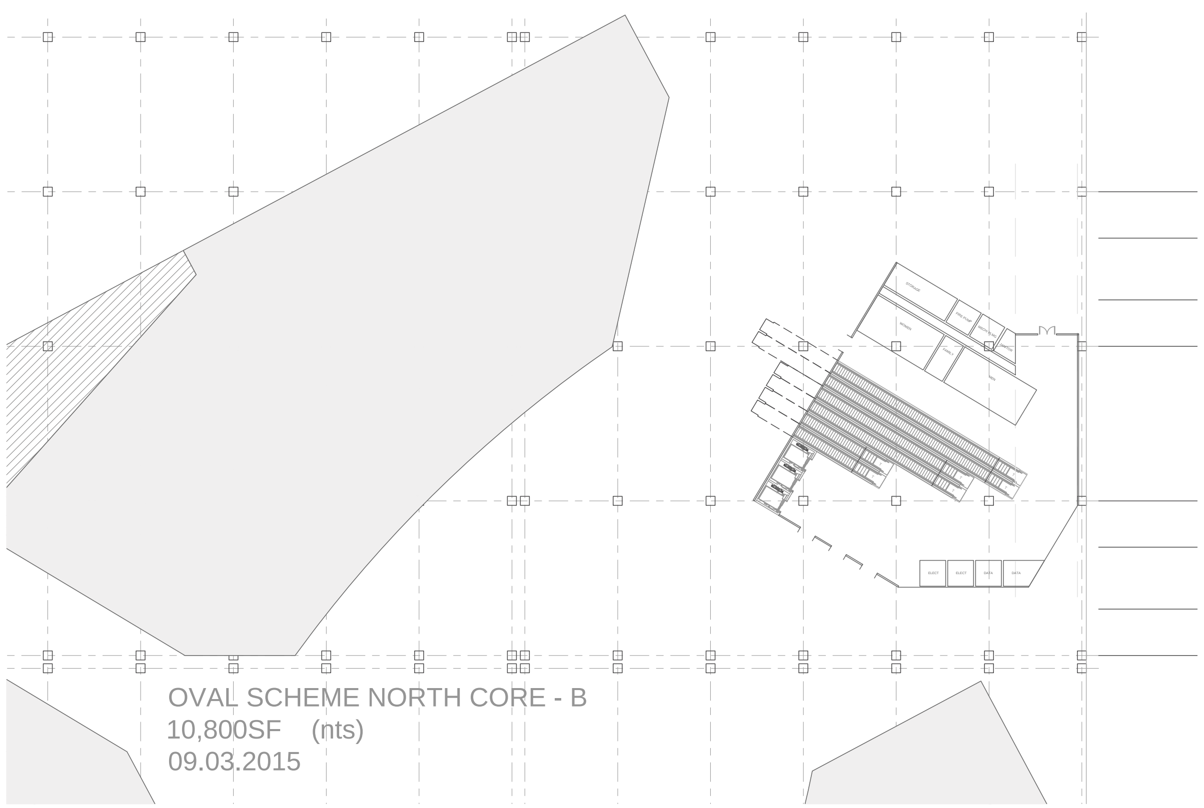
- Sketches for a 'Center Core' - this study indicates Ready customers going to the RAC Garage North, and Return Customers arriving from the South.



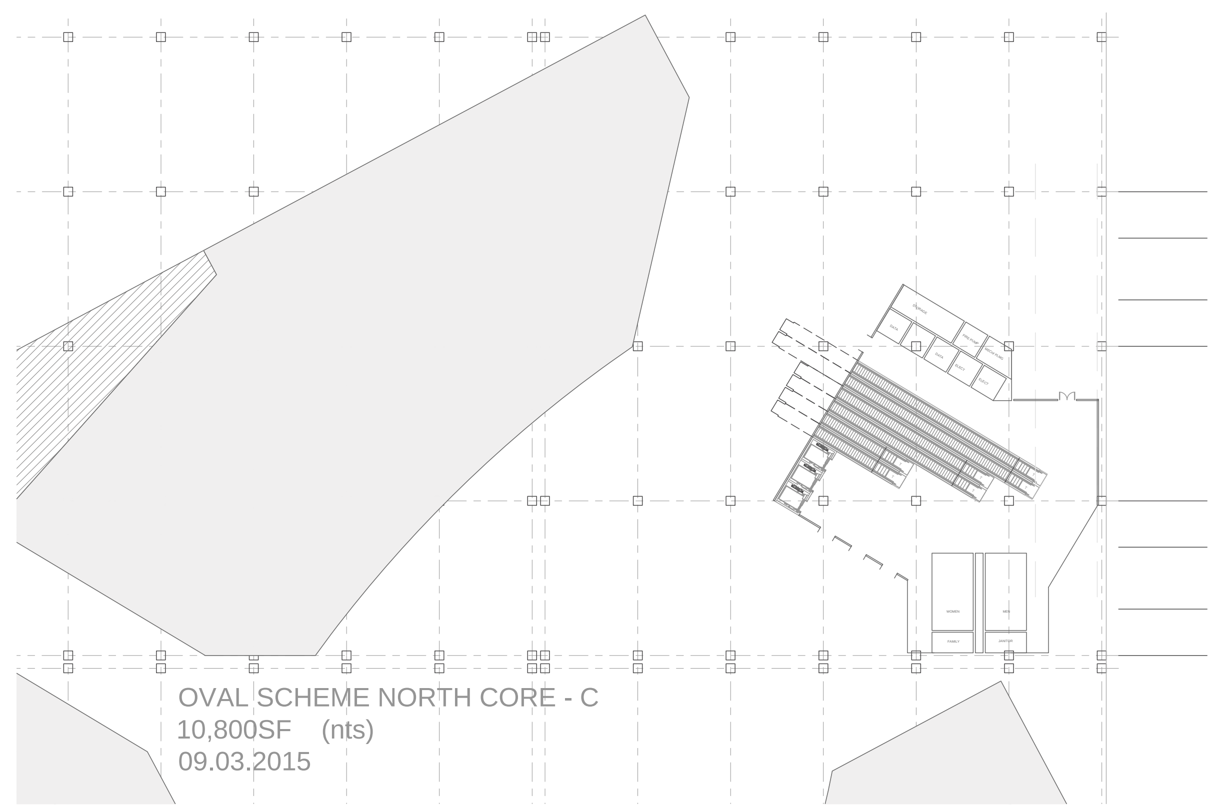
U SCHEME NORTH CORE - A
17,200SF (nts)
09.03.2015



OVAL SCHEME NORTH CORE - A
12,200SF (nts)
09.03.2015

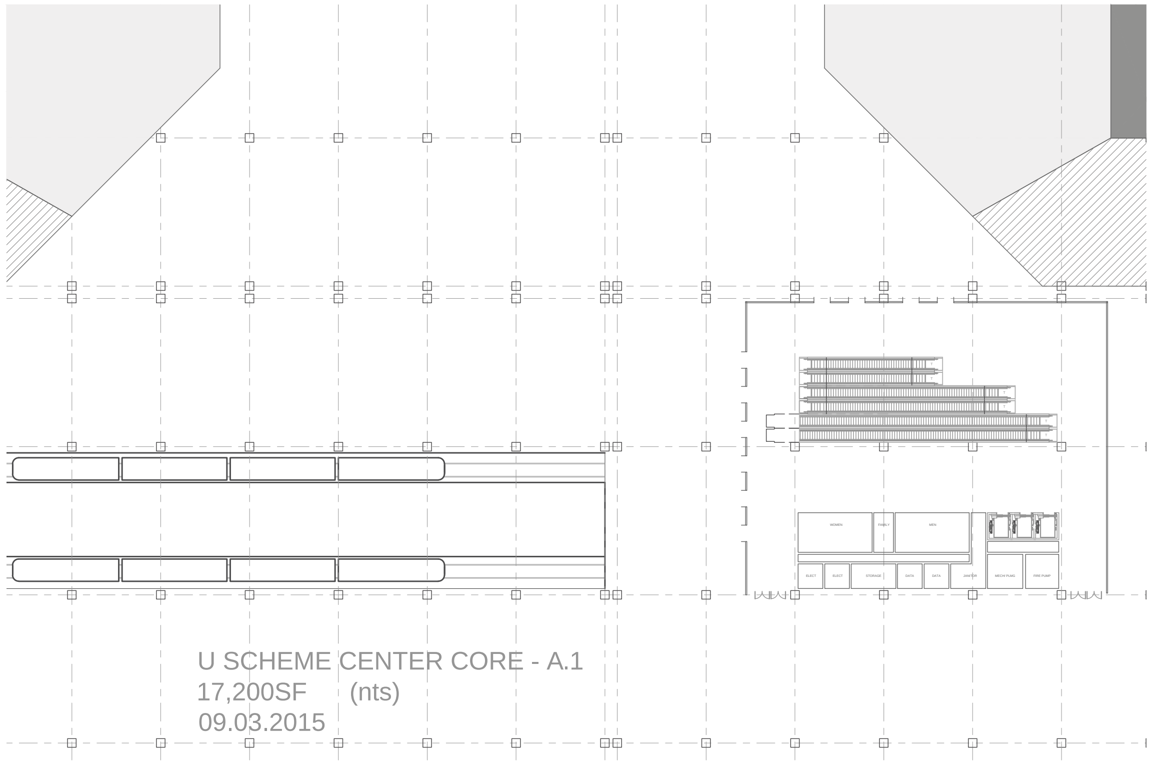


OVAL SCHEME NORTH CORE - B
10,800SF (nts)
09.03.2015

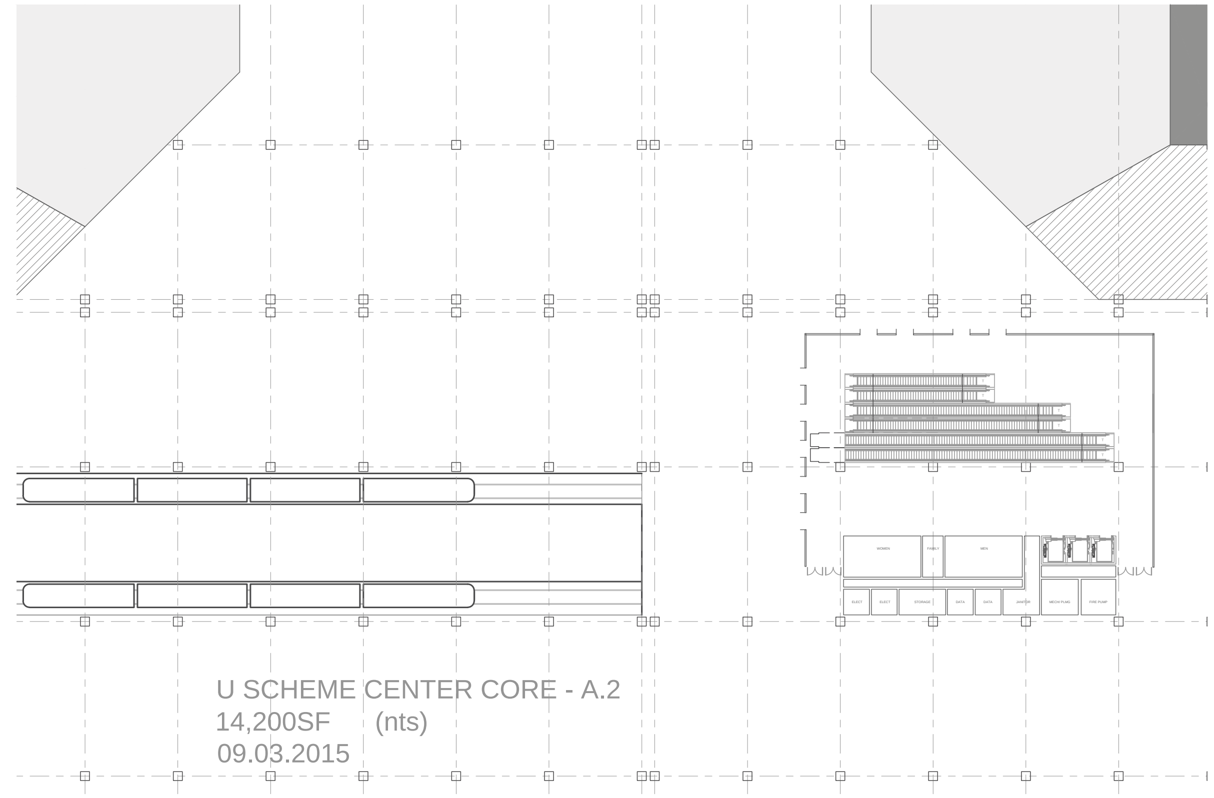


OVAL SCHEME NORTH CORE - C
10,800SF (nts)
09.03.2015

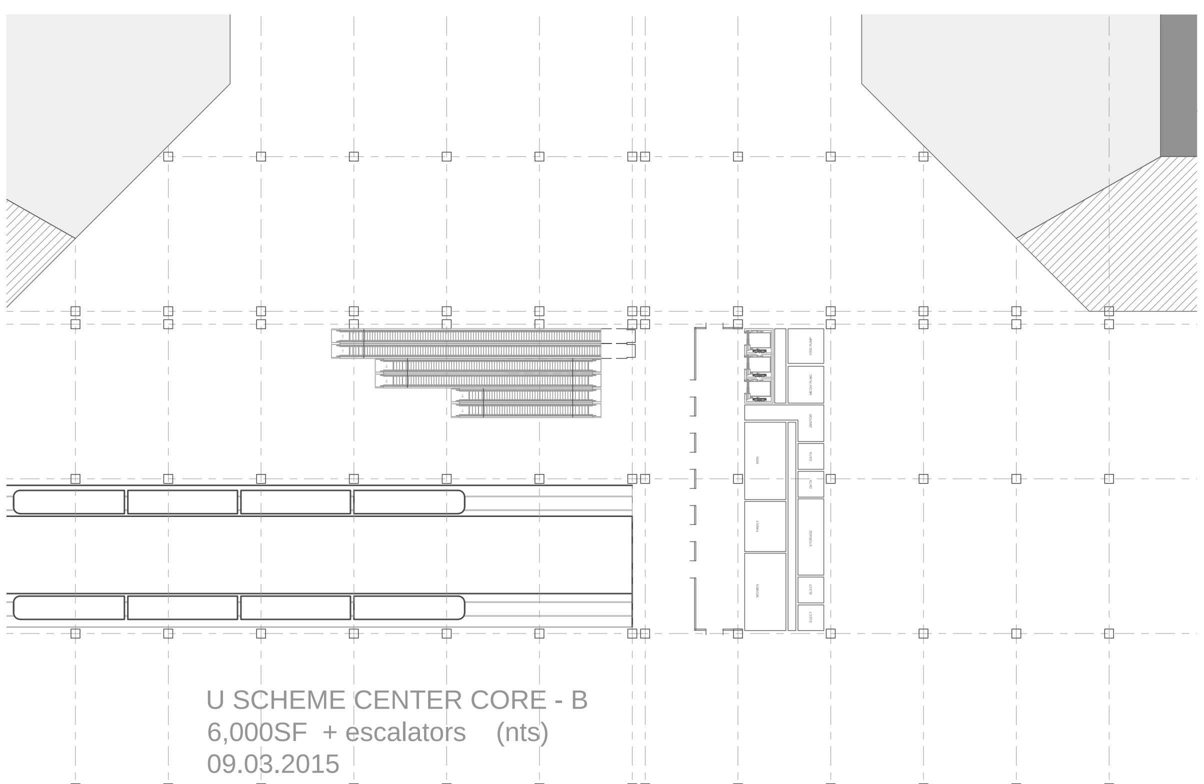
- Multiple options for a 'North Core' design that provided an enclosed and conditioned space with roof-level restrooms.



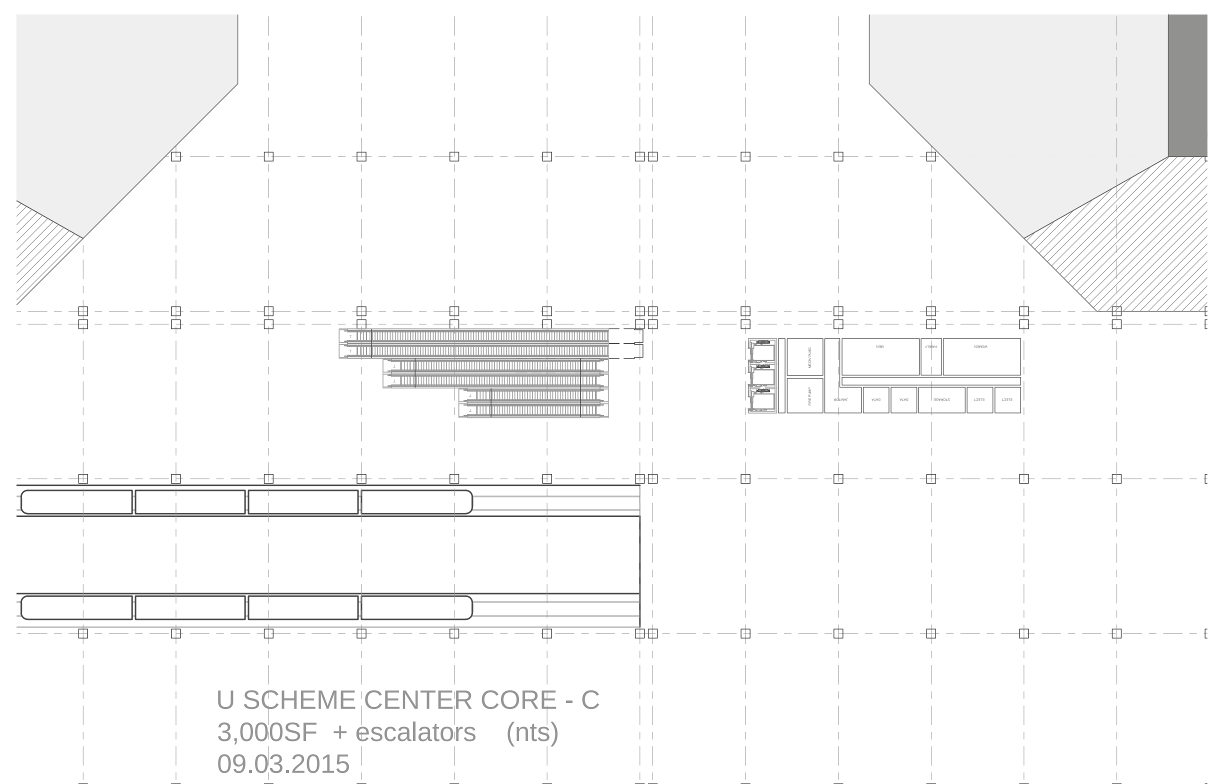
U SCHEME CENTER CORE - A.1
17,200SF (nts)
09.03.2015



U SCHEME CENTER CORE - A.2
14,200SF (nts)
09.03.2015

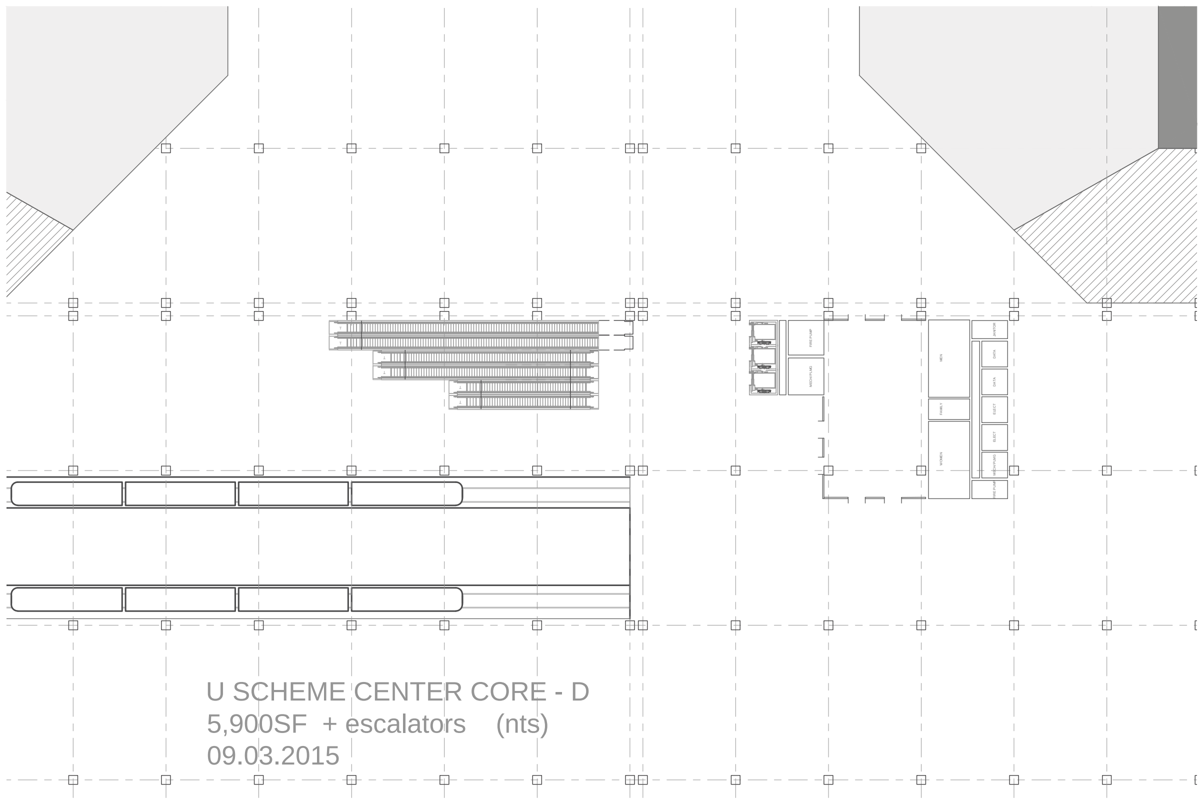


U SCHEME CENTER CORE - B
6,000SF + escalators (nts)
09.03.2015

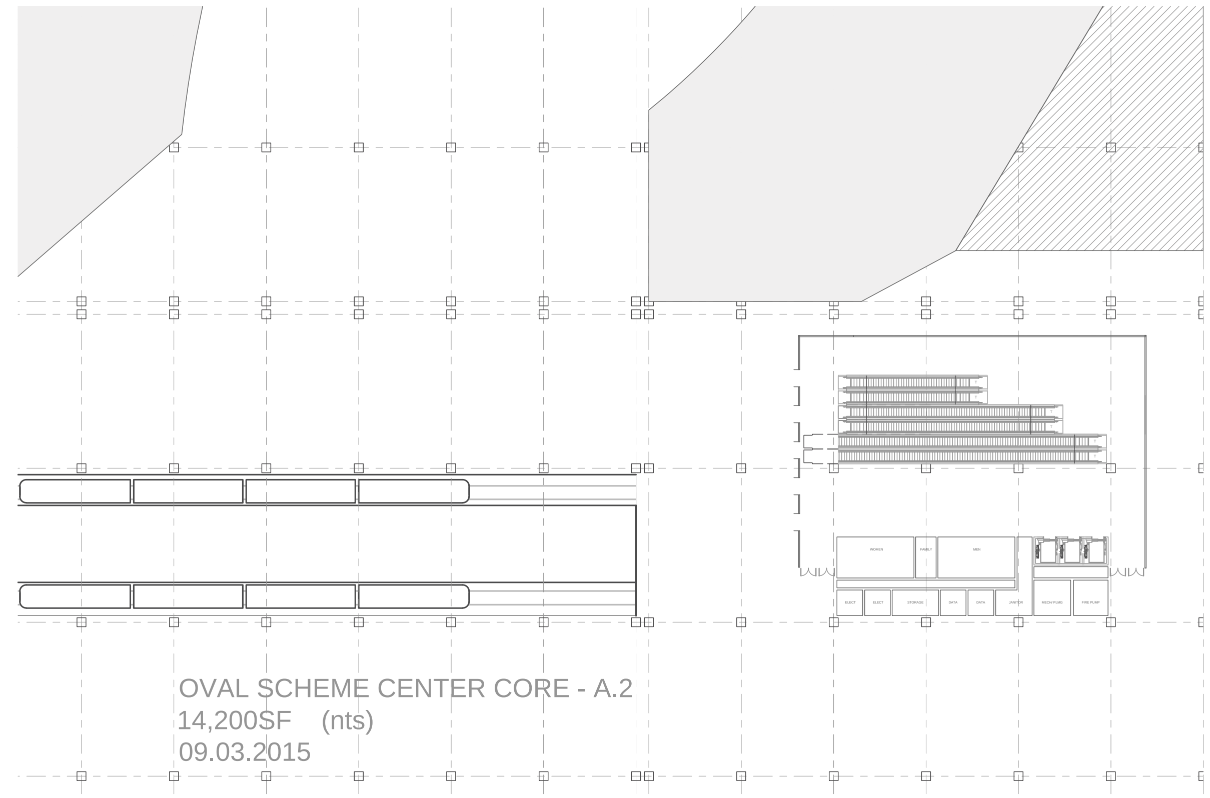


U SCHEME CENTER CORE - C
3,000SF + escalators (nts)
09.03.2015

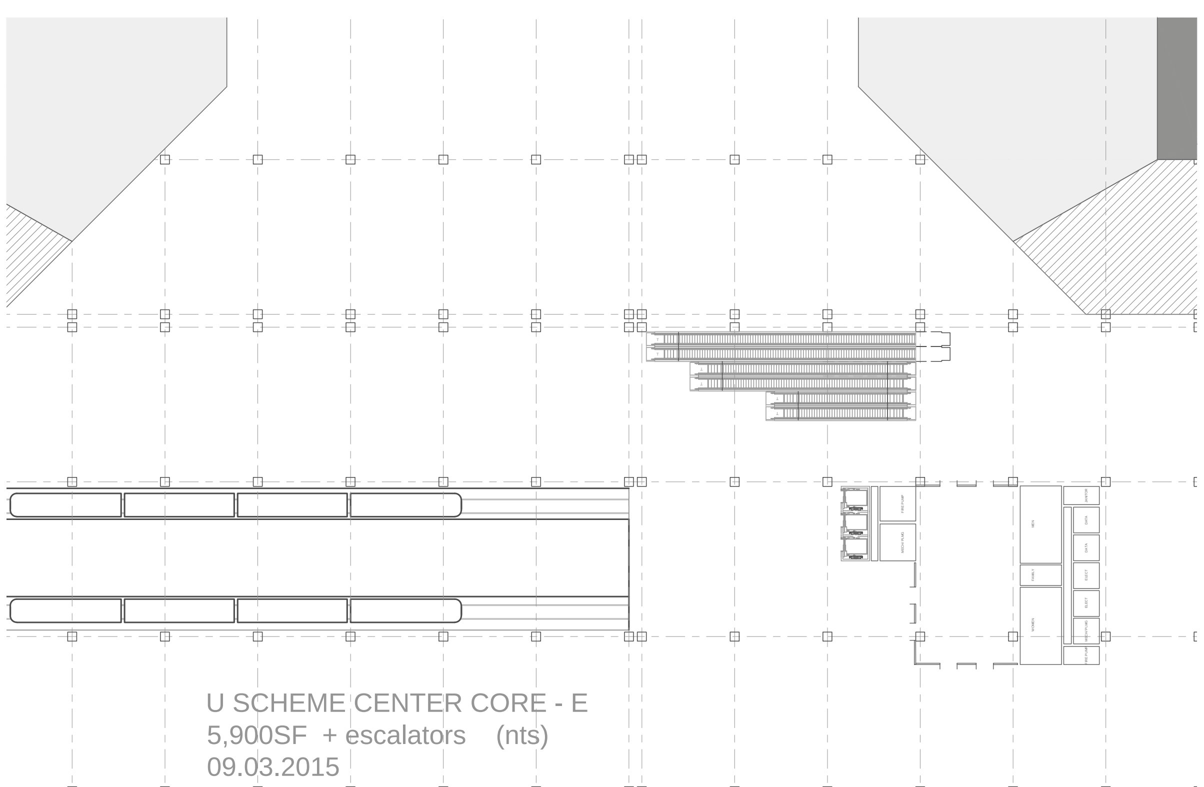
- 'Center Core' studies that included options for enclosed and conditioned space with roof-level restrooms.



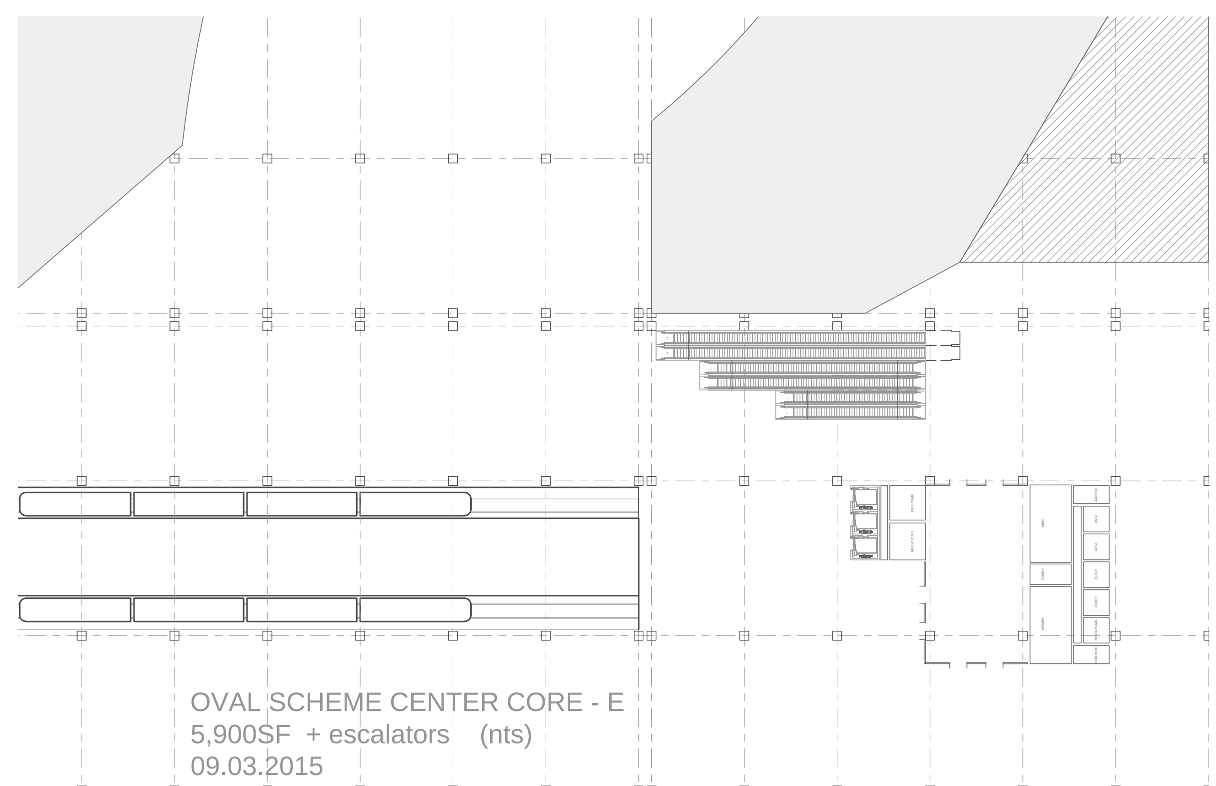
U SCHEME CENTER CORE - D
5,900SF + escalators (nts)
09.03.2015



OVAL SCHEME CENTER CORE - A.2
14,200SF (nts)
09.03.2015

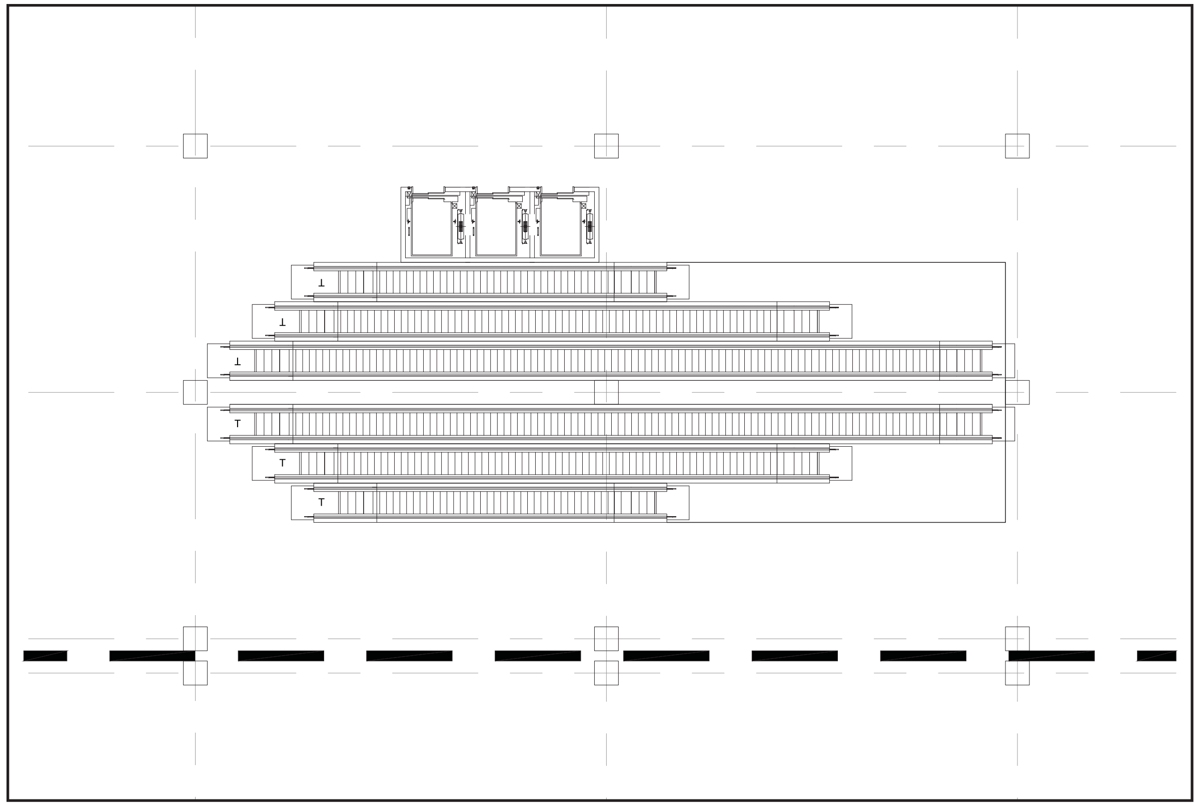


U SCHEME CENTER CORE - E
5,900SF + escalators (nts)
09.03.2015

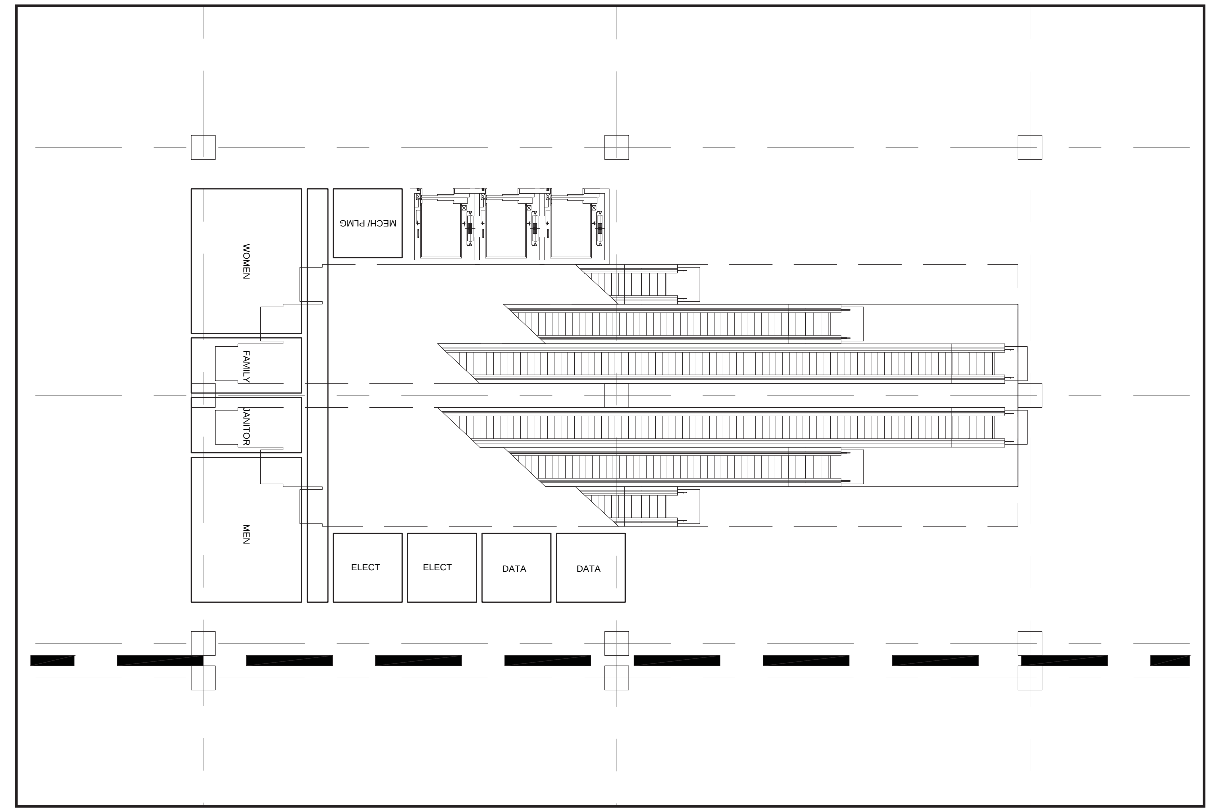


OVAL SCHEME CENTER CORE - E
5,900SF + escalators (nts)
09.03.2015

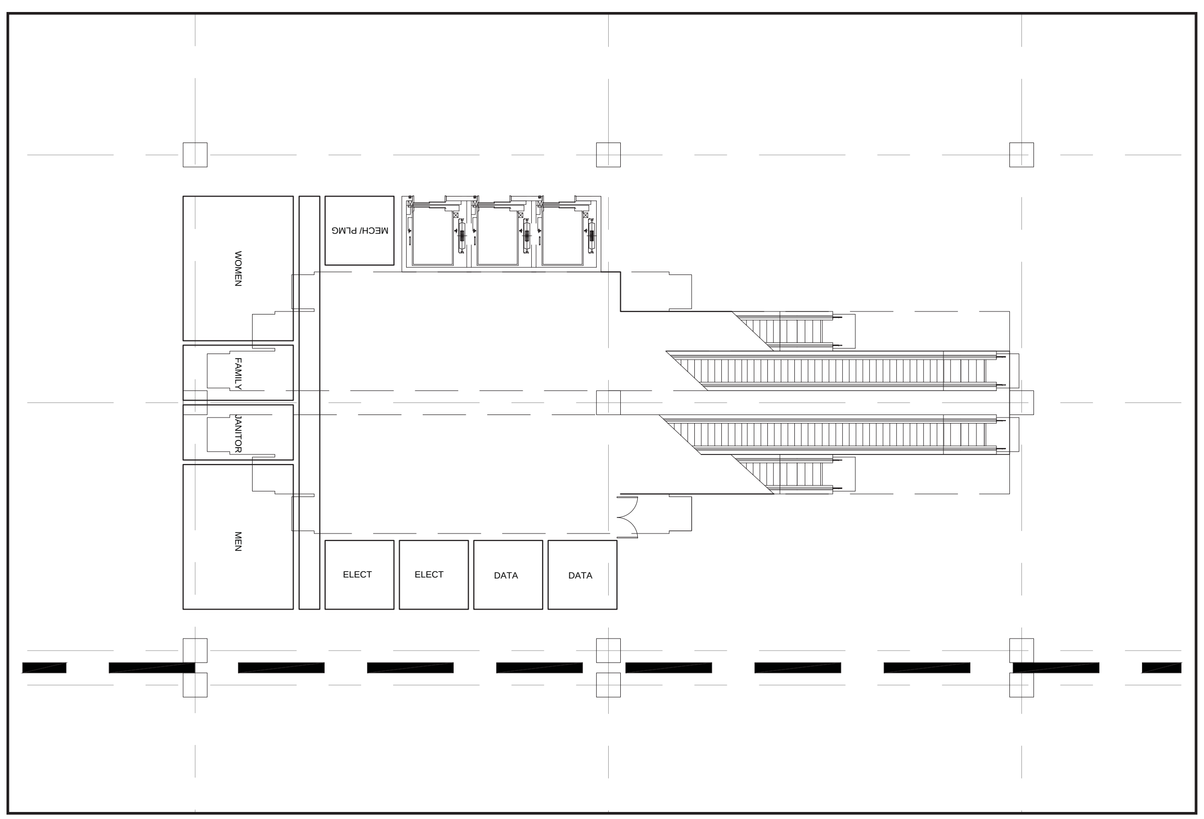
- 'Center Core' studies that included options for enclosed and conditioned space with roof-level restrooms.



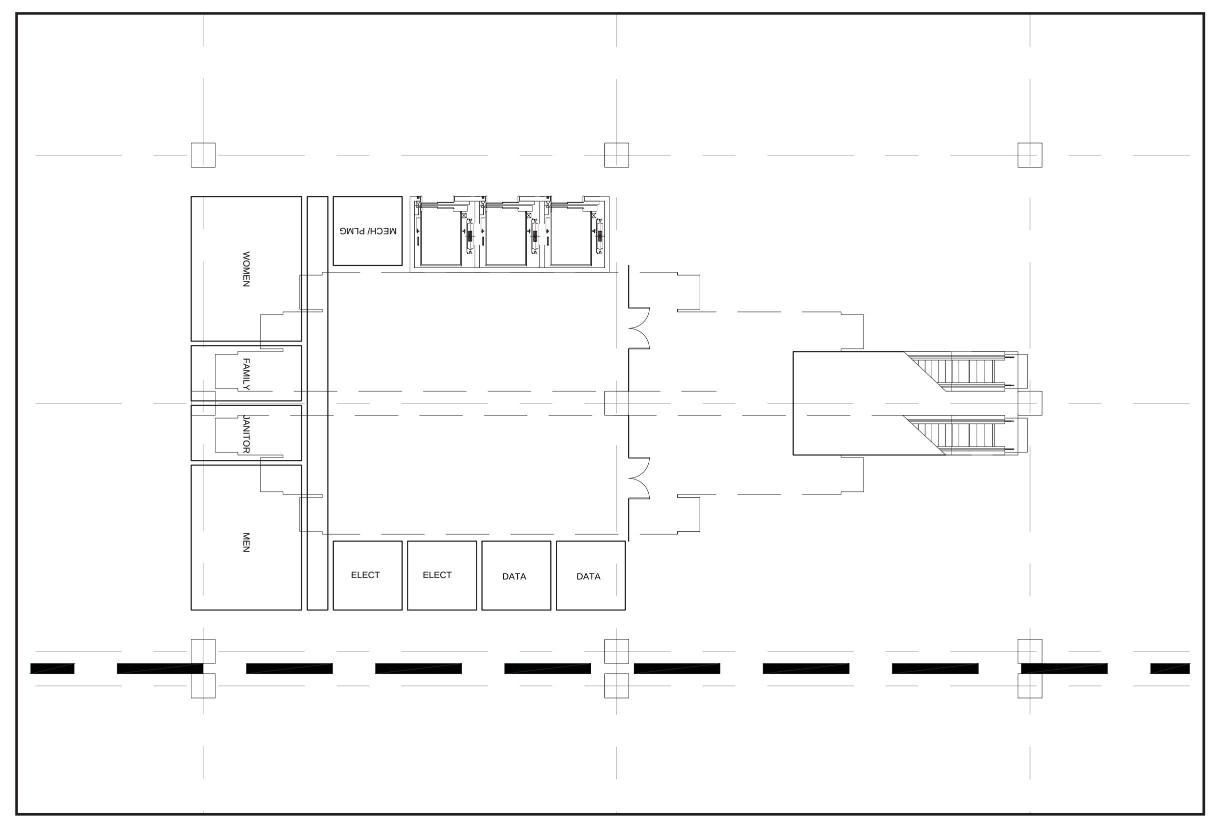
Typical north core- Roof Level



Typical north core- Level 3

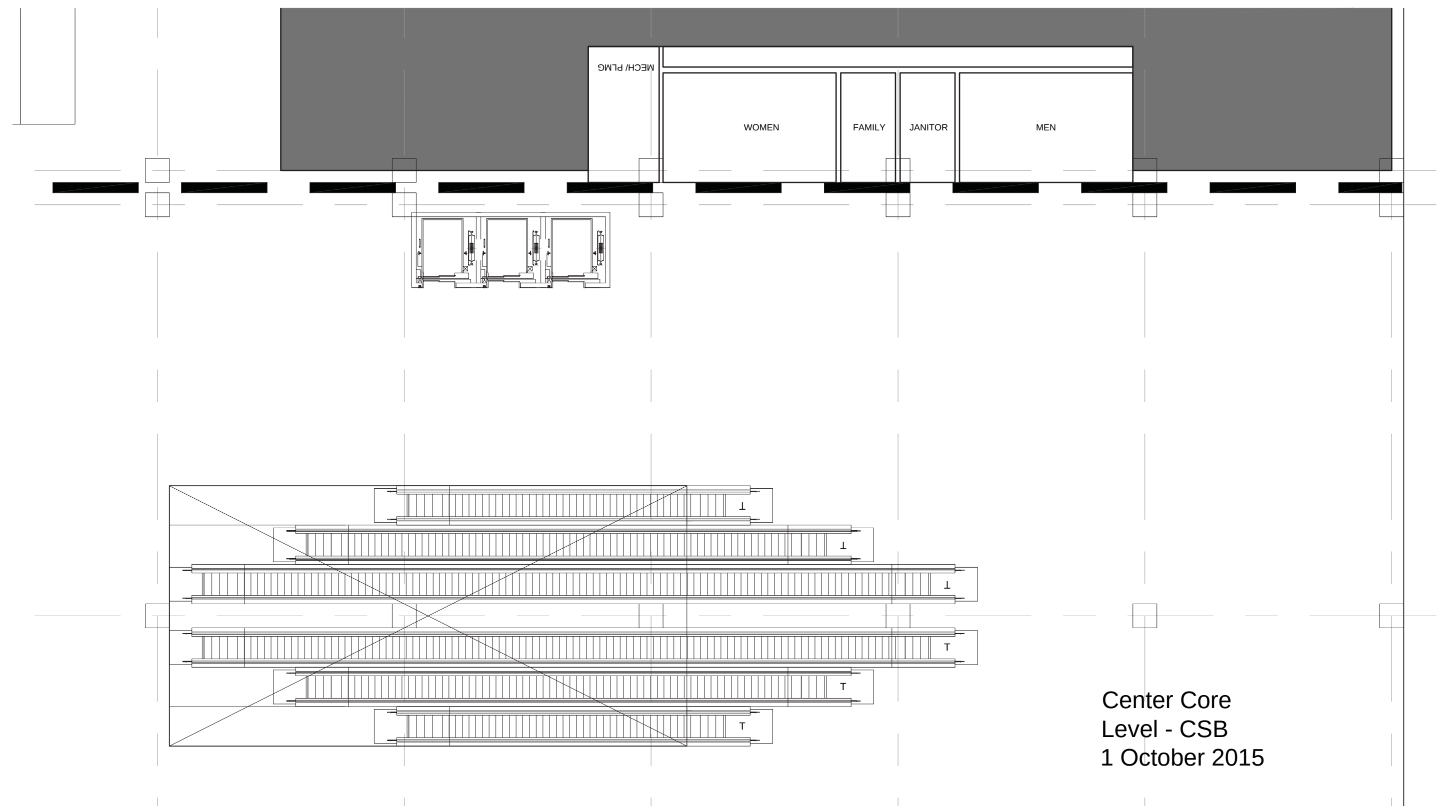


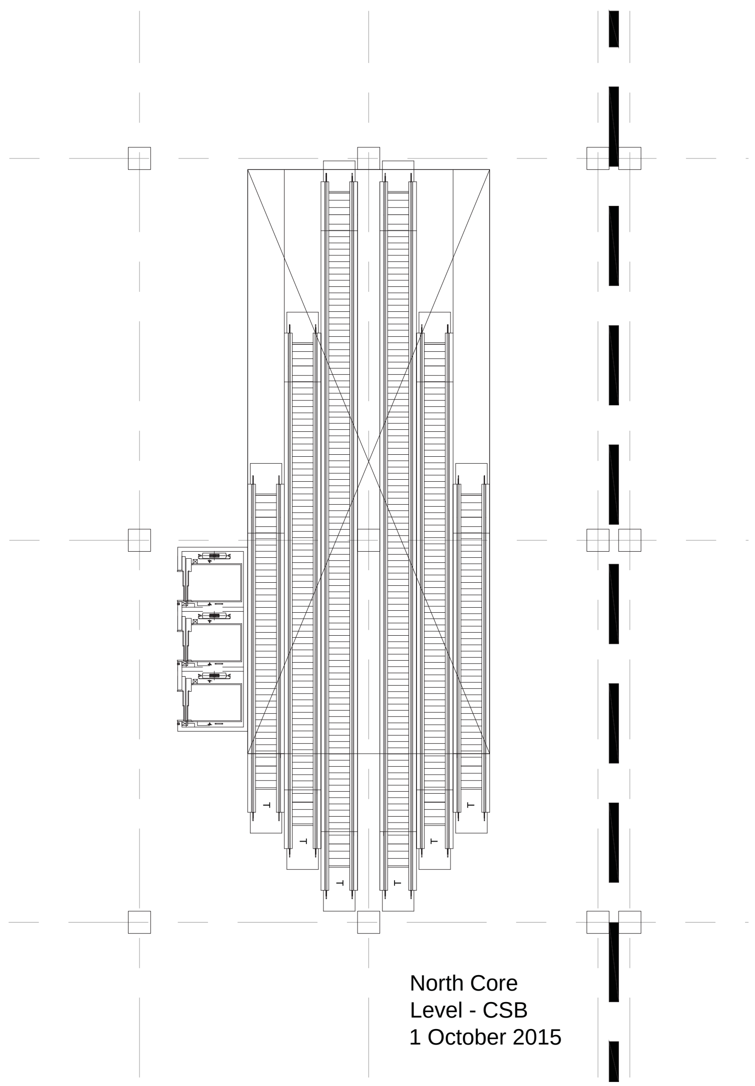
Typical north core- Level 2

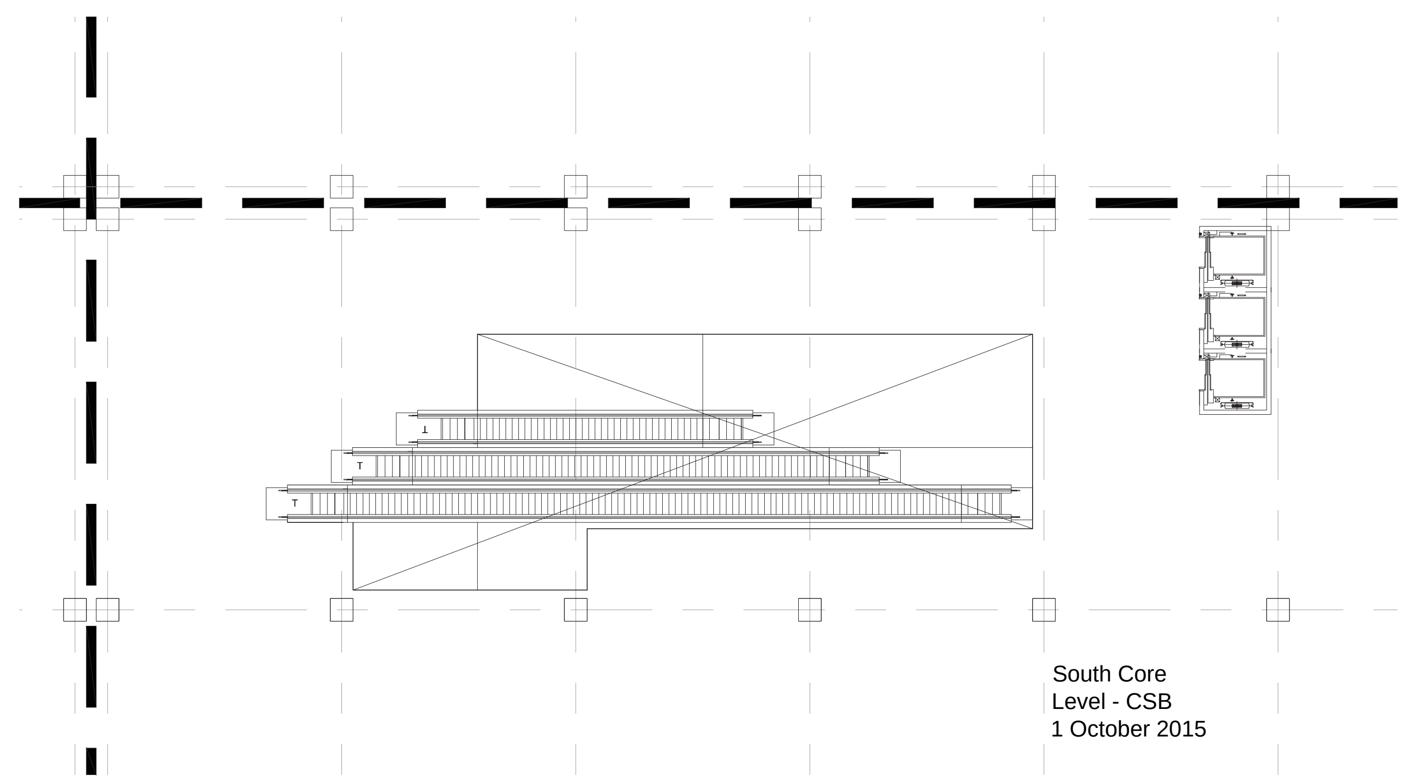


Typical north core- Level 1

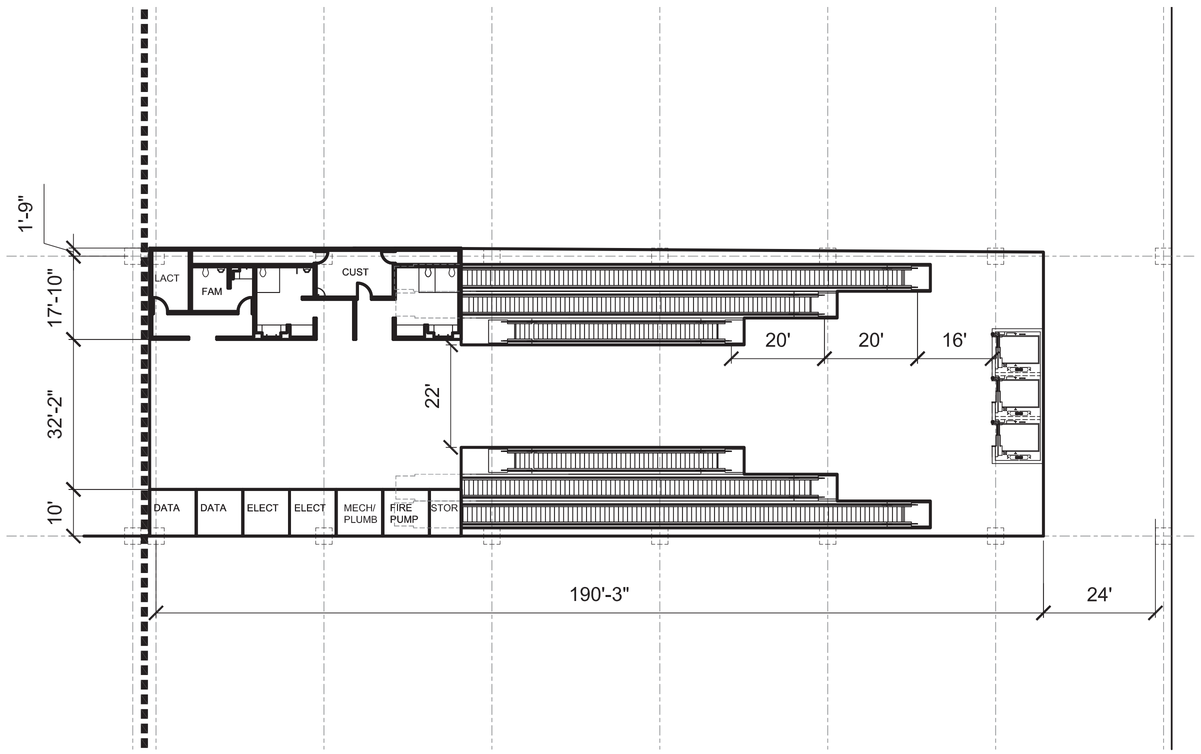
- Studies to coordinate the North Core elevators and escalators with the building structure and present options for utilities and restrooms.



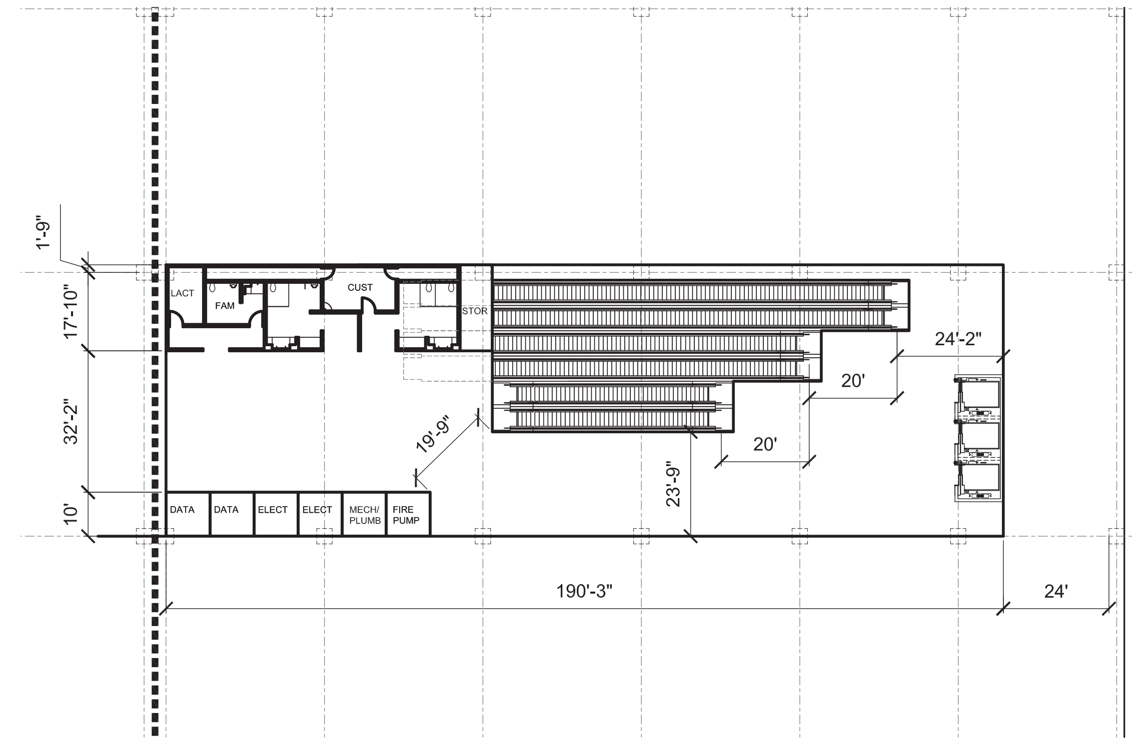




- Options for ready/ return escalators along with return only. Orientation set to best suit the access to and from the garage levels.

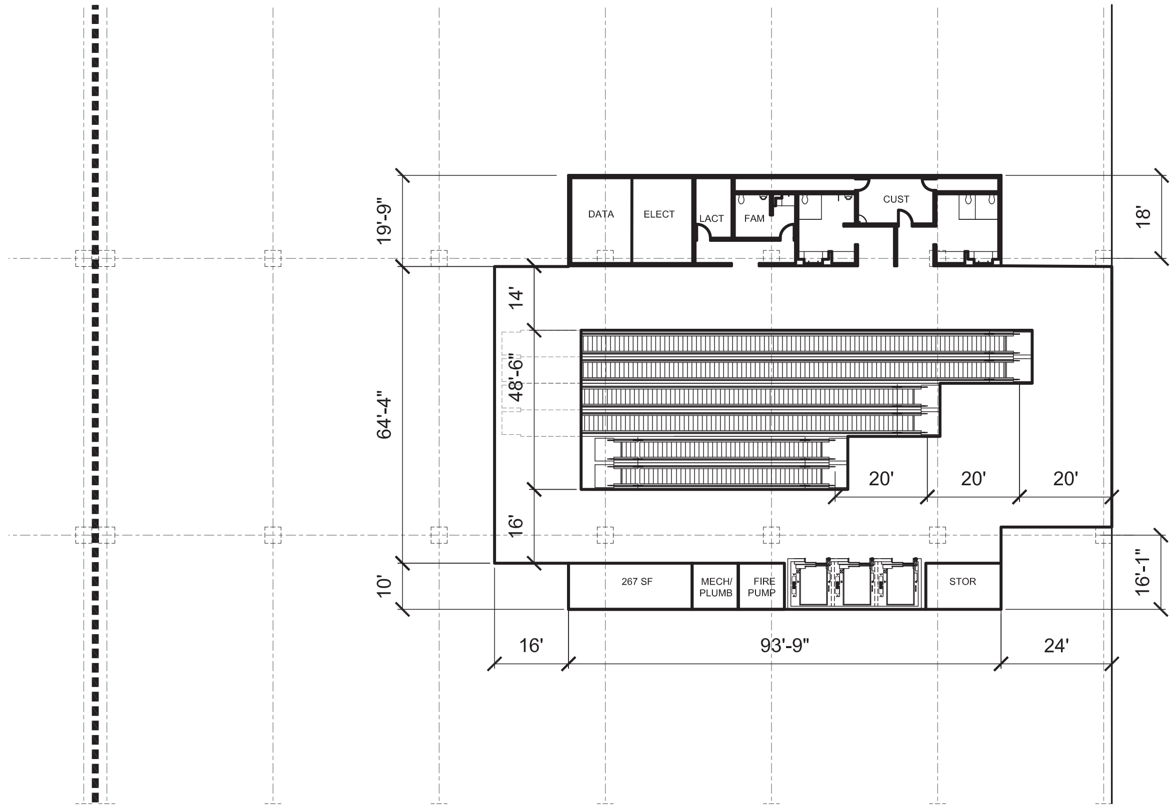


Typical center core - 3 sets of escalators on either side of core with center circulation

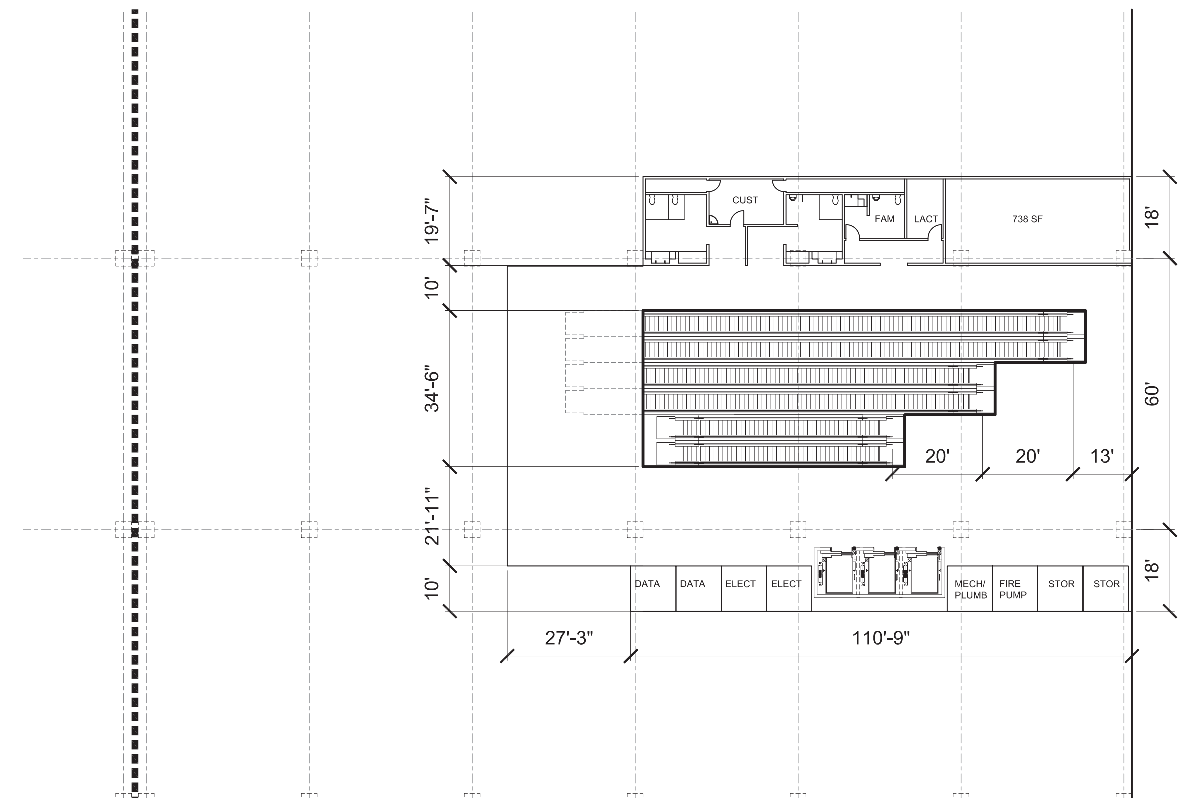


Typical center core - 6 sets of escalators grouped on same side

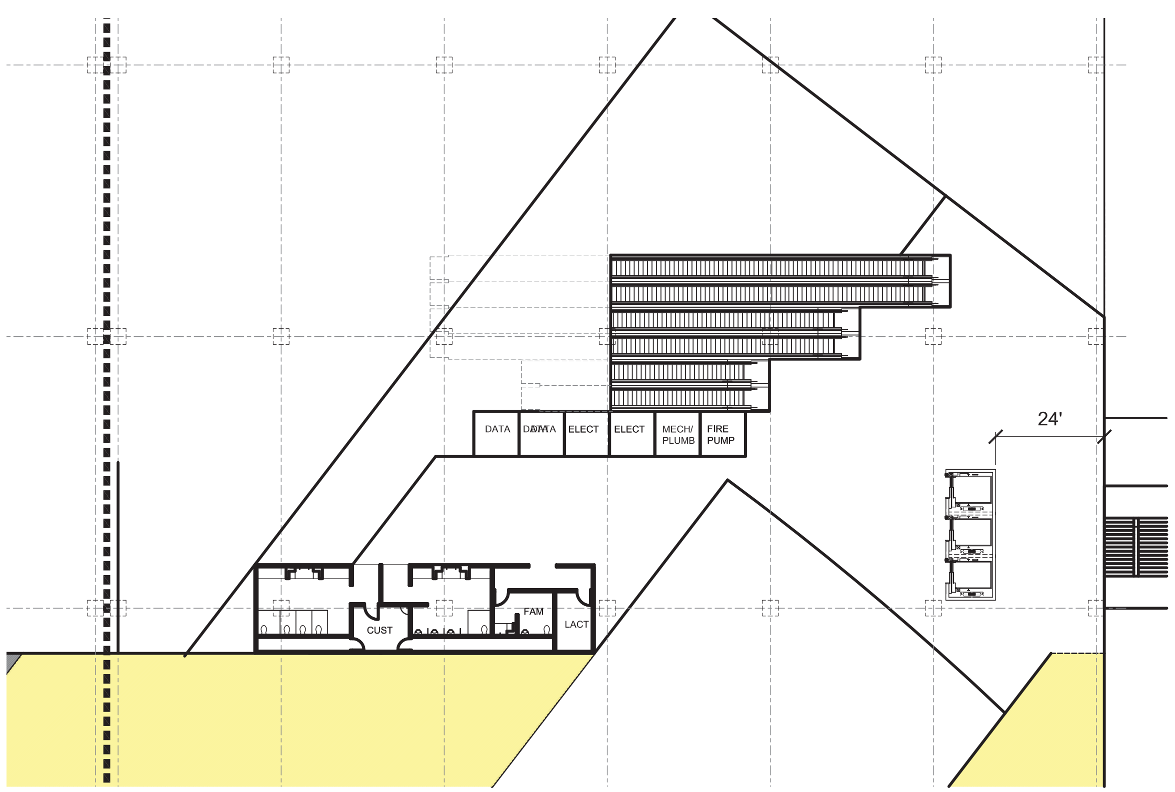
- Enclosed and conditioned core options that paired escalators based on RAC level destination or by Ready vs Return. More detailed restroom studies were created to determine area requirements based on amenities and circulation.



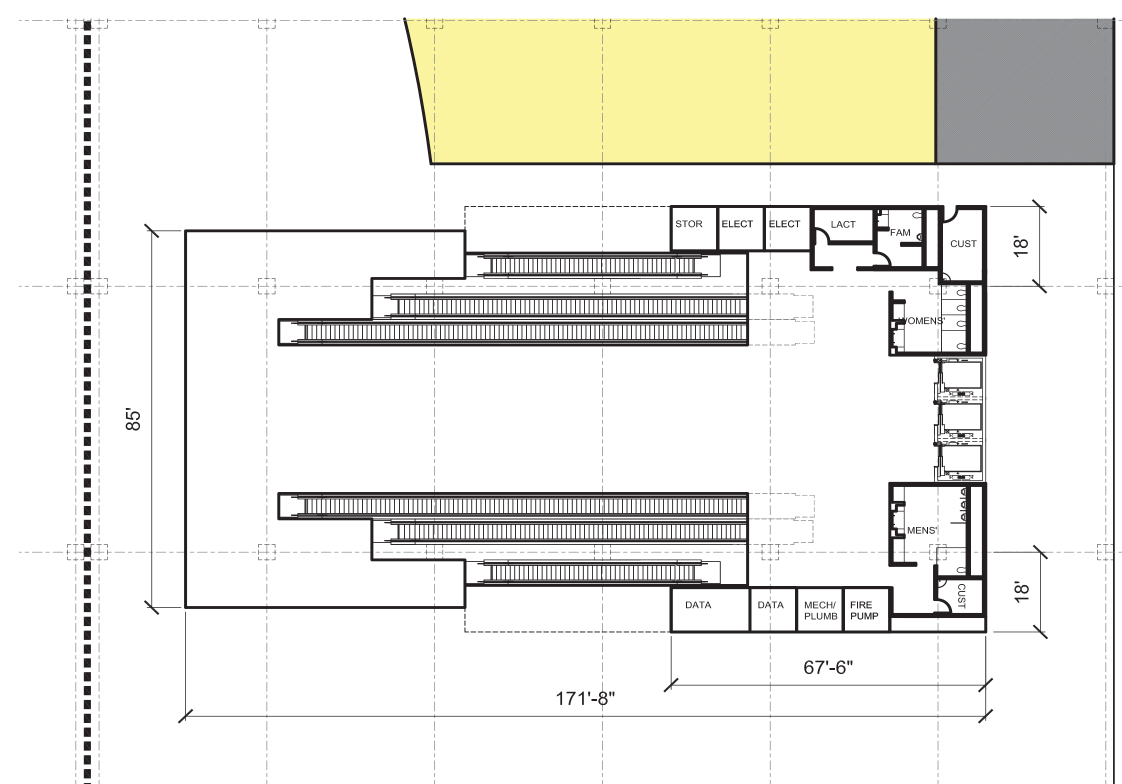
Typical core study



Typical core study

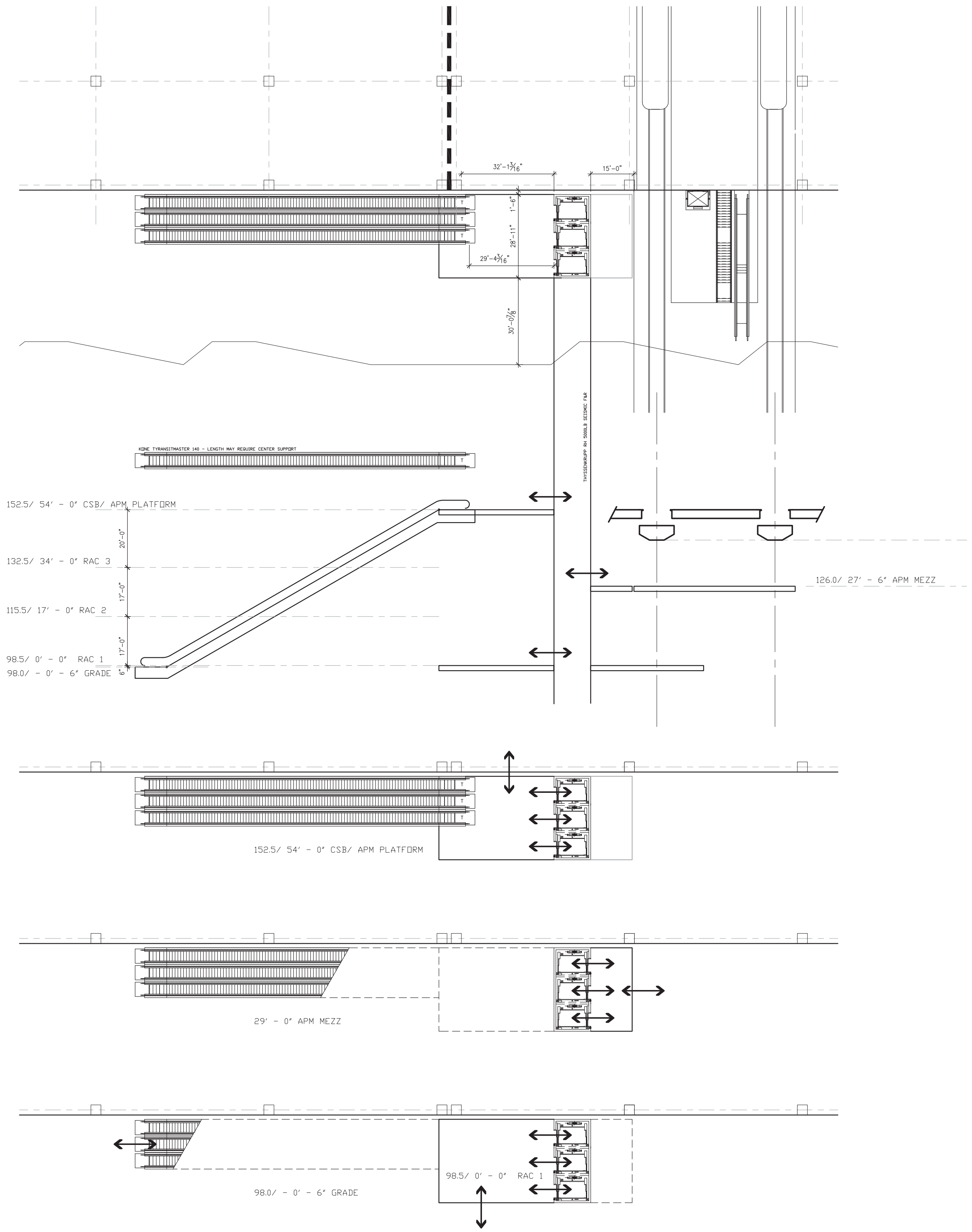


North core study for "Arch" scheme

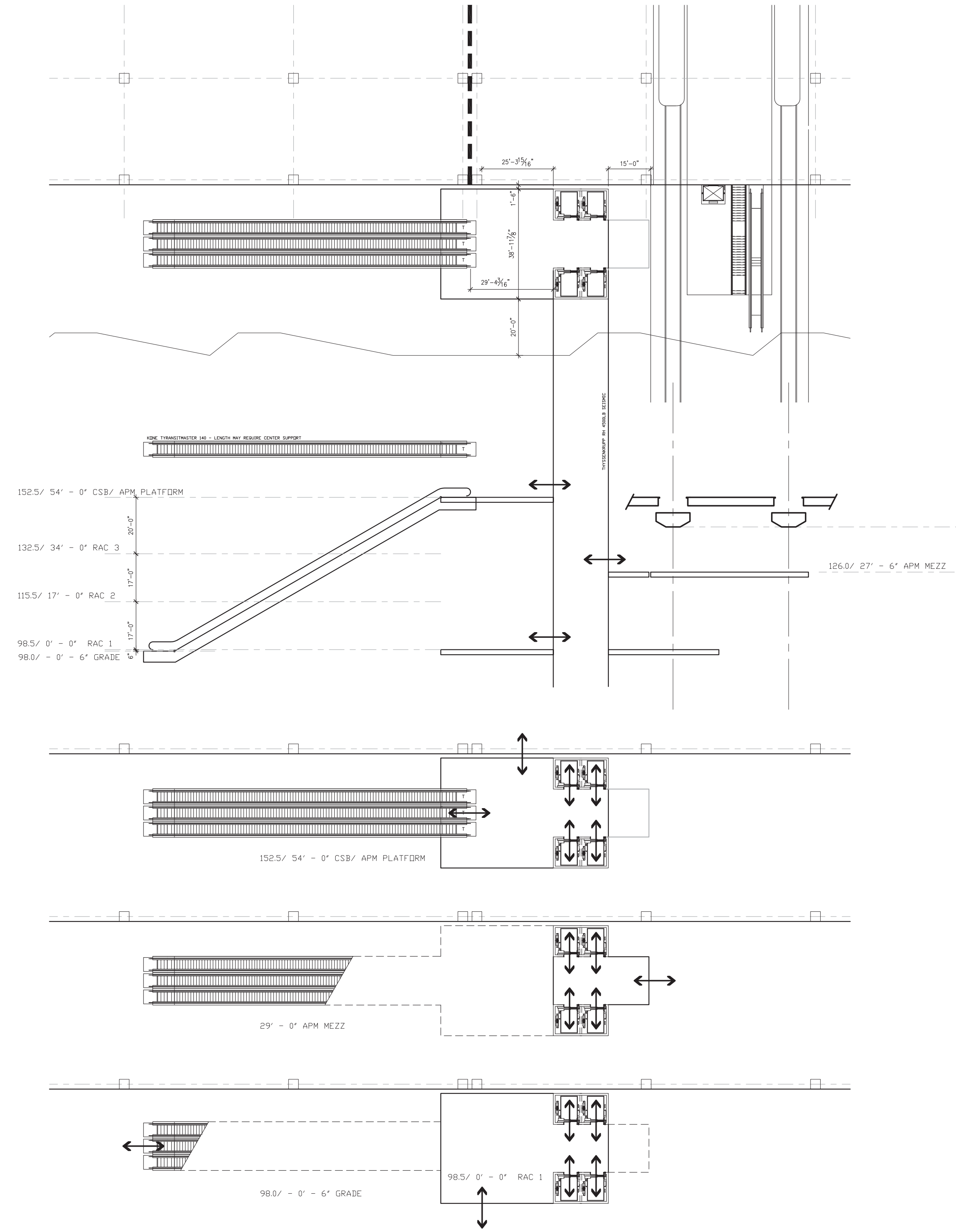


Center core study for "Arch" scheme

- Enclosed and conditioned core options that paired escalators based on RAC level destination or by Ready vs. Return. More detailed restroom studies were created to determine area requirements based on amenities and circulation.

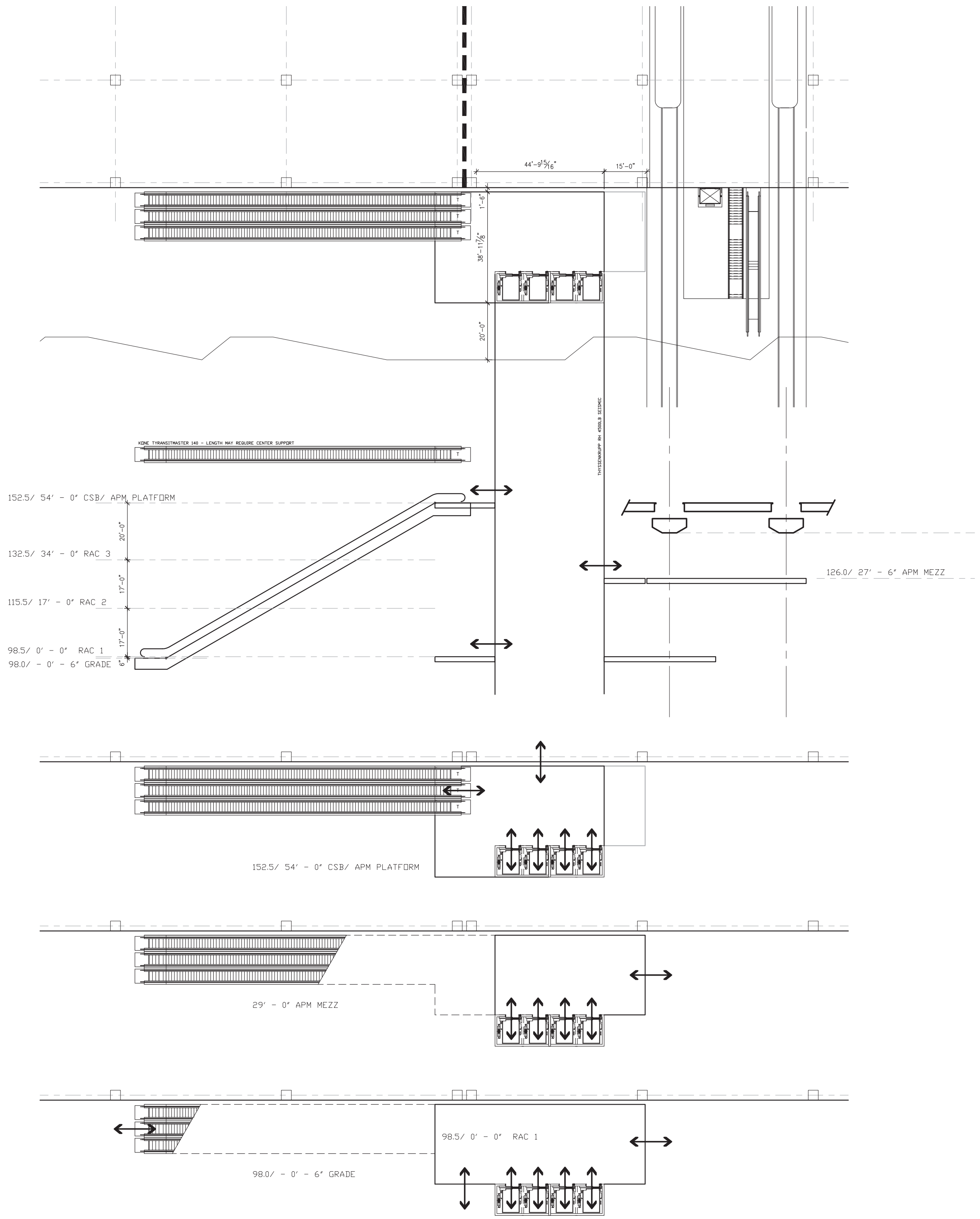


Three transit-grade, express escalators with three 5,000 lb. seismic grade elevators with access lobby to the north. Elevators are front and rear opening for mezzanine access

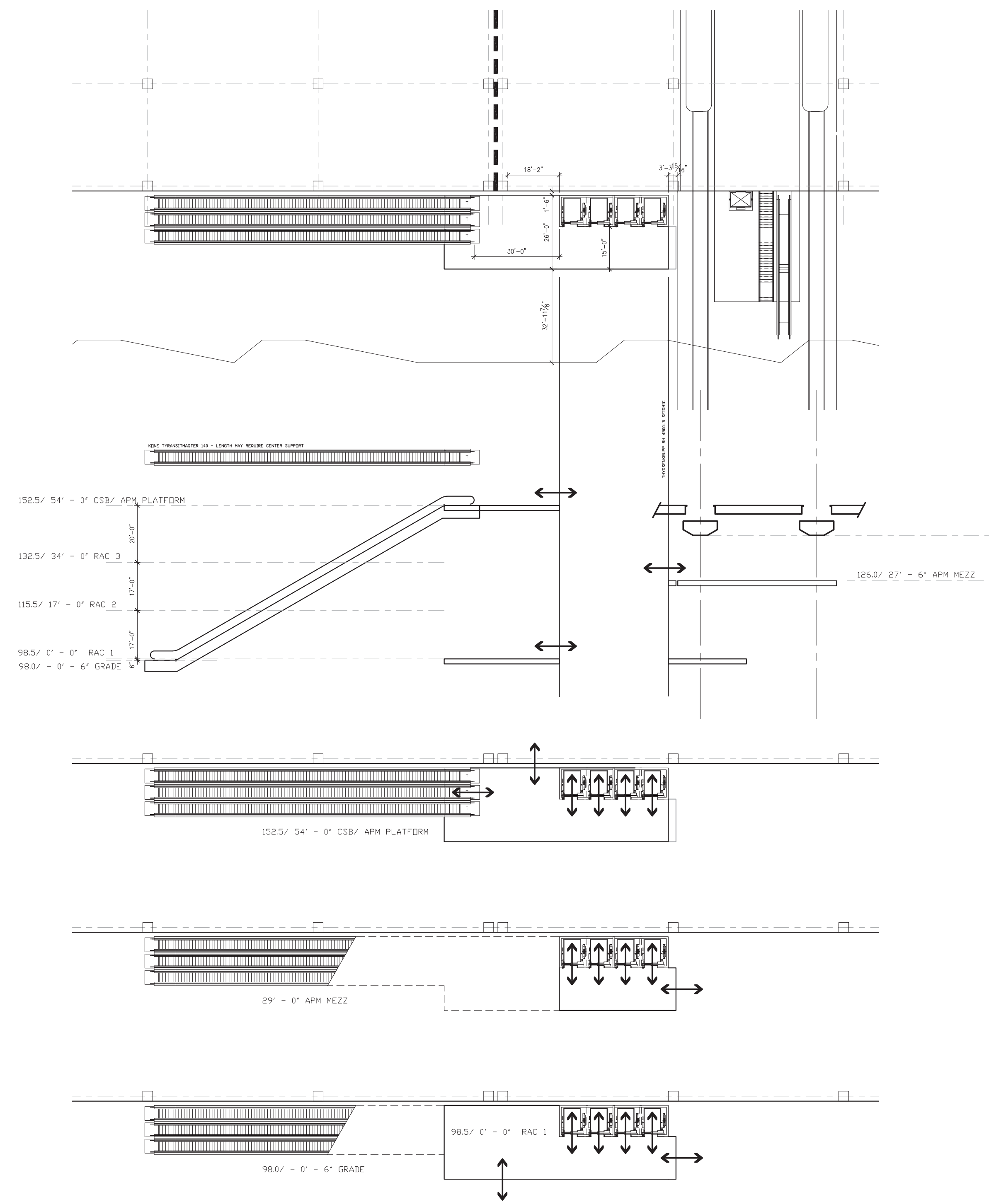


Three transit-grade, express escalators with four 5,000 lb. seismic grade elevators with central access lobby and mezzanine access ramp

- Options were produced to locate a 'West Core' adjacent to the APM to provide direct access to and from the grade level bus curb. The core also provided a connection to the mezzanine-level walkway beneath the APM.

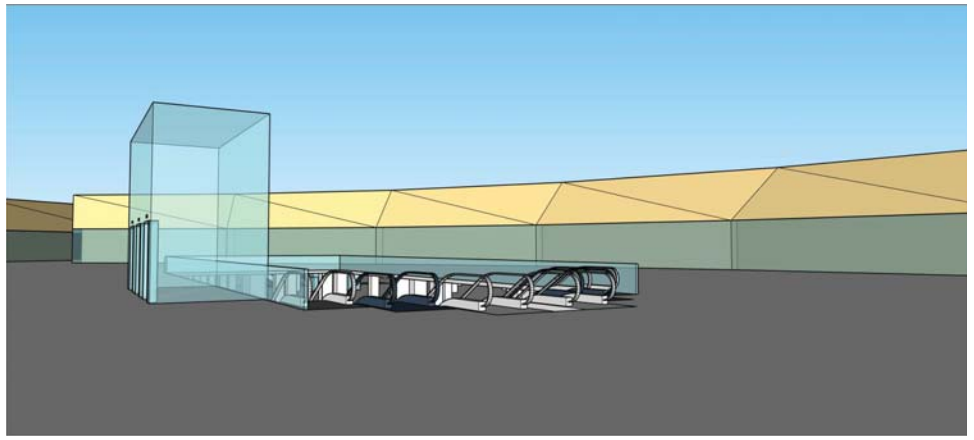


Three transit-grade, express escalators with four 5,000 lb. seismic grade elevators with access lobby to the east and mezzanine access ramp

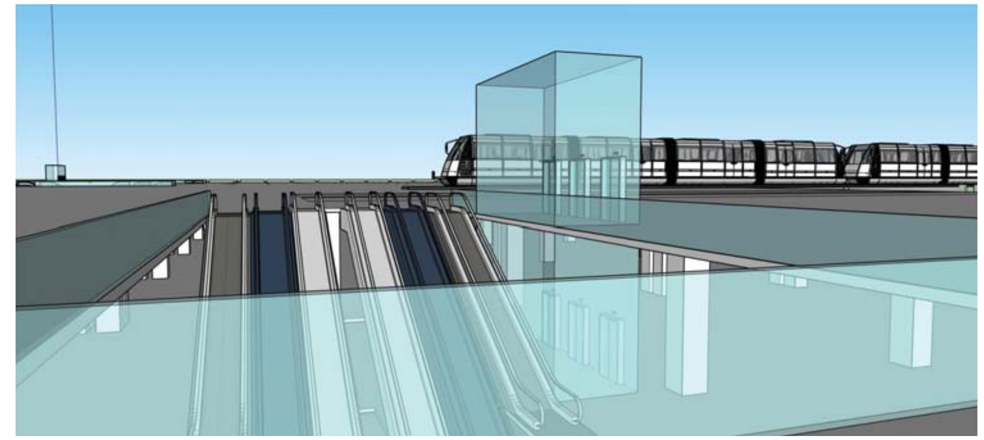


Three transit-grade, express escalators with four 5,000 lb. seismic grade elevators with access lobby to the west and mezzanine access ramp

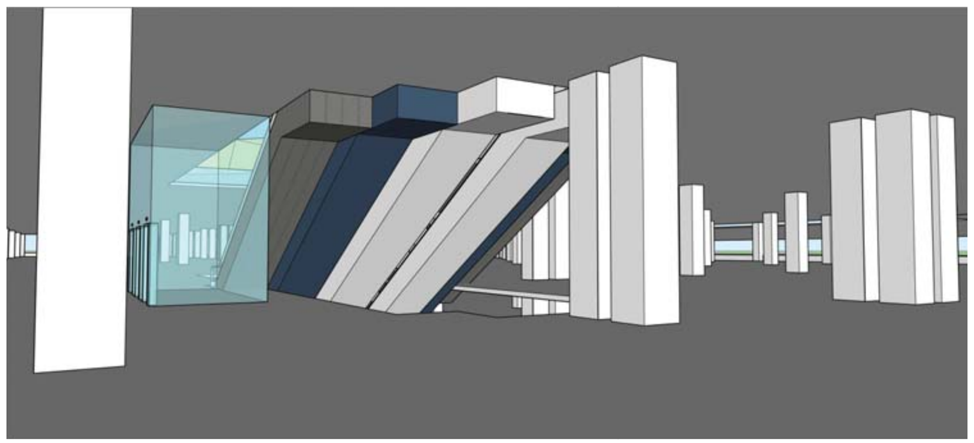
- Options were produced to locate a 'West Core' adjacent to the APM to provide direct access to and from the grade level bus curb. The core also provided a connection to the mezzanine-level walkway beneath the APM.



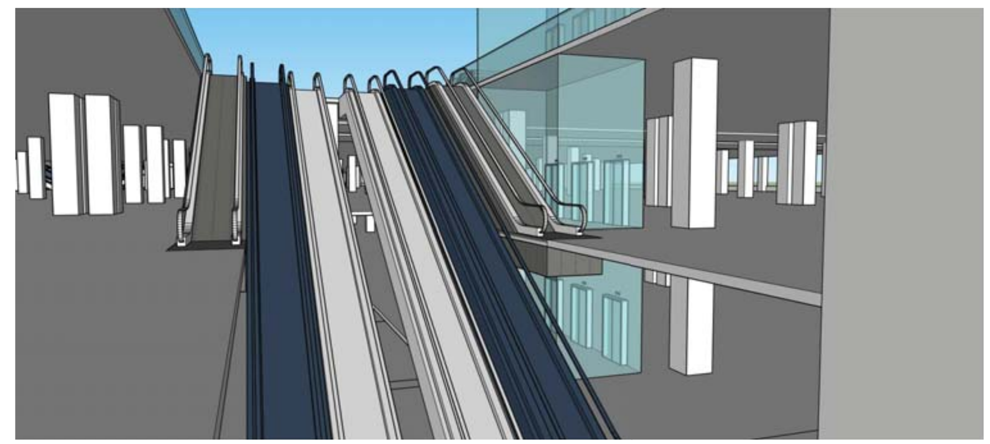
Center core,
Roof Level



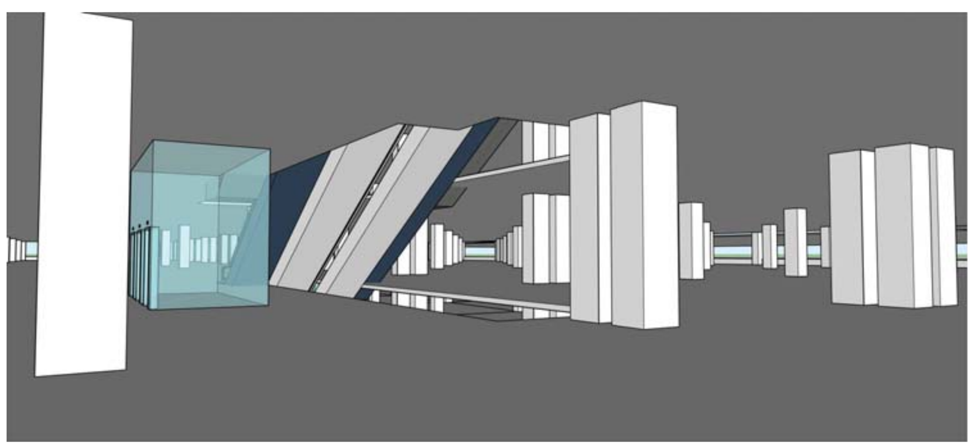
North core,
Roof level



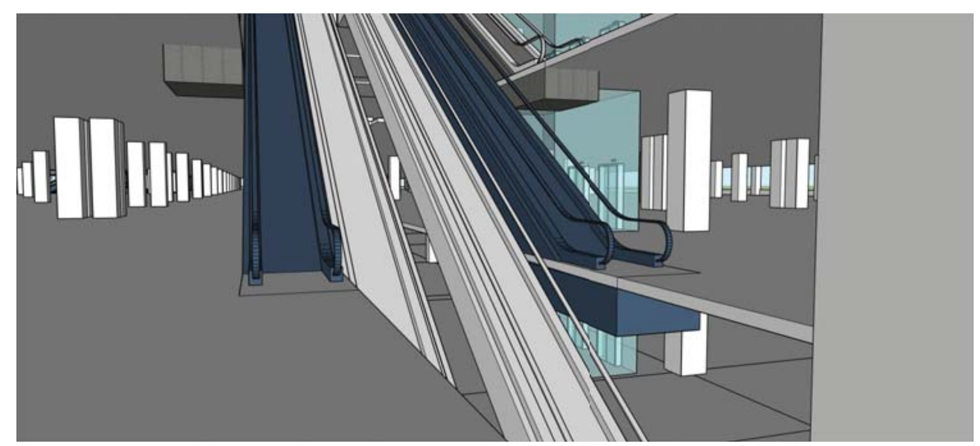
Center core,
Level 3



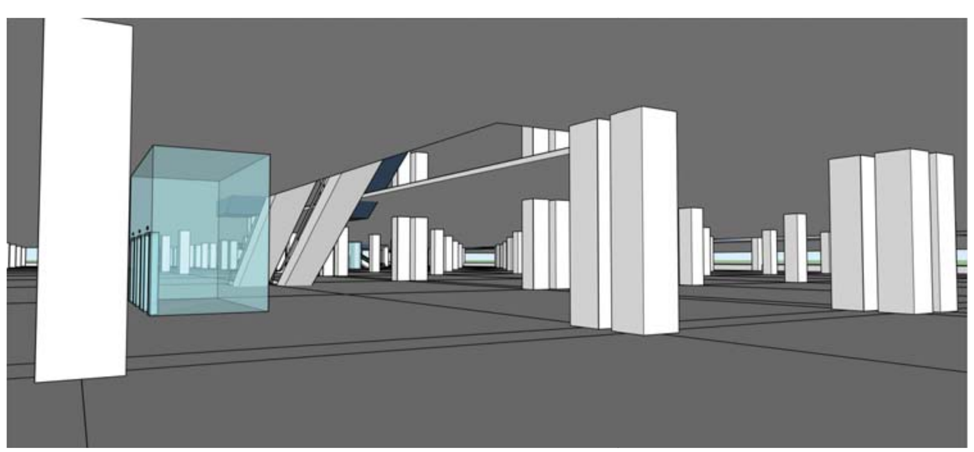
North core,
3rd level



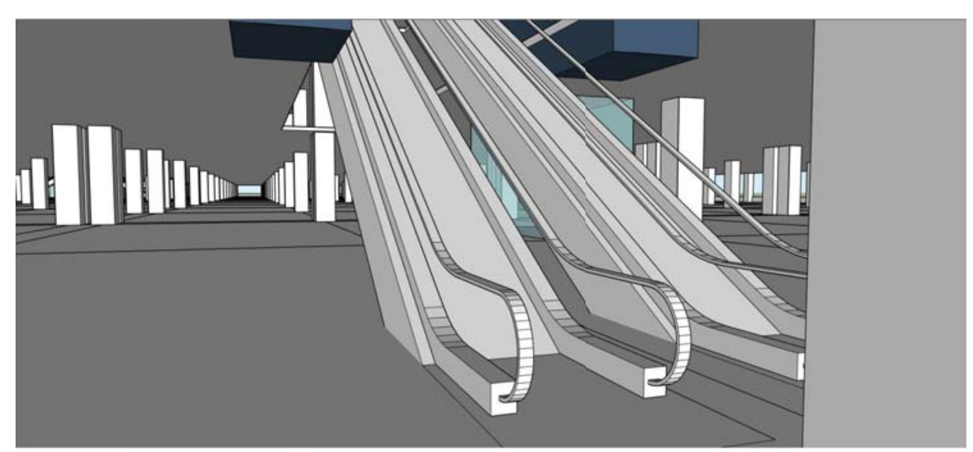
Center core,
Level 2



North core,
Level 2

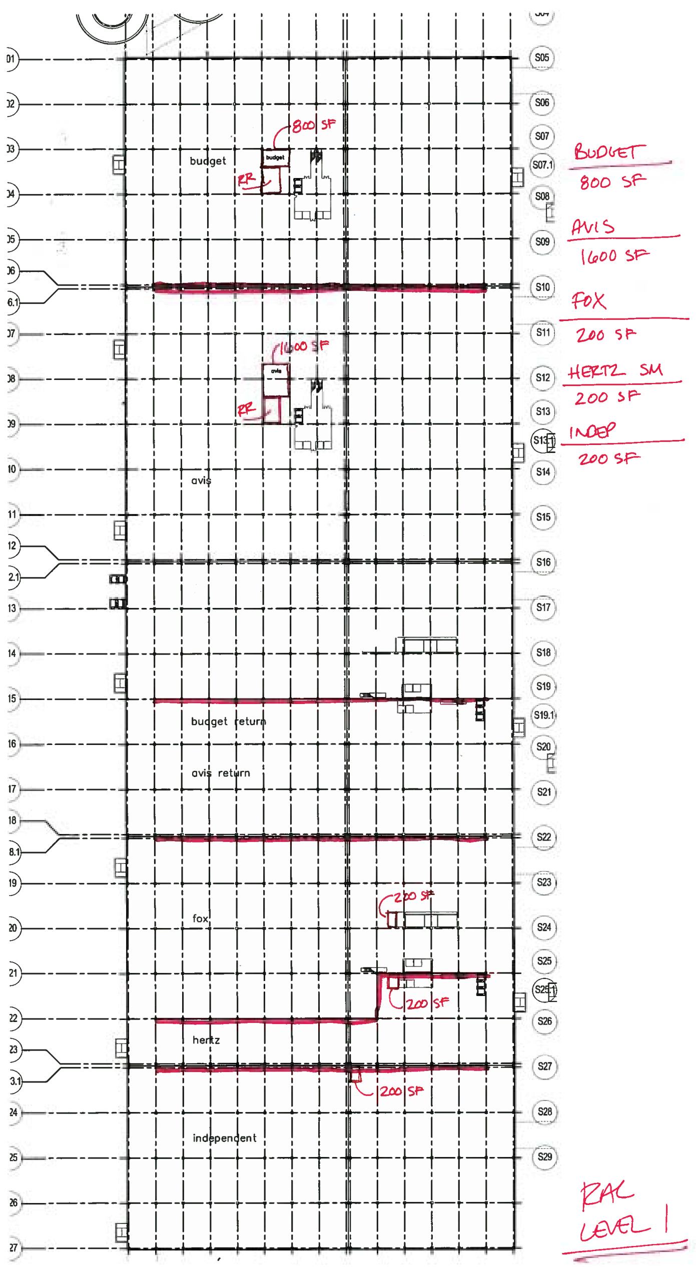


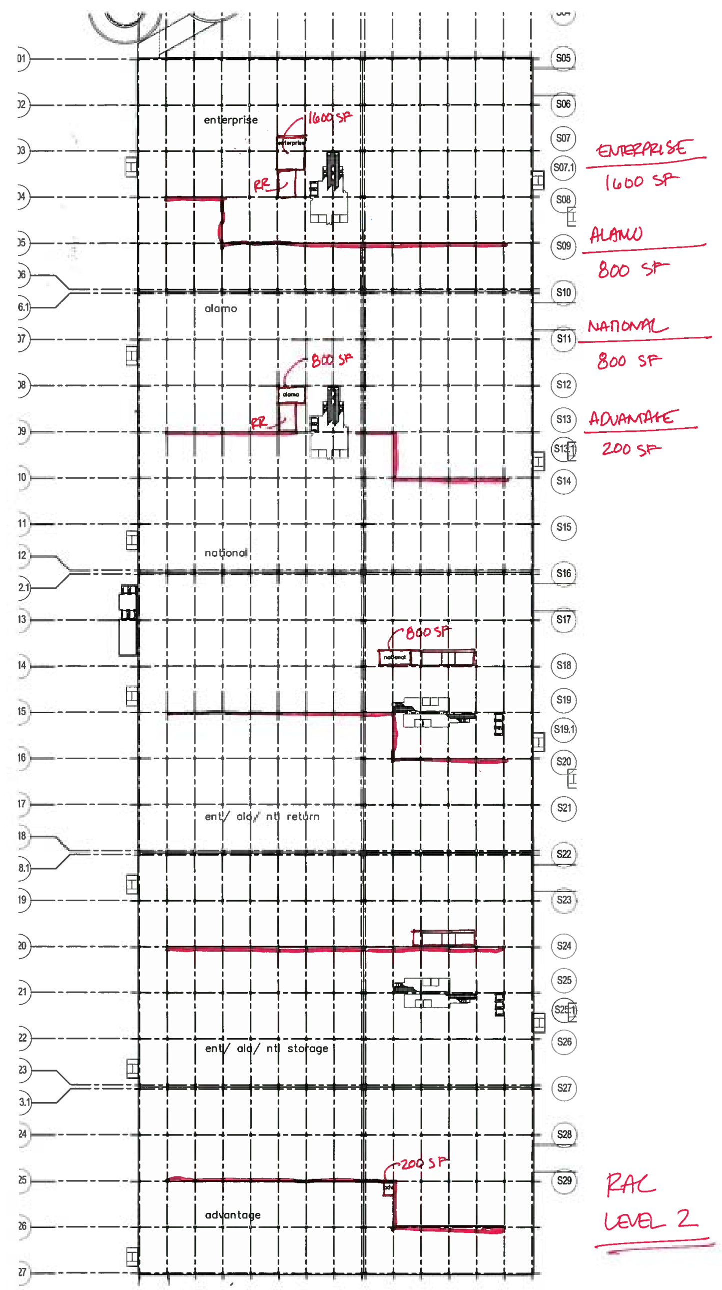
Center core,
Level 1

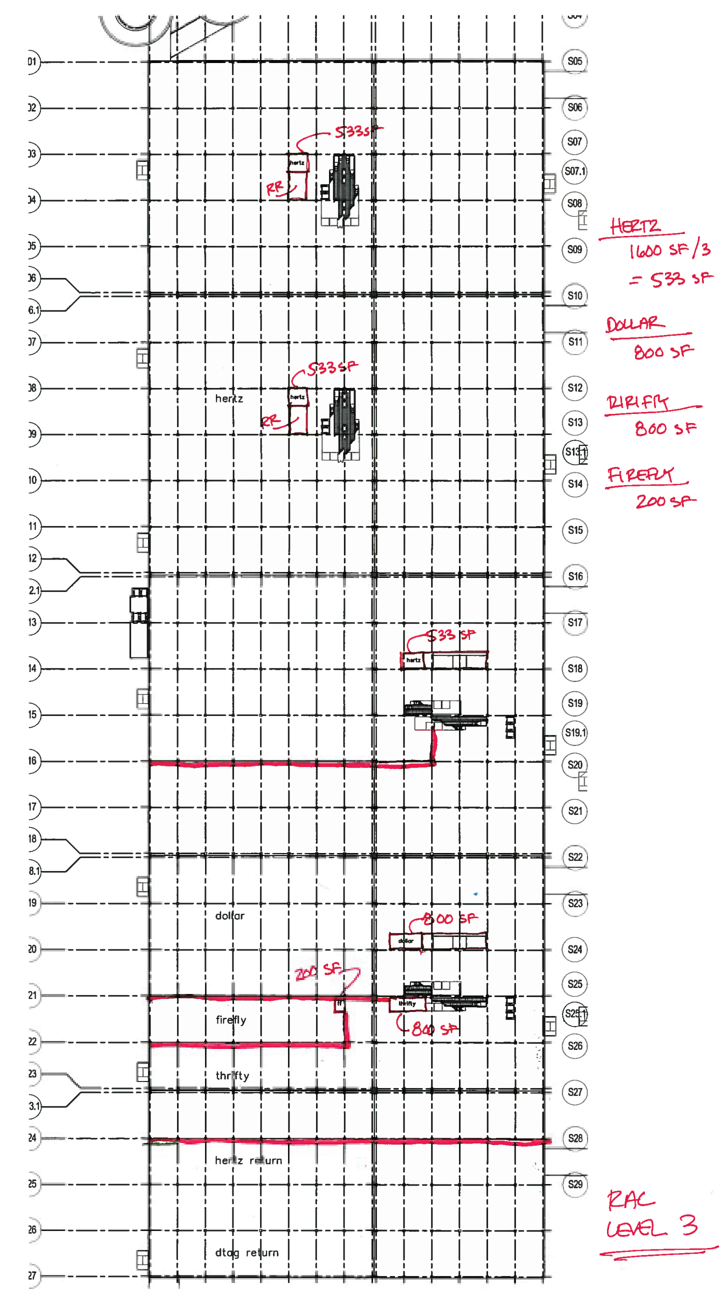


North core,
Level 1

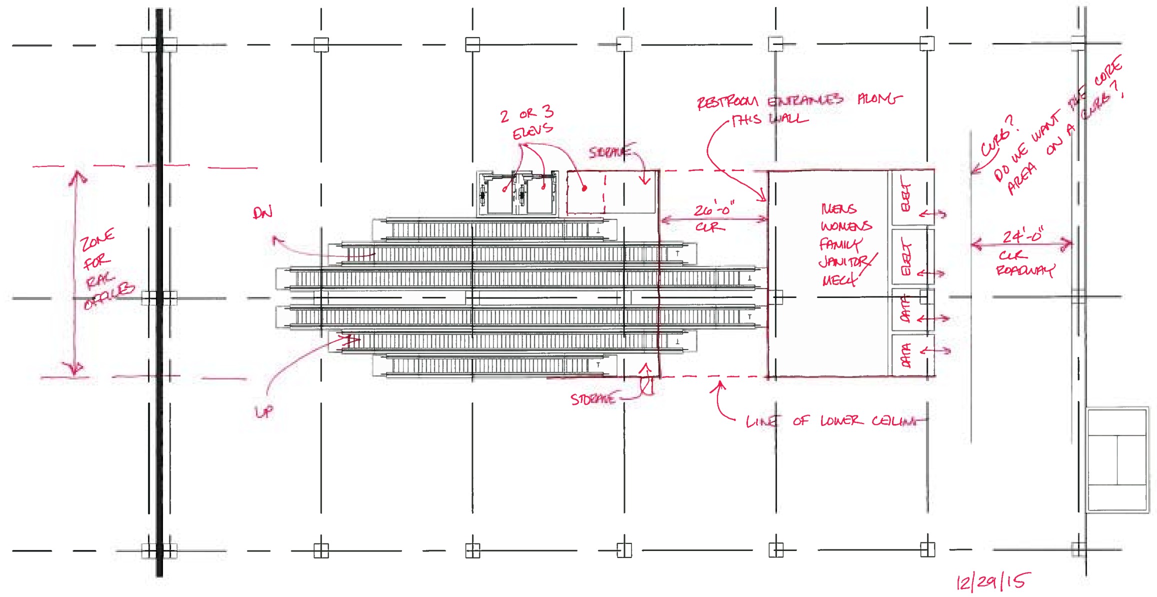
- 3-D modeling with escalators colored by level.



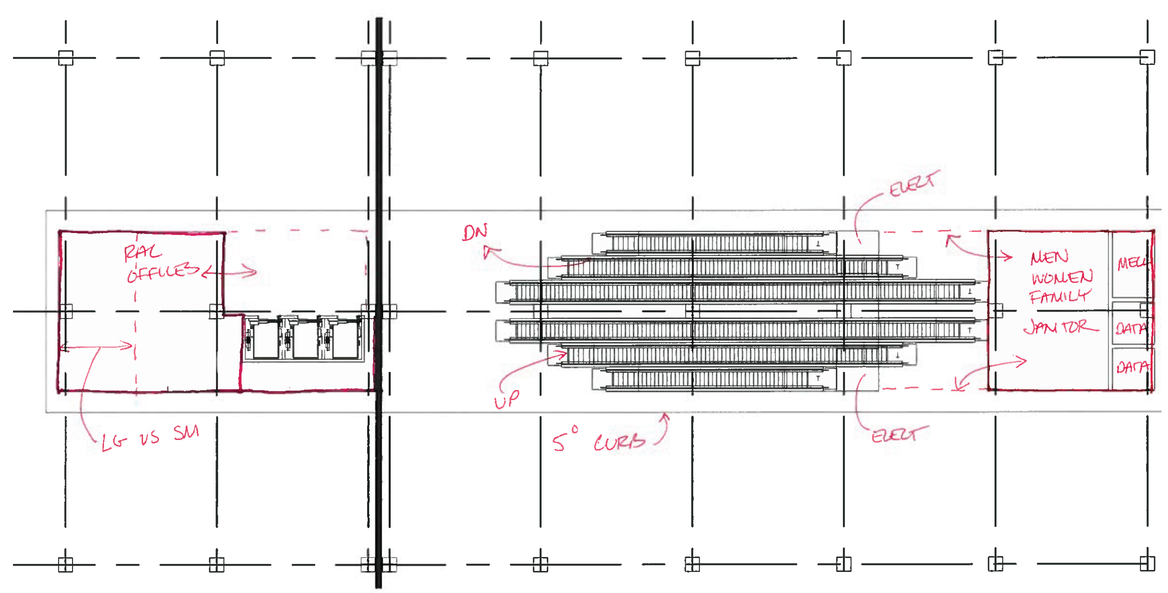




- Studies for allocation areas, core locations/ configurations, and RAC level office sizes and locations.

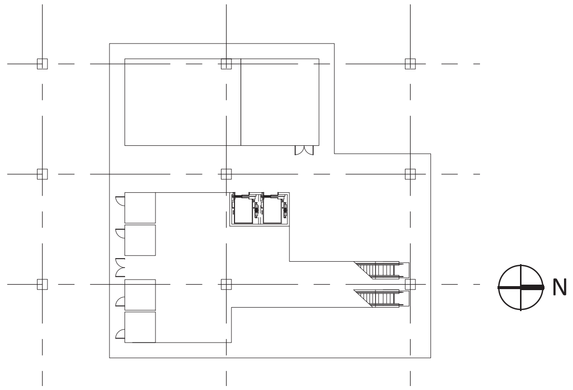


South core study

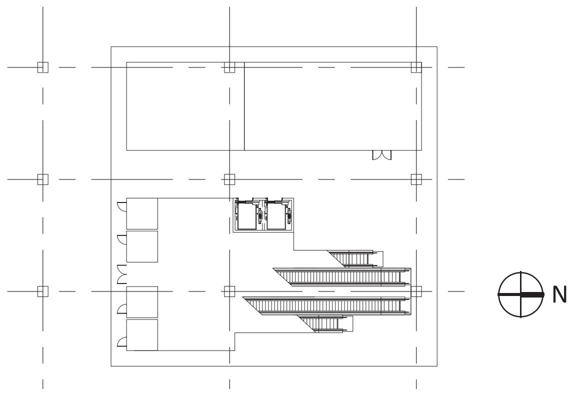


South core study

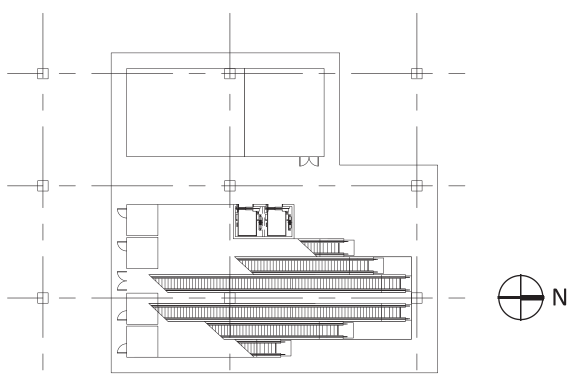
- South core studies showing location of restrooms, mechanical/plumbing rooms, data rooms, electrical rooms and RAC lobbies.



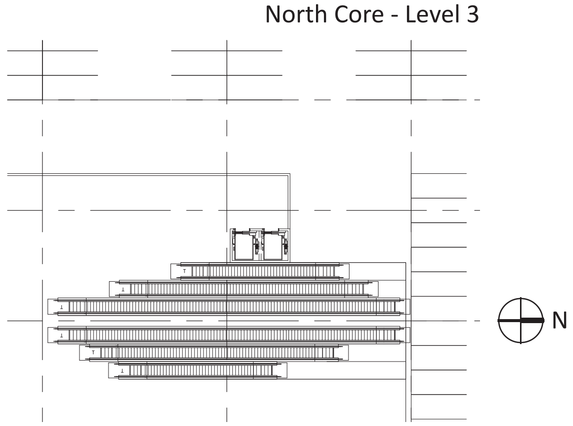
North Core - Level 1



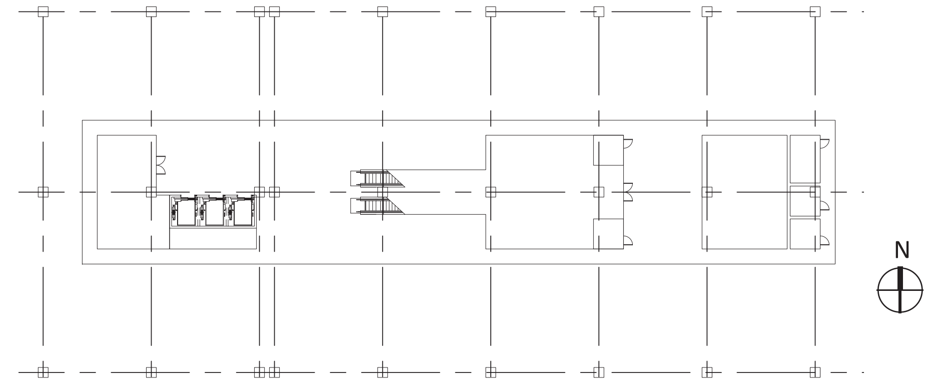
North Core - Level 2



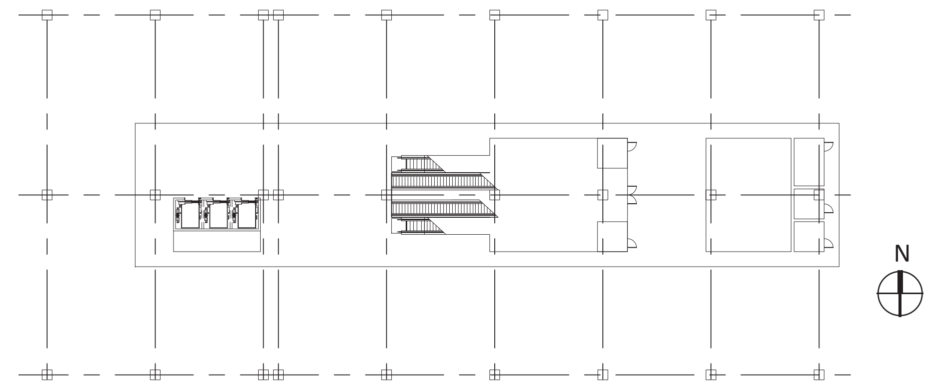
North Core - Level 3



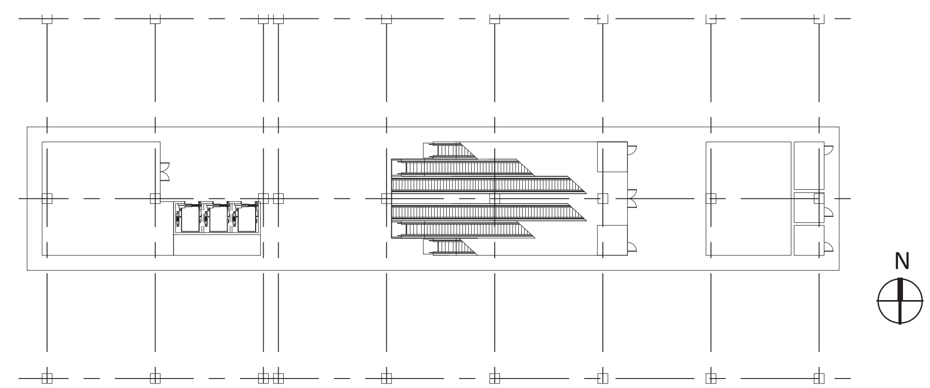
North Core - Roof Level



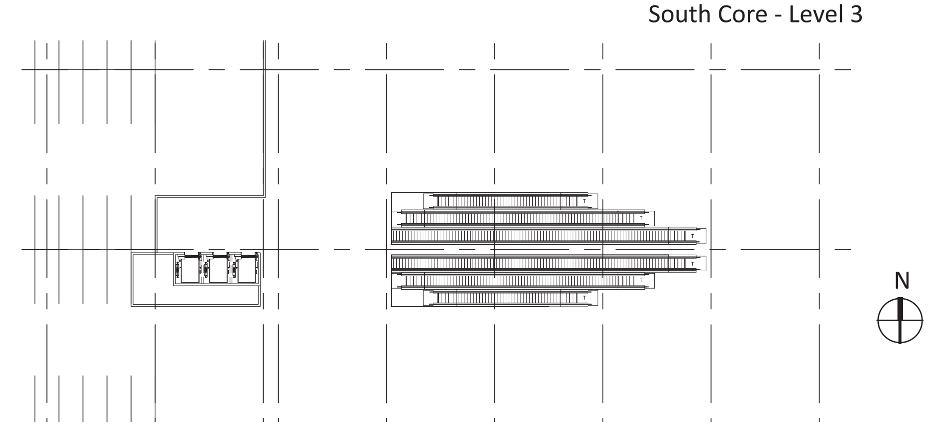
South Core - Level 1



South Core - Level 2

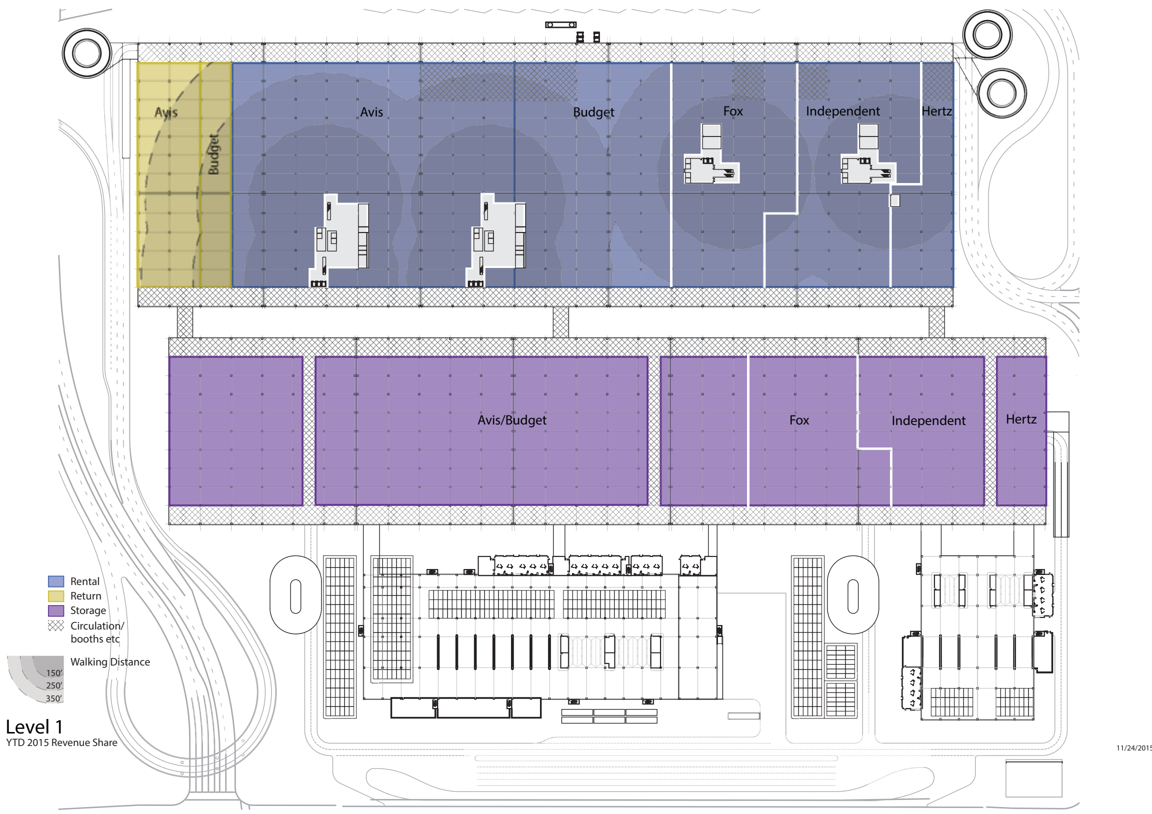


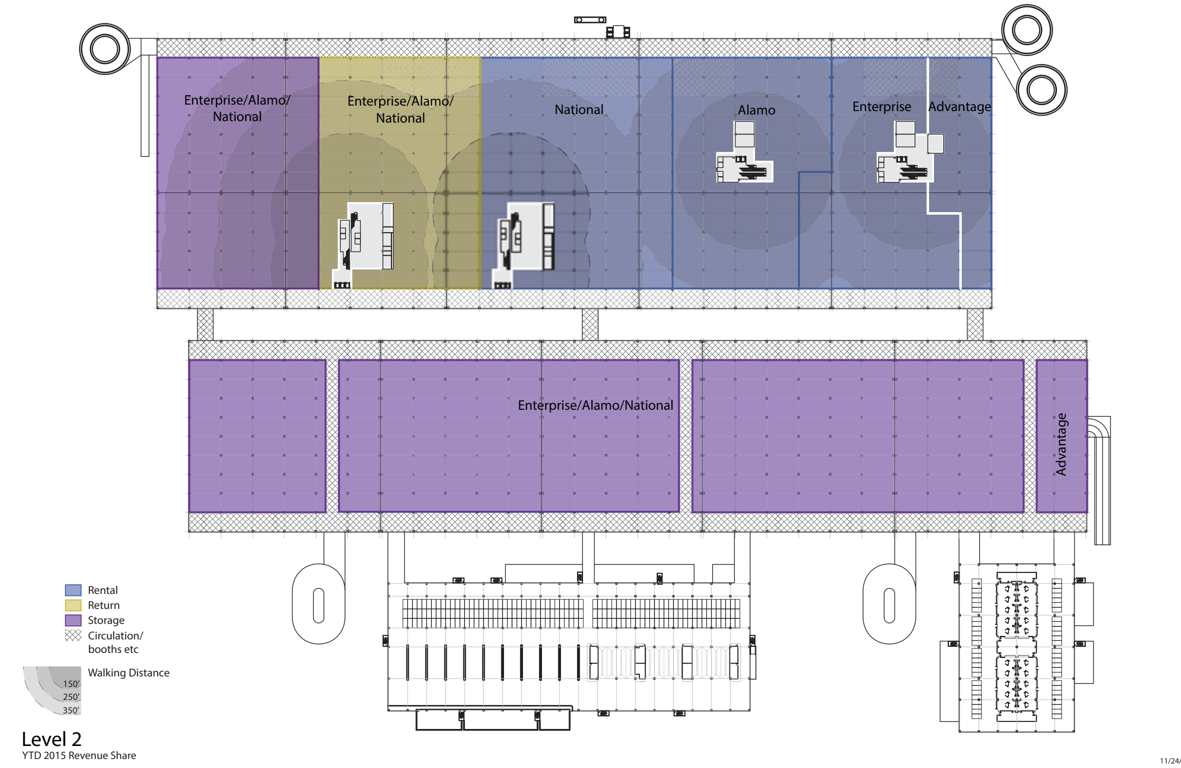
South Core - Level 3

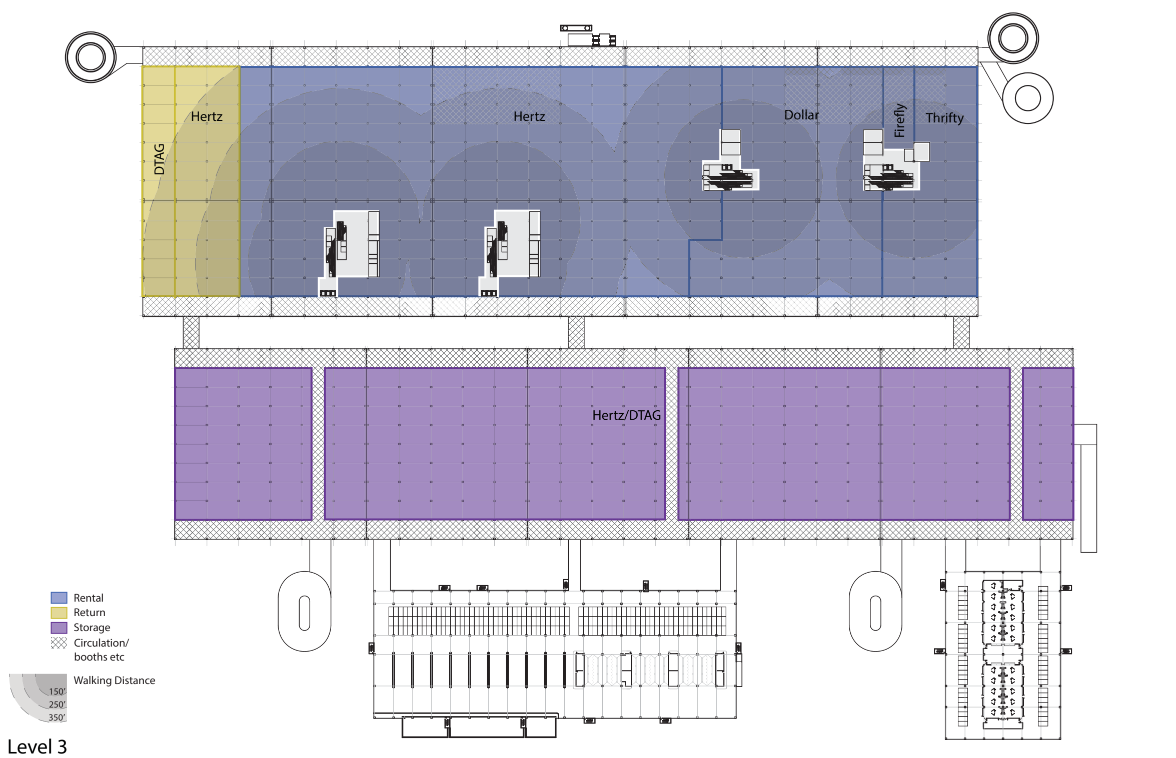


South Core - Roof Level

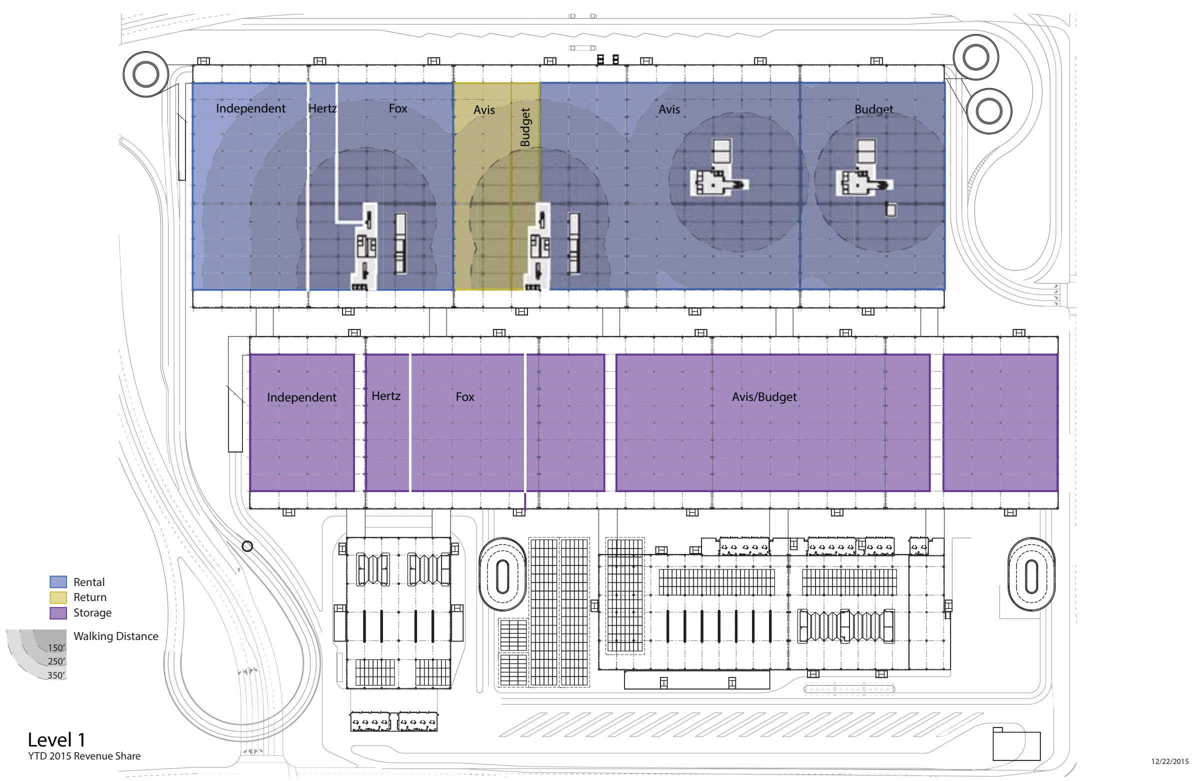
- Studies for the current north core and south core design. For the south cores, reduction in impact to east-west traffic flow by relocating elevators west of escalators and placing restrooms by east service roadway. Core width is now limited to just the width of the escalators.



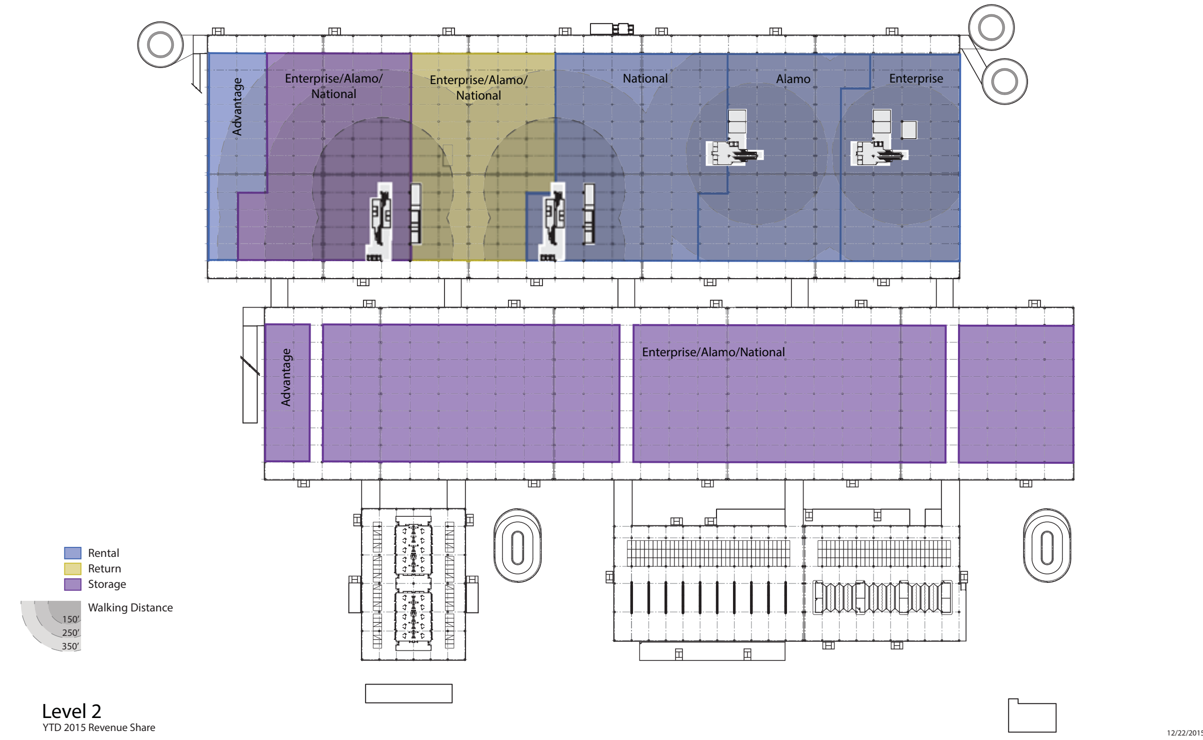




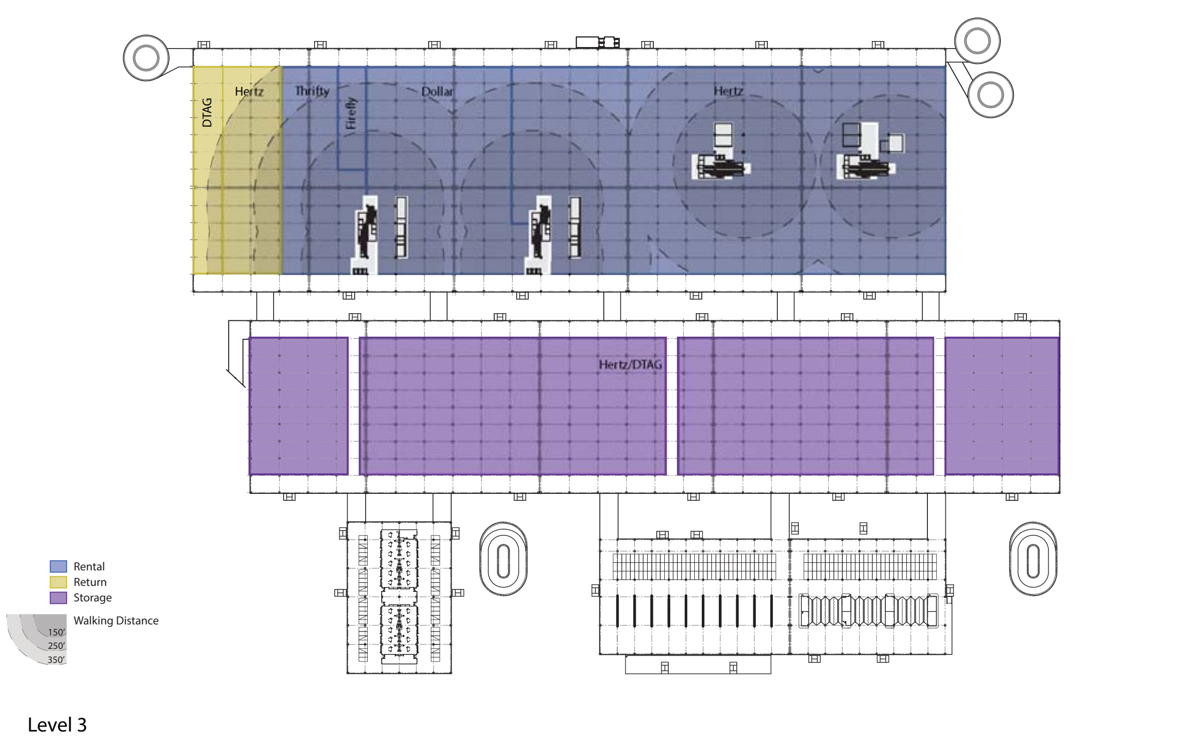
- RAC Garage allocations with 4 cores indicating zones for rental, return, storage, circulation, and distance radii from the access point at bottom of escalators. This series is based on main QTA building at ConRAC South.



Level 1
YTD 2015 Revenue Share

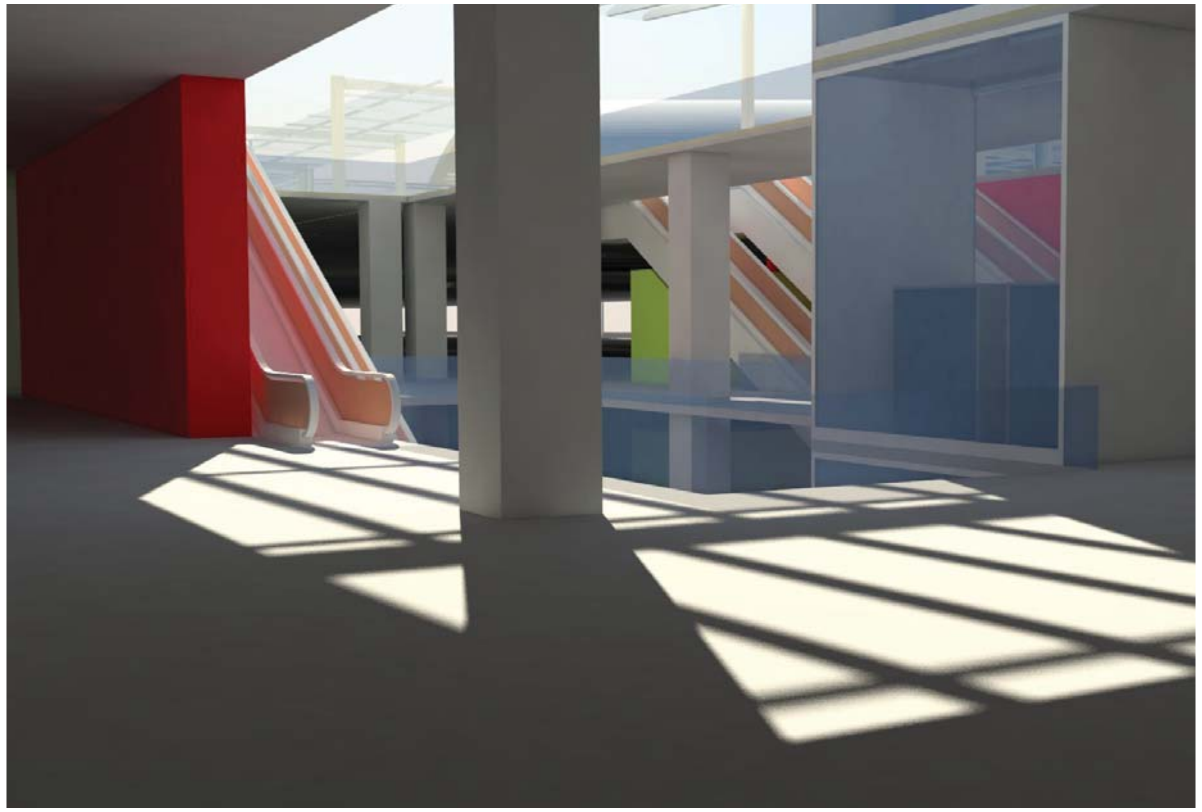


Level 2
YTD 2015 Revenue Share

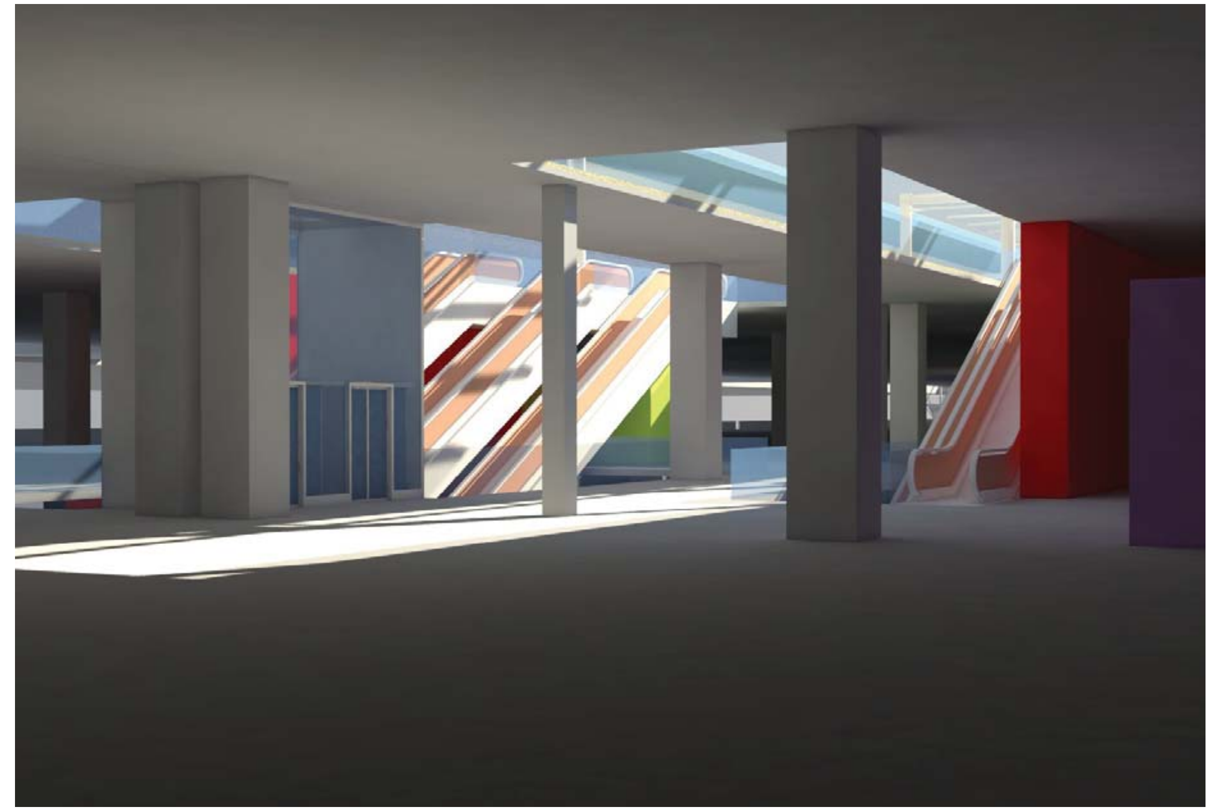


Level 3
YTD 2015 Revenue Share

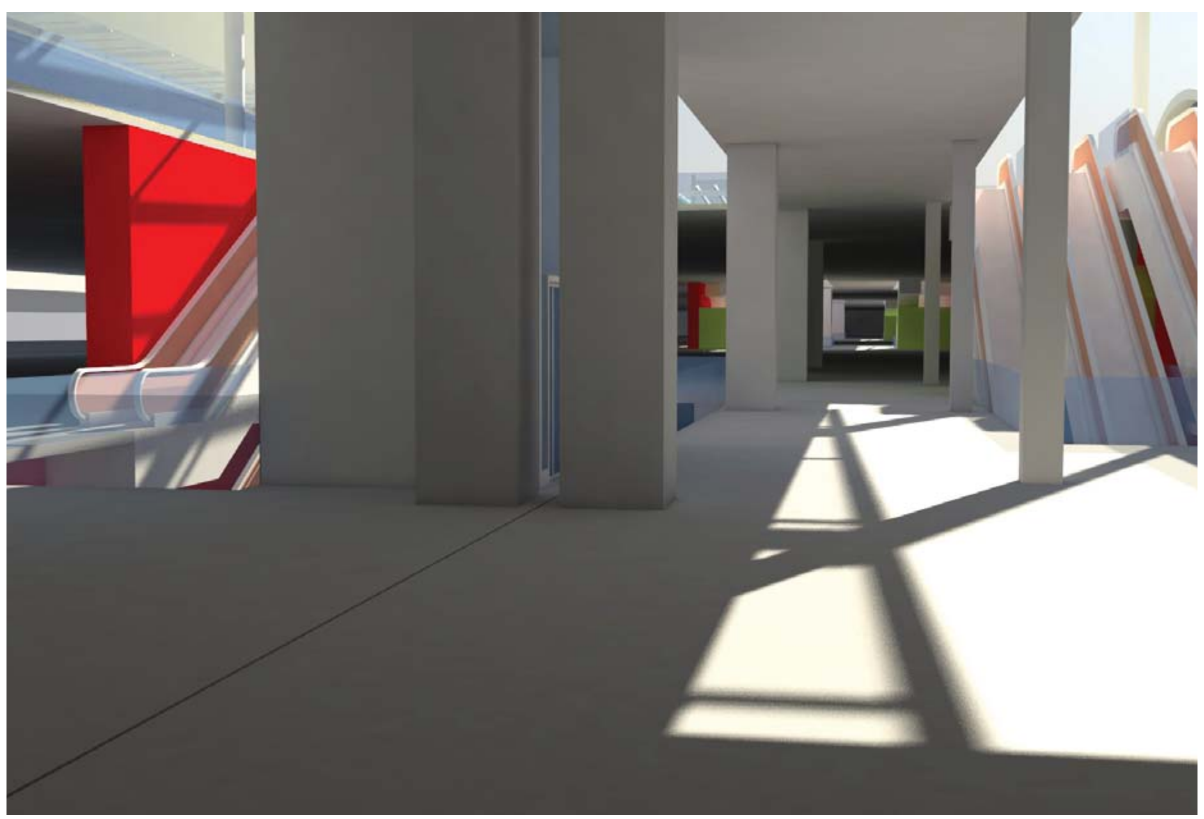
- RAC Garage allocations with 4 cores indicating zones for rental, return, storage, circulation, and distance radii from the access point at the bottom of the escalators. This series is based on Main QTA building at ConRAC North and small and independent operators located south of ConRAC.



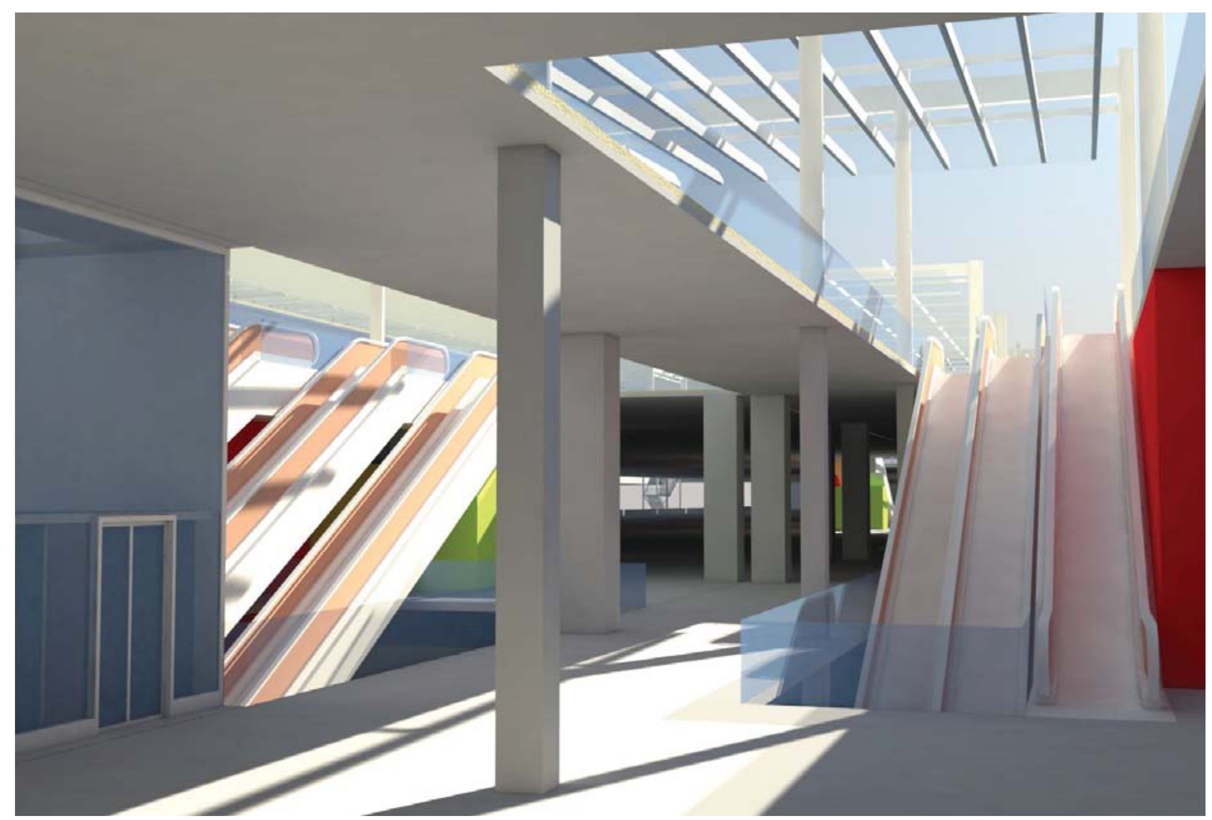
View of core on 3rd floor looking at down escalators



View of core on 3rd floor looking at up escalators and elevators

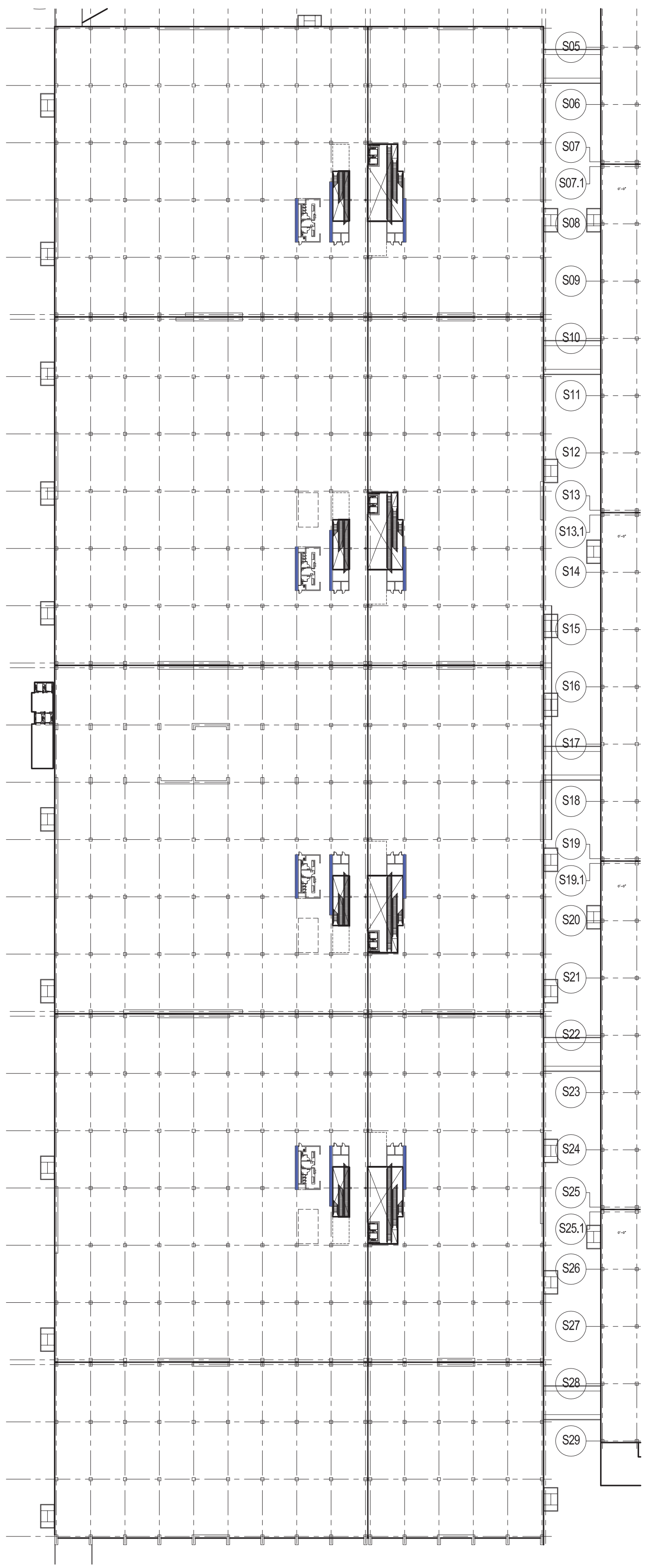


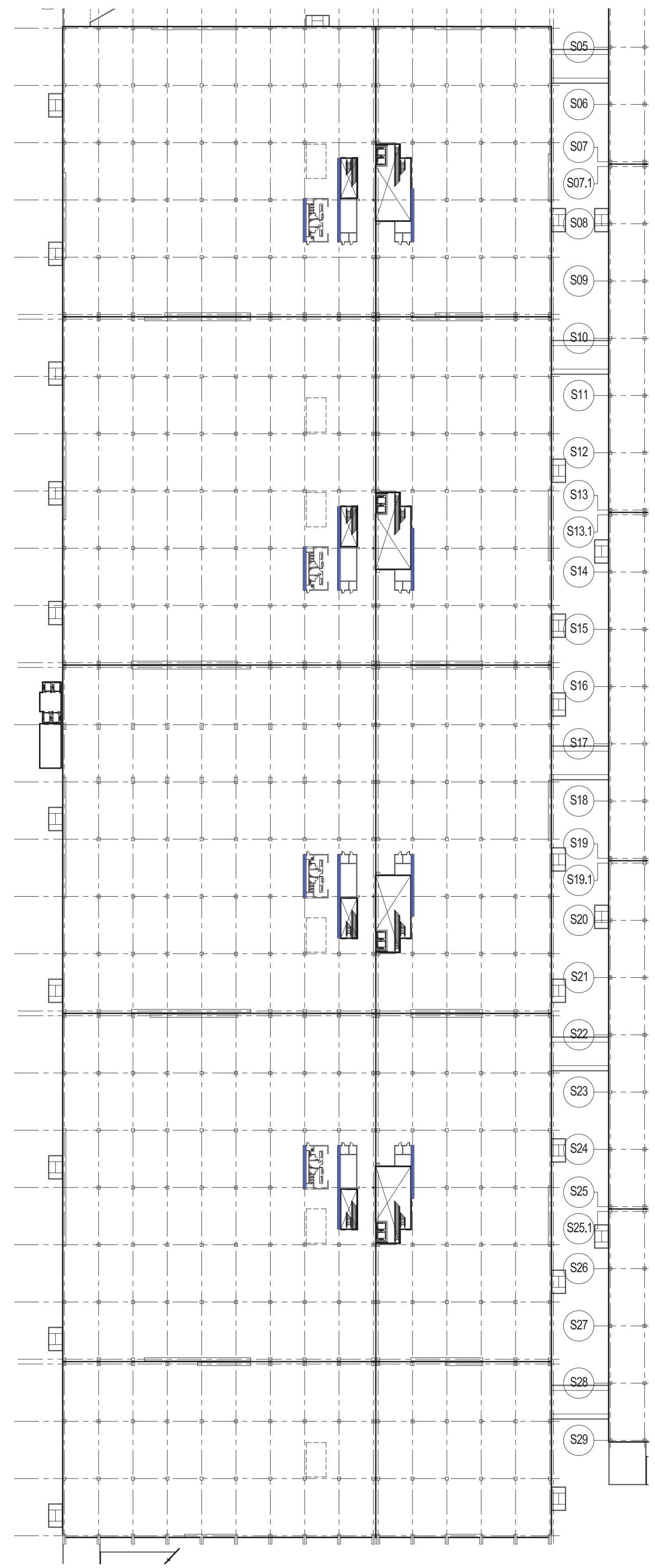
View of core on 3rd floor looking through circulation spine

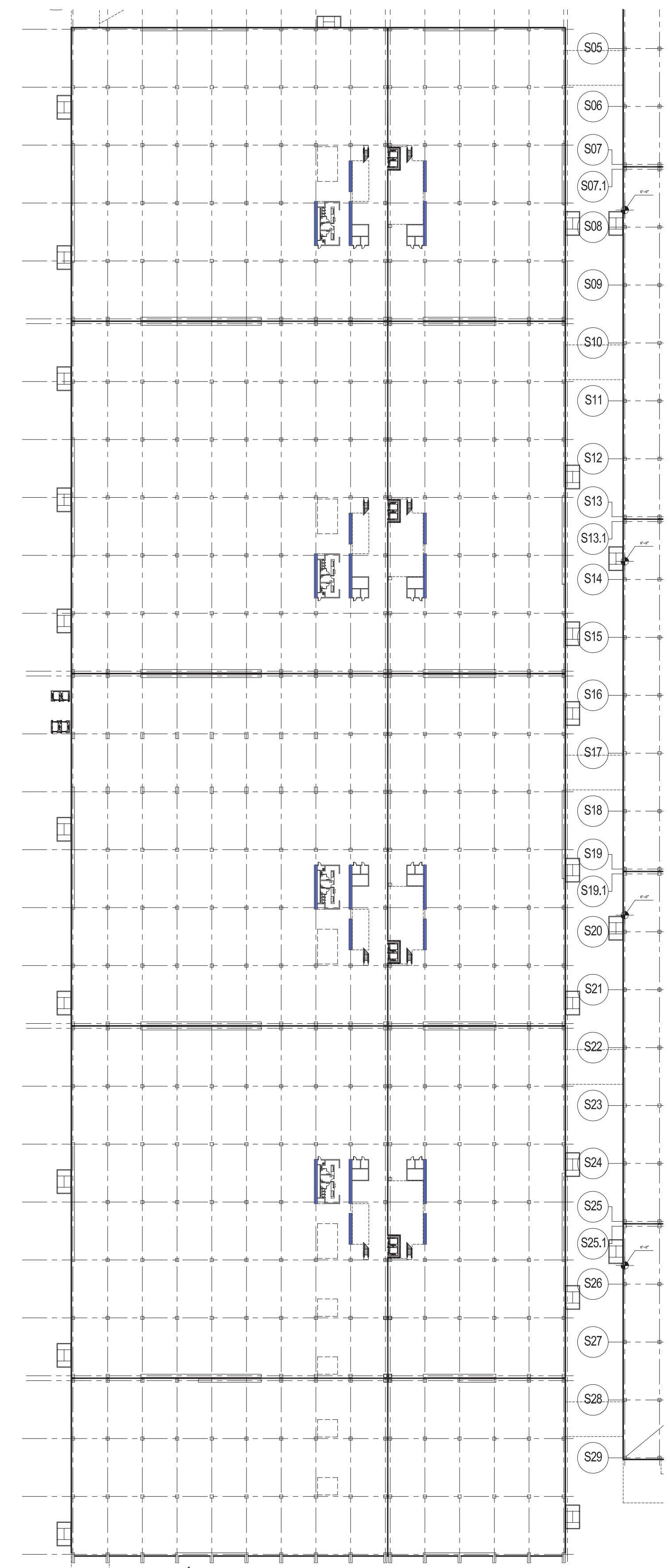


View of core on 3rd floor looking towards roof level

- 3-D modeling of core on 3rd level. The renderings depict shear walls in red, ancillary support spaces in lime green and offices/booths in lilac colors.







- Studies for allocation areas, core locations/ configurations, and RAC level office sizes and locations.

5. COURTYARD EXPERIENCE & AMENITY STUDY

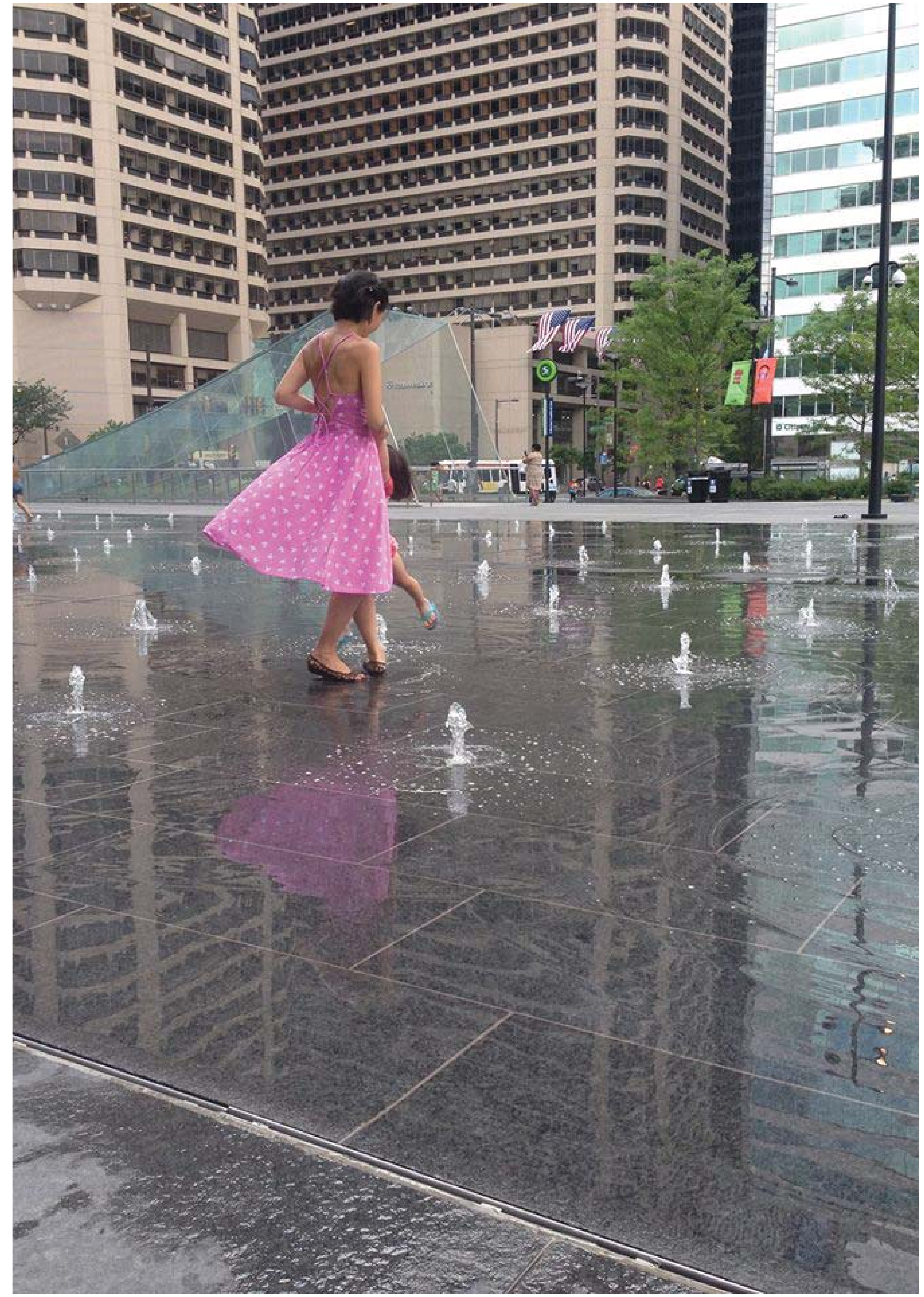
As the roof level CSB design developed, it was recognized that the APM arrival point at the CSB courtyard could be more pleasurable for the traveling public by taking advantage of the opportunity provided by the facility's size and organization to introduce amenities that would improve the customer experience.

Goals were established to provide a courtyard for the CSB that would be welcoming for leisure travelers and their families, and designs that would support a quick and intuitive use for the business traveler.

The following amenities were proposed for implementation in the courtyard:

-Screen walls between roof level parking and CSB courtyard to separate vehicular and pedestrian circulation as well as screens which may provide sound buffering
-Canopies that would provide a continuous sheltered pathway from the APM to the CSB lobbies to the cores
-Greenscape and landscaping elements that would enhance the courtyard resulting in a more welcoming experience and breaking up the vastness of the roof level
-Furnishings such as large seating opportunities to accommodate travelers with families and luggage
-Lighting for general illumination for safety, 24-hour operation, as well as a means to provide wayfinding and identify focal points such as lobbies and cores
-Art to provide visual interest
-Kiosks for information or vending
-Paving designs that would delineate the path of travel and break up the vast hardscape areas

After further discussion of these strategies with the Industry, we were tasked to pare down the proposed amenities to consider cost and maintainability. We determined that at a functional minimum, screen walls and canopies should be incorporated. We expanded our study to focus on wayfinding strategies to direct weary travelers or rushed business travellers to the most efficient routes to their rental cars without backtracking or becoming lost. Both of which would prolong the travel distance and time to complete their transaction at the ConRAC and thereby diminish a positive experience.

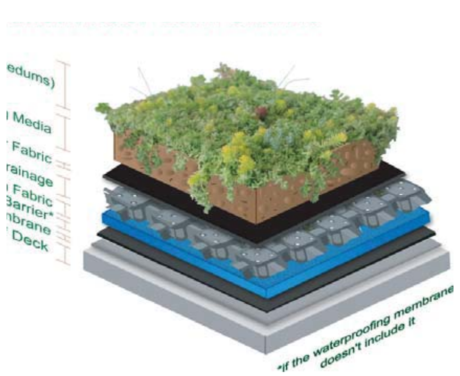


- Examples of water feature at urban courtyard.

Vertical Garden Structure with Lighting
Garden by the Bay, Singapore

Landscape integrated with Paver
High Line, New York

Landscape integrated with Paver
Levinson Plaza, Boston



Green Roof Components

Green Structure
Milan Expo

Vertical Succulent Garden

Landscape integrated with Vehicle Circulation
Burj Khalifa Park, Dubhai

Examples of greenscape

Decorative metal screen fencing

Vertical landscape screen with drought tolerant planting

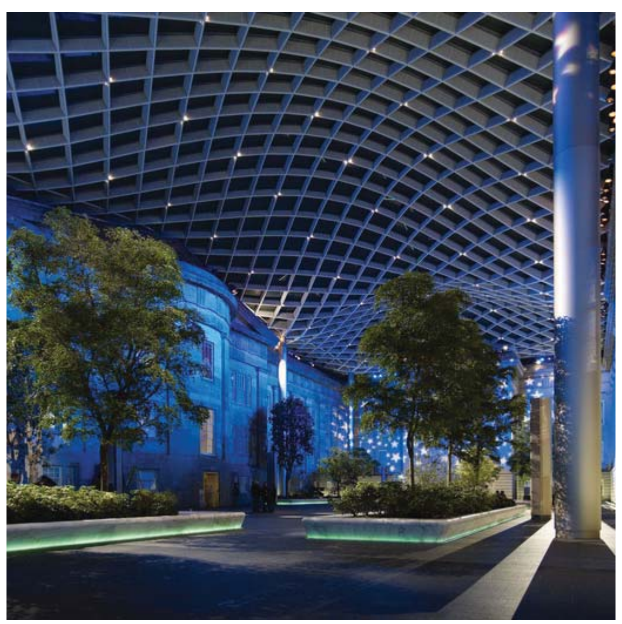
Noise reduction barrier with view panels

Vertical landscape screen

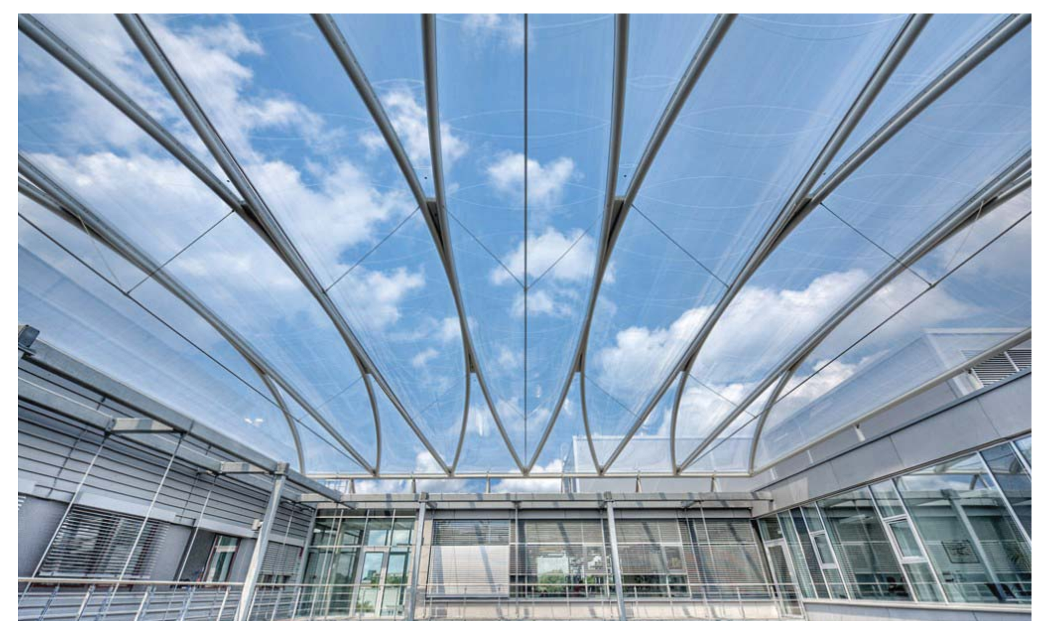
Decorative metal screen

- Examples of screens to divide vehicular and customer pedestrian circulation at the roof level. The screens may also serve as sound buffer depending on the type of screens used.

Tensile steel canopy with ETFE
(Ethylene tetrafluoroethylene)



Metal canopy with glazing and LED lighting



Tensile steel canopy with ETFE
(Ethylene tetrafluoroethylene)

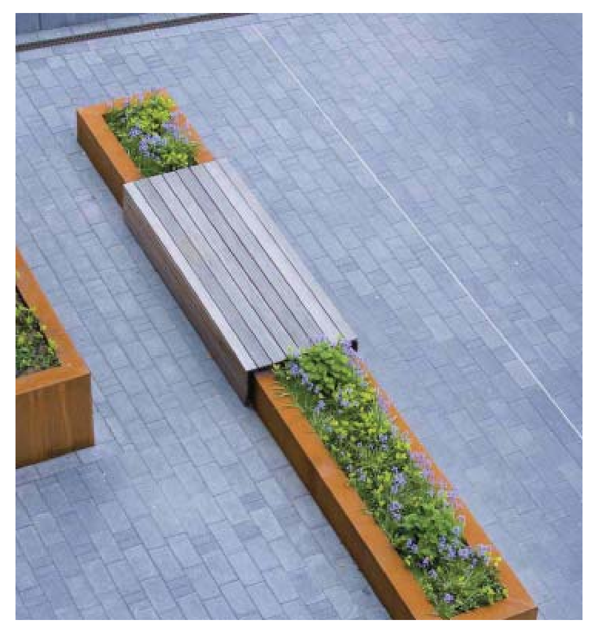
- Examples of canopies which can cover the APM, cores, portions of the courtyard and CSB.

Raised planters with integrated seating

Raised planters of varying heights with drought tolerant plants

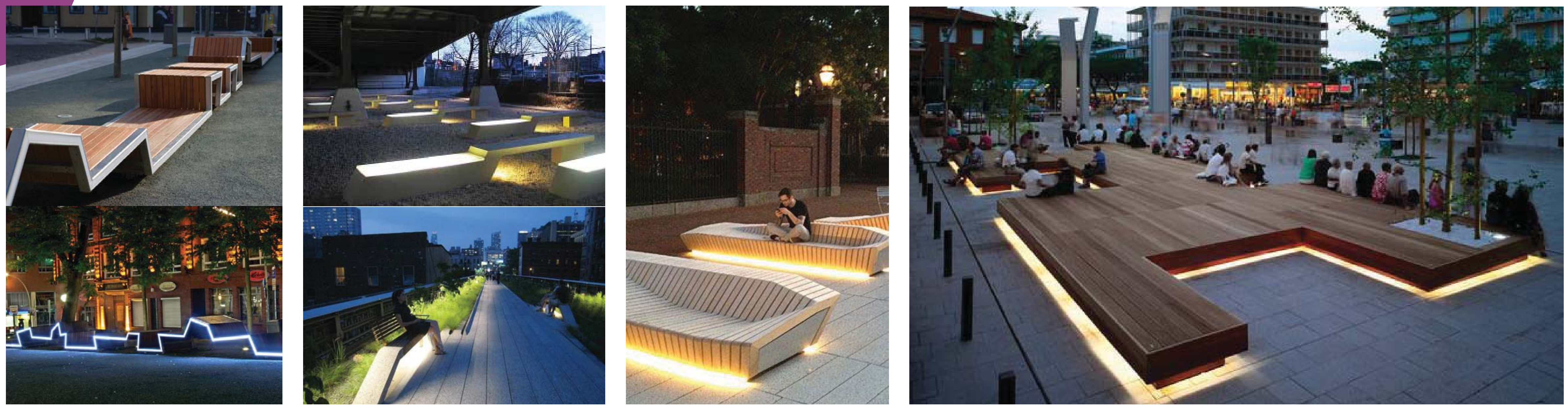
Landscape integrated with Paver

Raised planters with drought tolerant plants



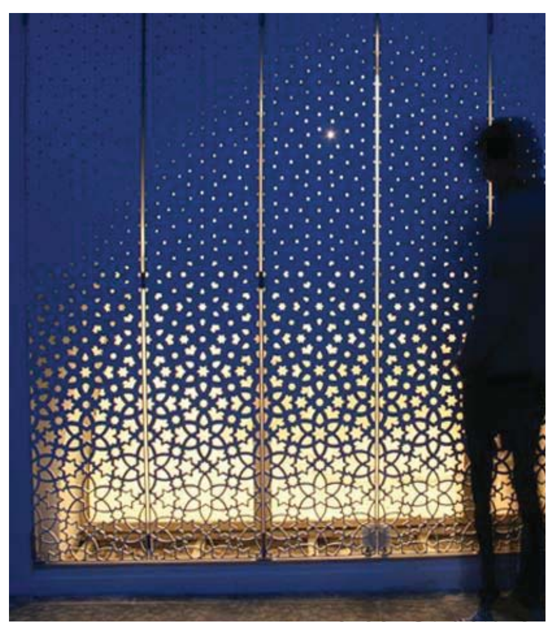
Vertical wall with drought tolerant succulents

- Examples of landscaping including use of vertical planters, drought tolerant plants and staggered height planters.



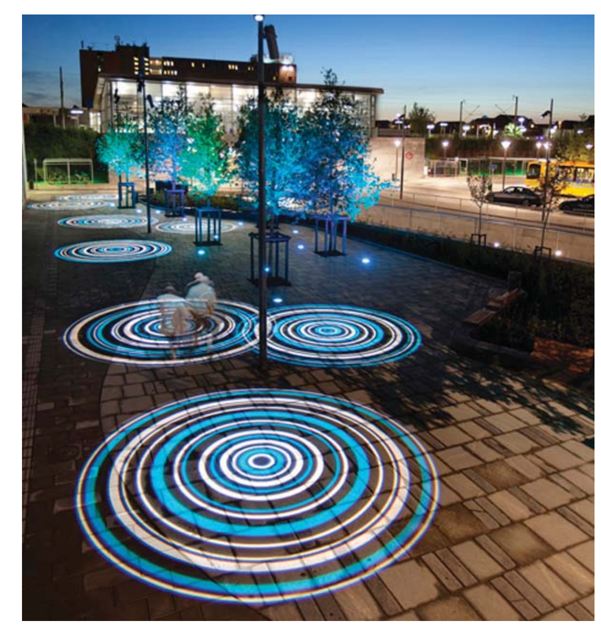
Illuminated site furnishing

Decorative pedestrian lighting



Lit metal mesh screen

Integrated wayfinding lighting



Projected LED light patterns

- Examples of seating with light features for wayfinding. Examples of lighting fixtures, embedded lighting and projected lighting.

Information kiosk

Vending kiosk

Light Sculpture

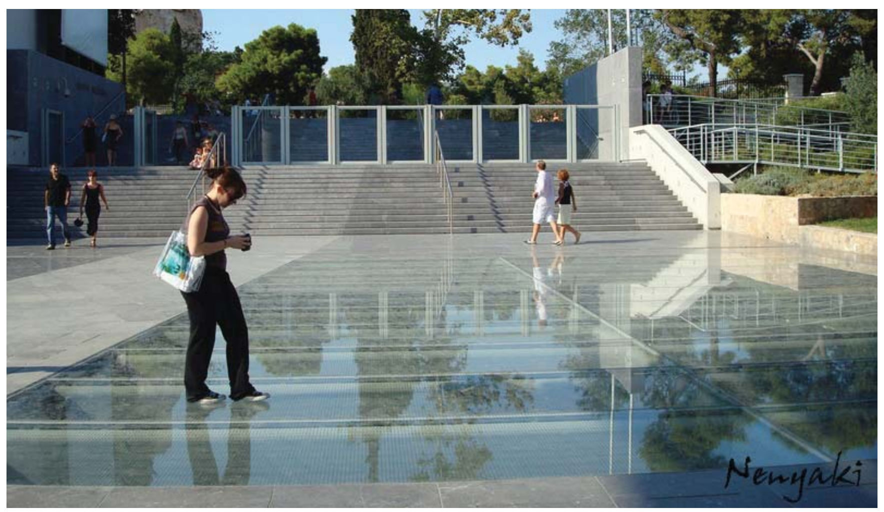
Interactive sculpture

Interactive sculpture

Children friendly sculpture

- Examples of kiosks to serve as information booths or small retail. Examples of interactive art.

Super graphic visible from above

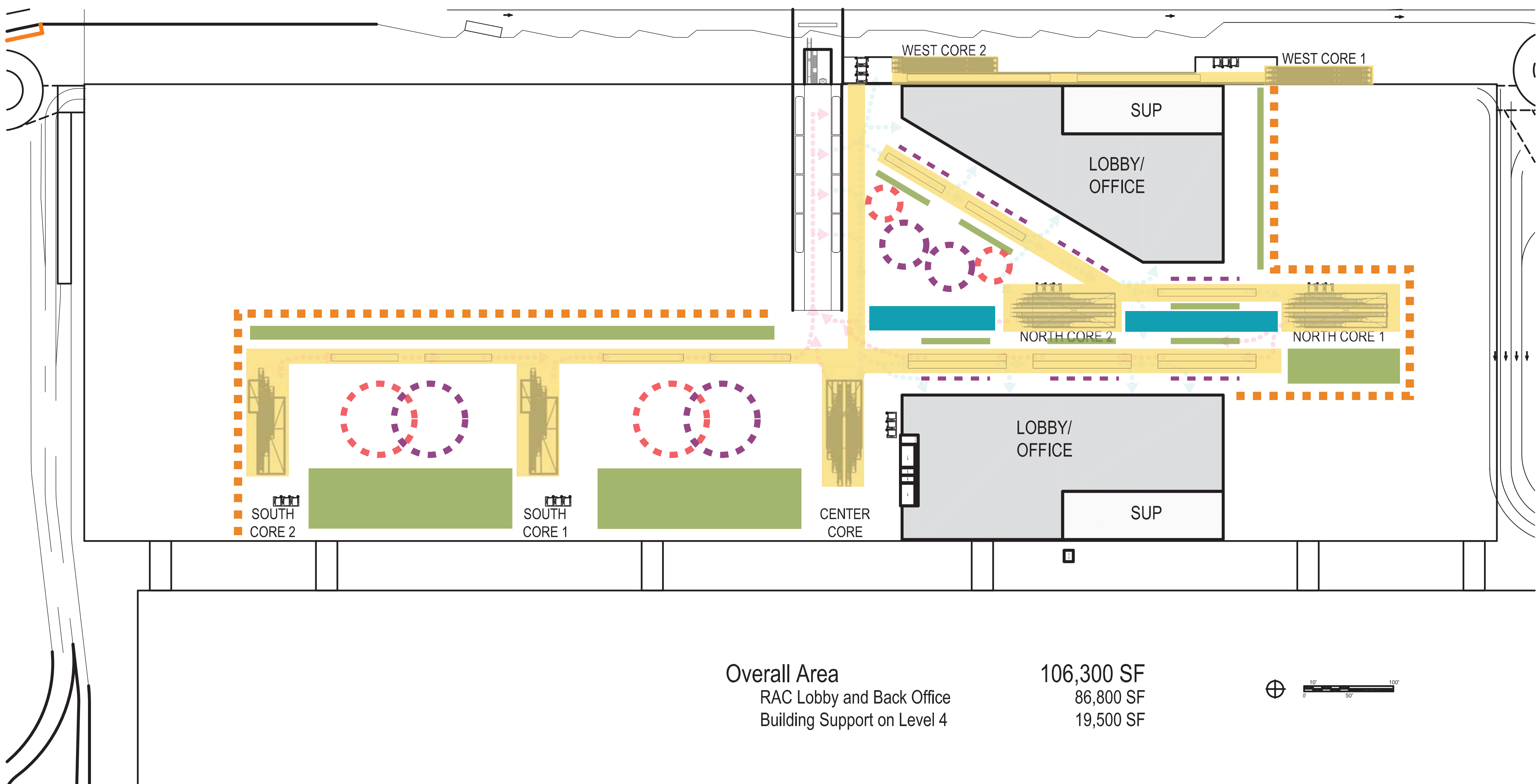


Structural glazing to provide daylight and view of RAC

Interactive paving
(sun dial)

Colored paving to aid with wayfinding

- Examples of paving with opportunity to view RAC level from CSB level.



Overall Area	106,300 SF
RAC Lobby and Back Office	86,800 SF
Building Support on Level 4	19,500 SF

- Study of courtyard and placement of amenities aimed to provide a positive customer experience.

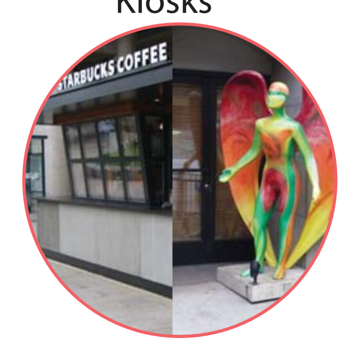
Screens

Canopies

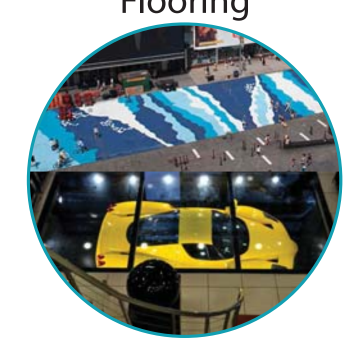
Greenscape
& Planters

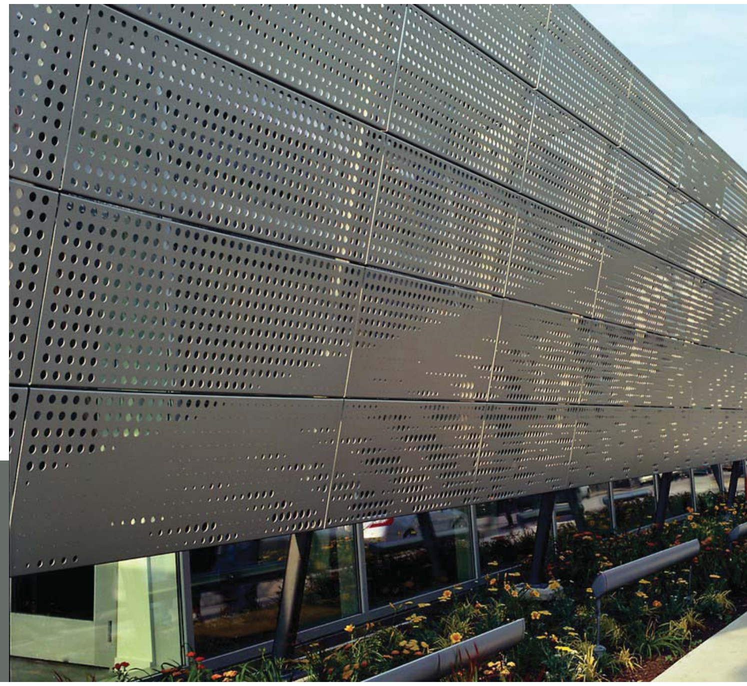
Furnishings
& Illumination

Art &
Kiosks



Paving &
Flooring

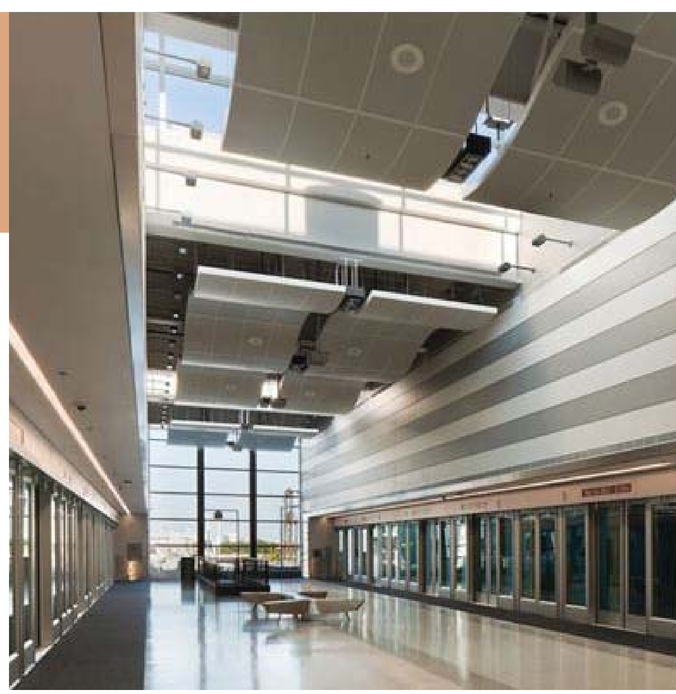




Decorative metal screen fencing

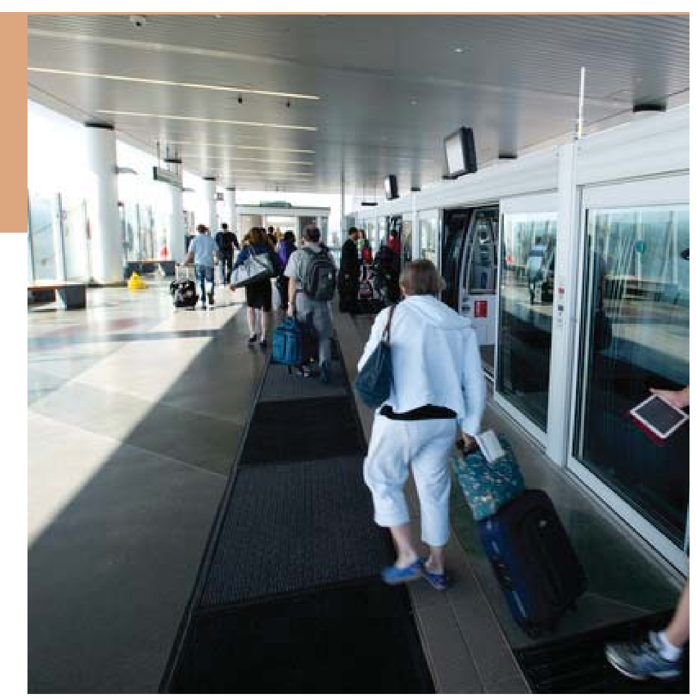
Vertical landscape screen with drought tolerant planting

Acoustic barrier louvered screen wall



Enclosed lobby for Automated People Mover

Tunnel enclosure for Automated People Mover



Semi-enclosed shelter for Automated People Mover

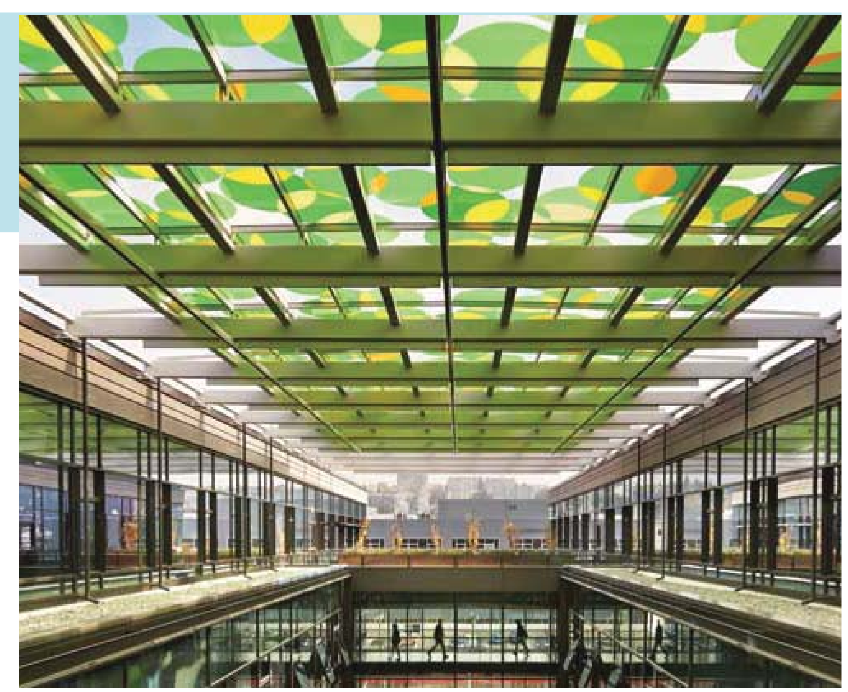
- Refined examples of screens and APM roof/enclosures.

Concrete planter pots with water-wise plants

Planters integrated with seating

Breezeway canopy with ETFE panels
(Ethylene tetrafluoroethylene)

Photovoltaic canopy

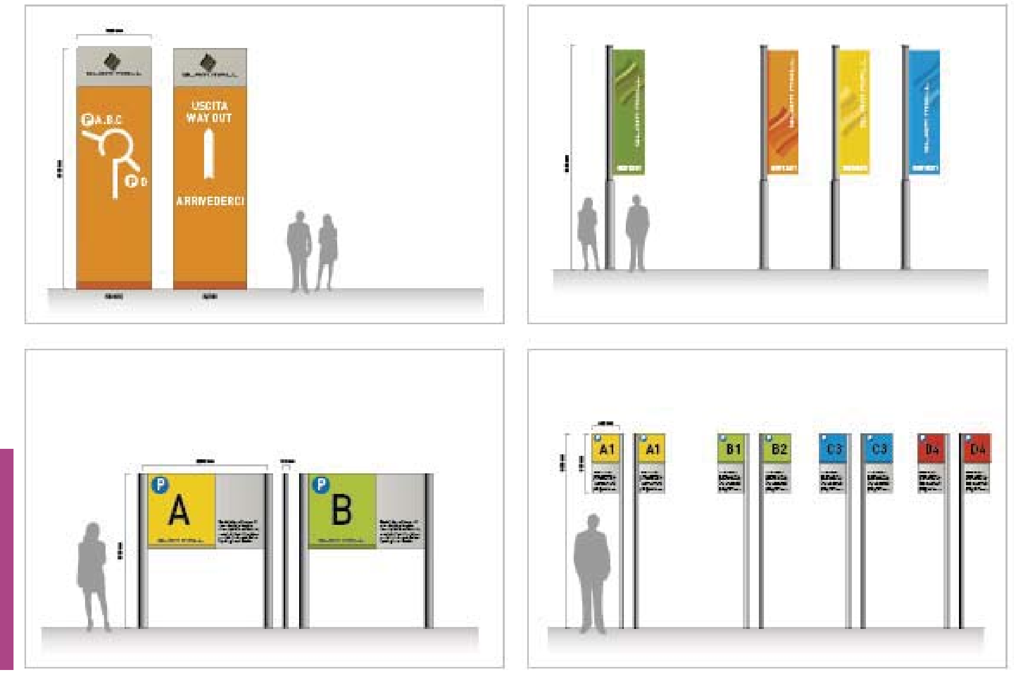


Kalwall canopy with graphic

- Refined examples of landscaping utilizing raised planter beds and pots. Examples of canopies over cores and exterior circulation paths.

Luminous escalator signage

Multi-dimensionan sigage



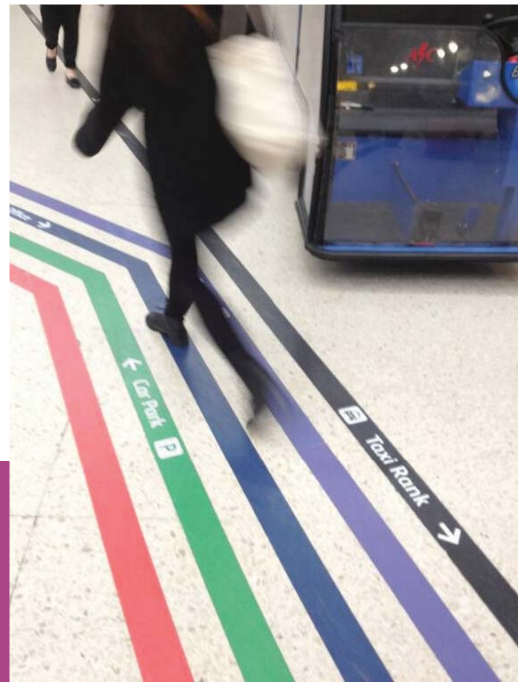
Signage family- kiosks, banners, pedestrian signs

Overhead signage

Pylon Signage with landing identification

Pylon Signage

- Examples of wayfinding which include standard signage and use of building elements to direct customers.

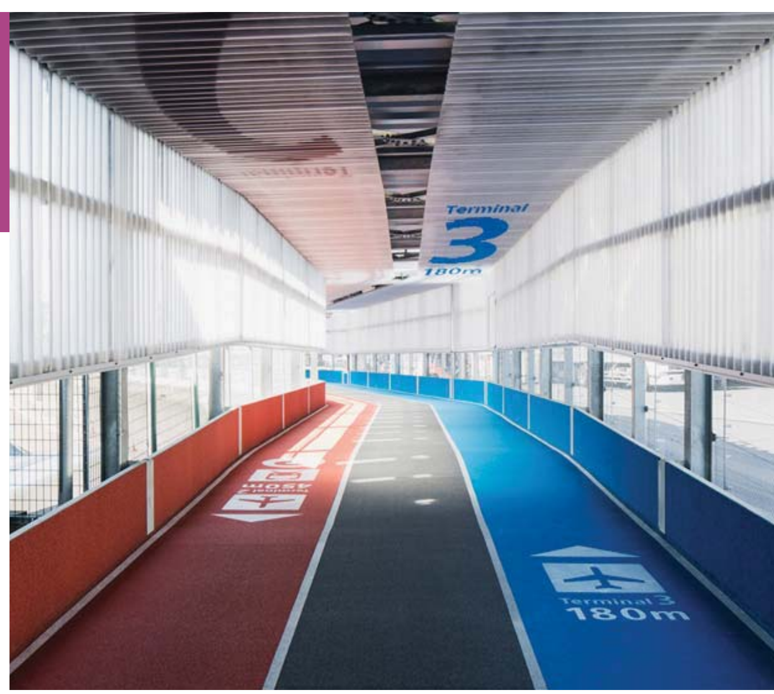


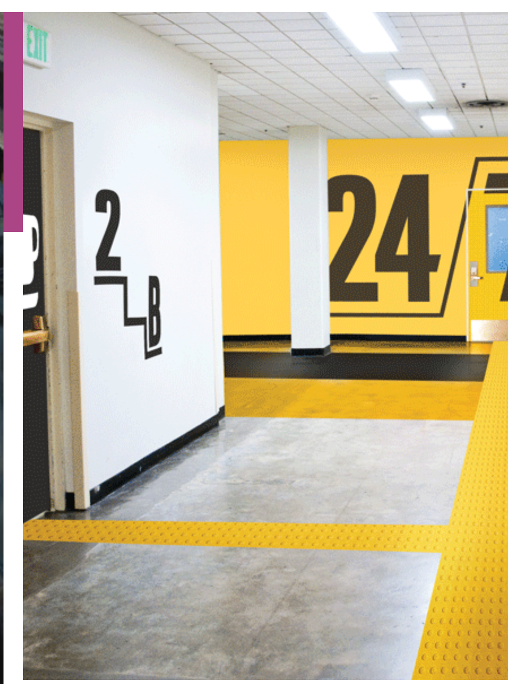
Surface adhered wayfinding

Painted wayfinding

Building facade as wayfinding

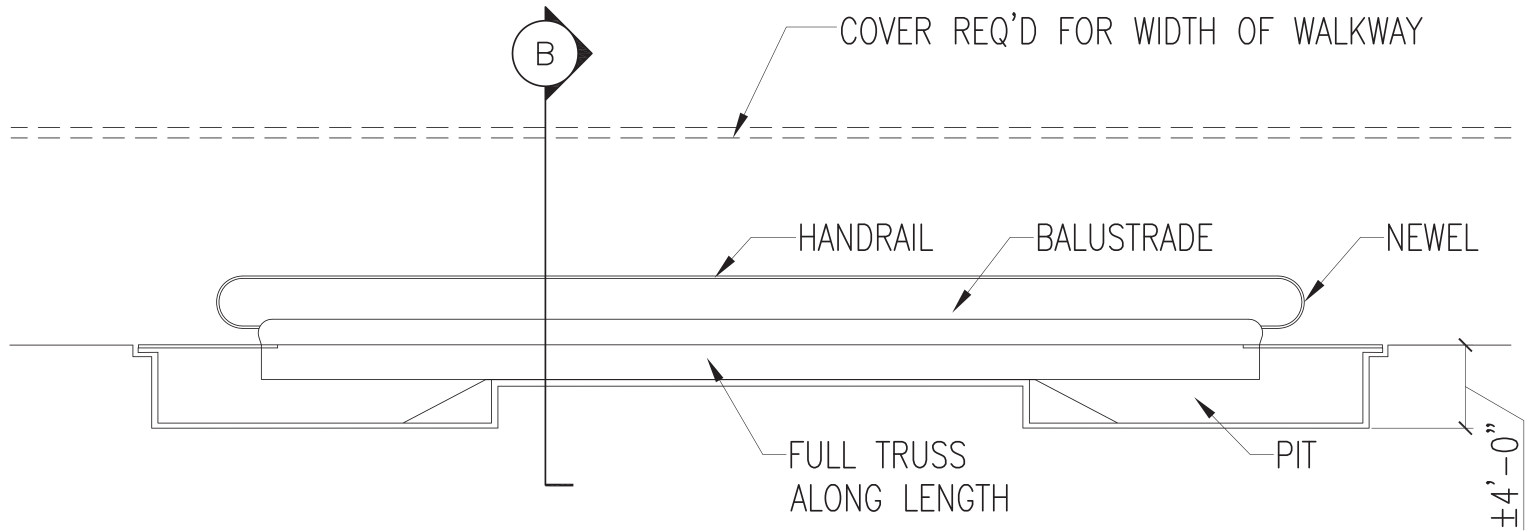
Projected wayfinding



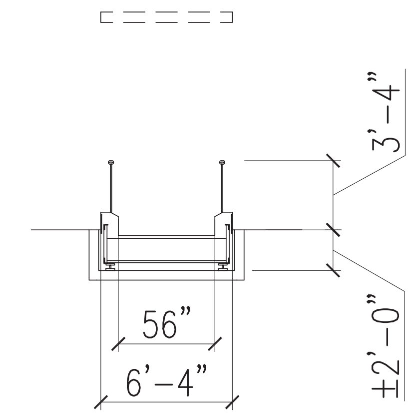


Integrated graphic wayfinding

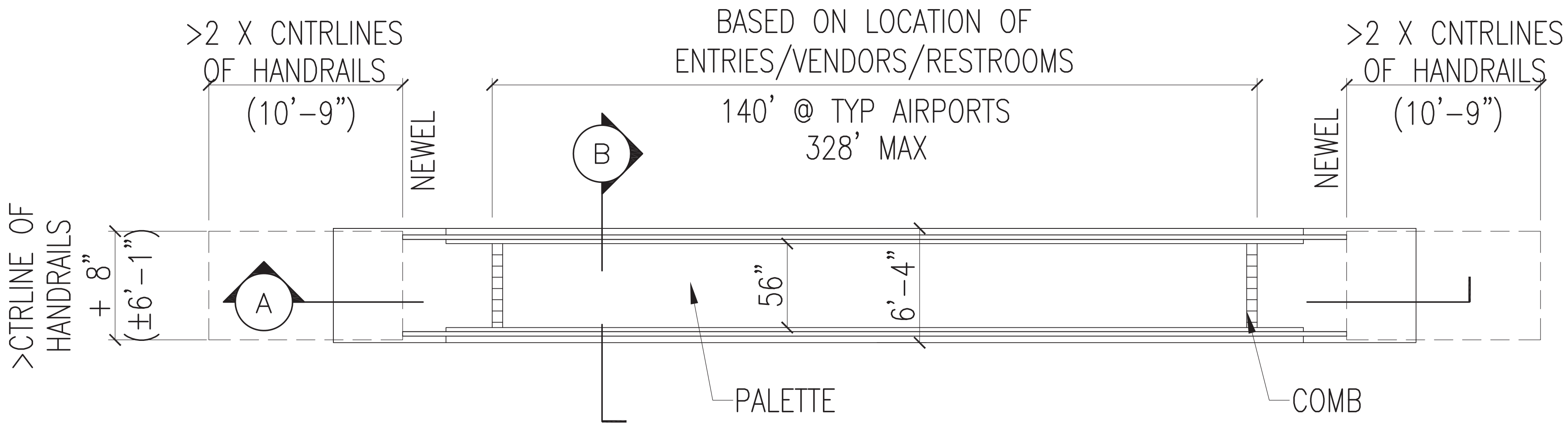
- Examples of wayfinding with use of super graphics, integrated graphics and project graphics.



A SECTION
NTS



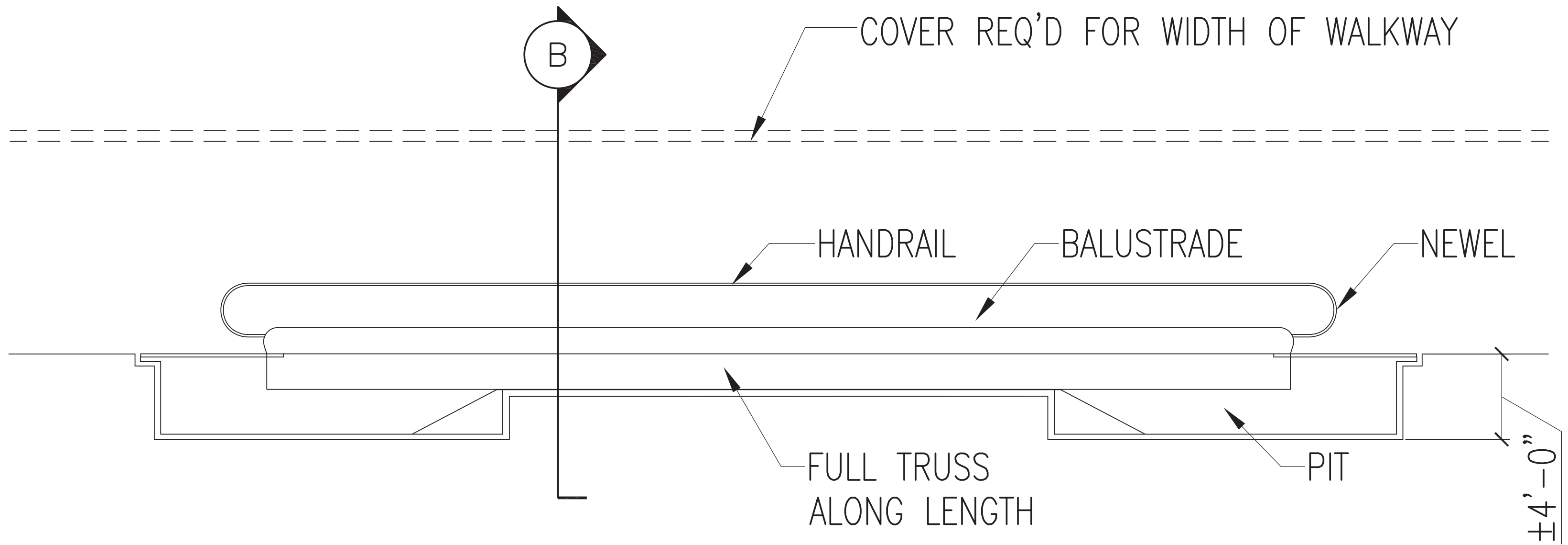
B SECTION
NTS



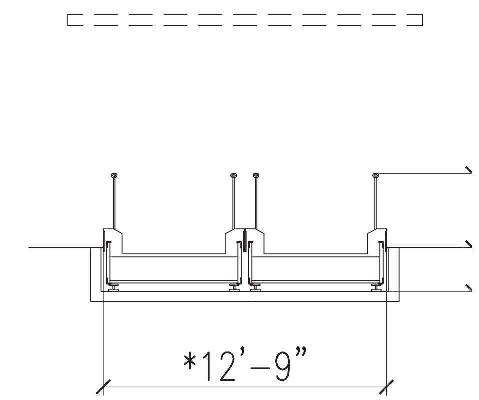
1 PLAN – SINGLE MOVING WALKWAY
NTS

NOTE:
1. DIMENSIONS BASED ON SCHINDLER 9500, TYPE 30, PALLET WIDTH 56"
MAX LENGTH 328' @ 0° INCLINE
2. MOVING WALKS GOVERNED BY ASME A17.1 (CALIFORNIA USES VERSION 2014)
3. *WIDTH OF TWO SIDE BY SIDE MOVING WALKS CAN BE UP TO 16'-0" DEPENDING ON MANUFACTURER AND MODEL
4. PER COMPREHENSIVE SIDWALK STUDY (BETTER STREET PLAN S.F.) COMMERCIAL WALKWAYS TO ACCOMODATE MULTIPLE PEDESTRIANS RECOMMENDED TO BE MINIMALLY 15'-0".

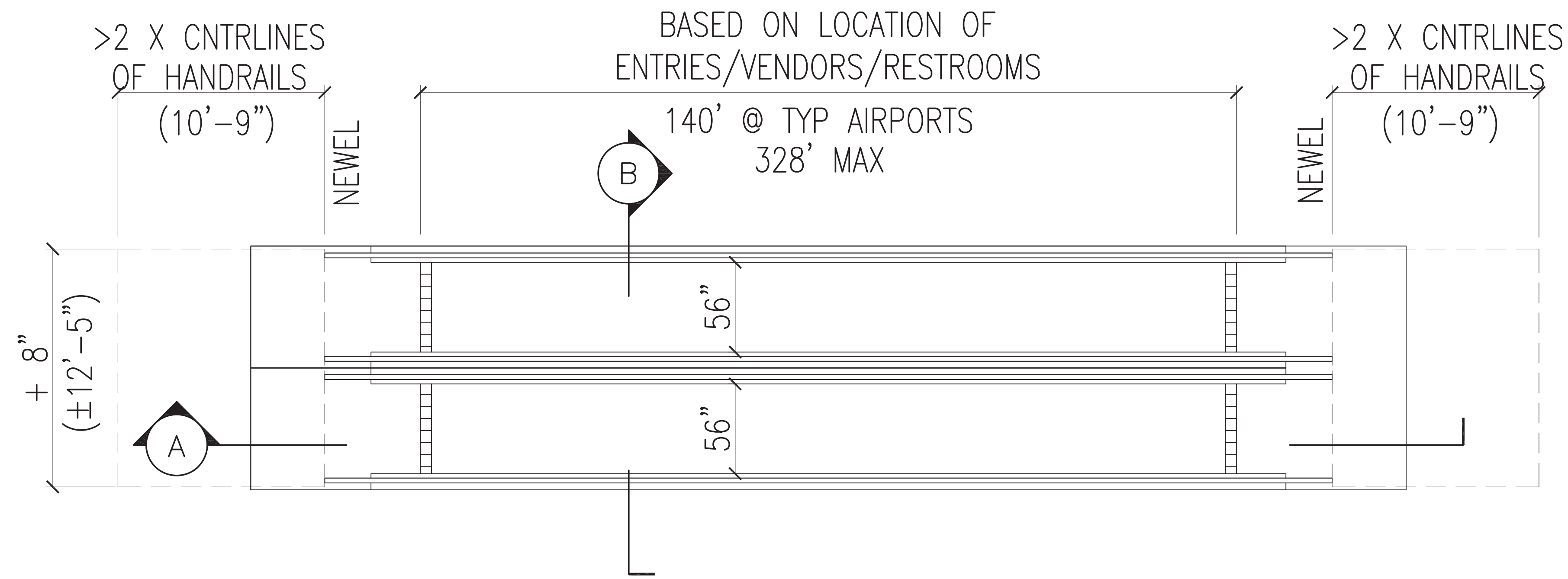
- Study of single moving sidewalk.



A SECTION
NTS

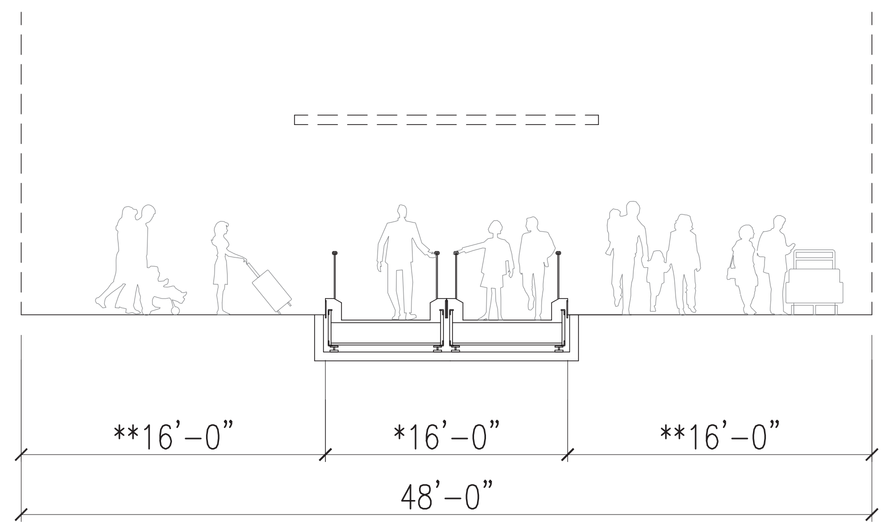


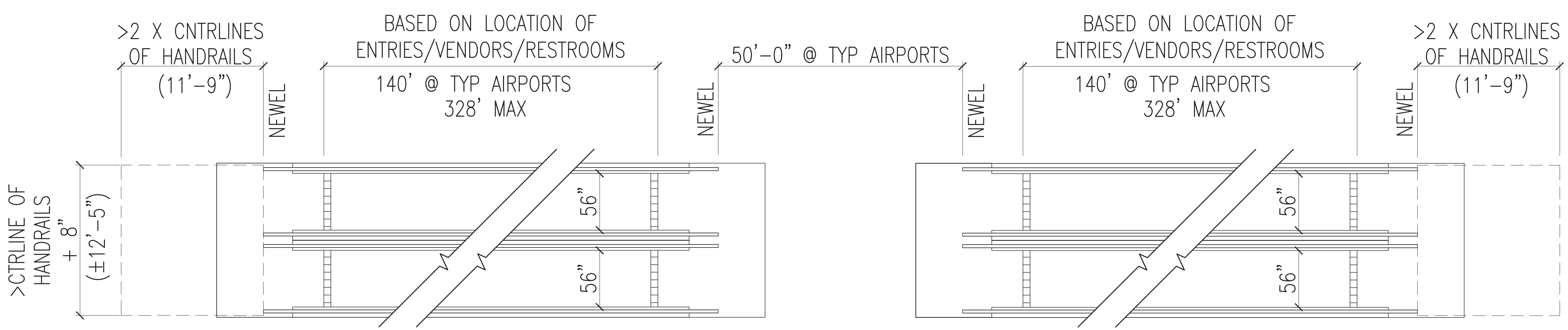
B SECTION
NTS



2 PLAN – DOUBLE MOVING WALKWAY
NTS

- Study of double moving sidewalk.





3 CLEARANCES
NTS

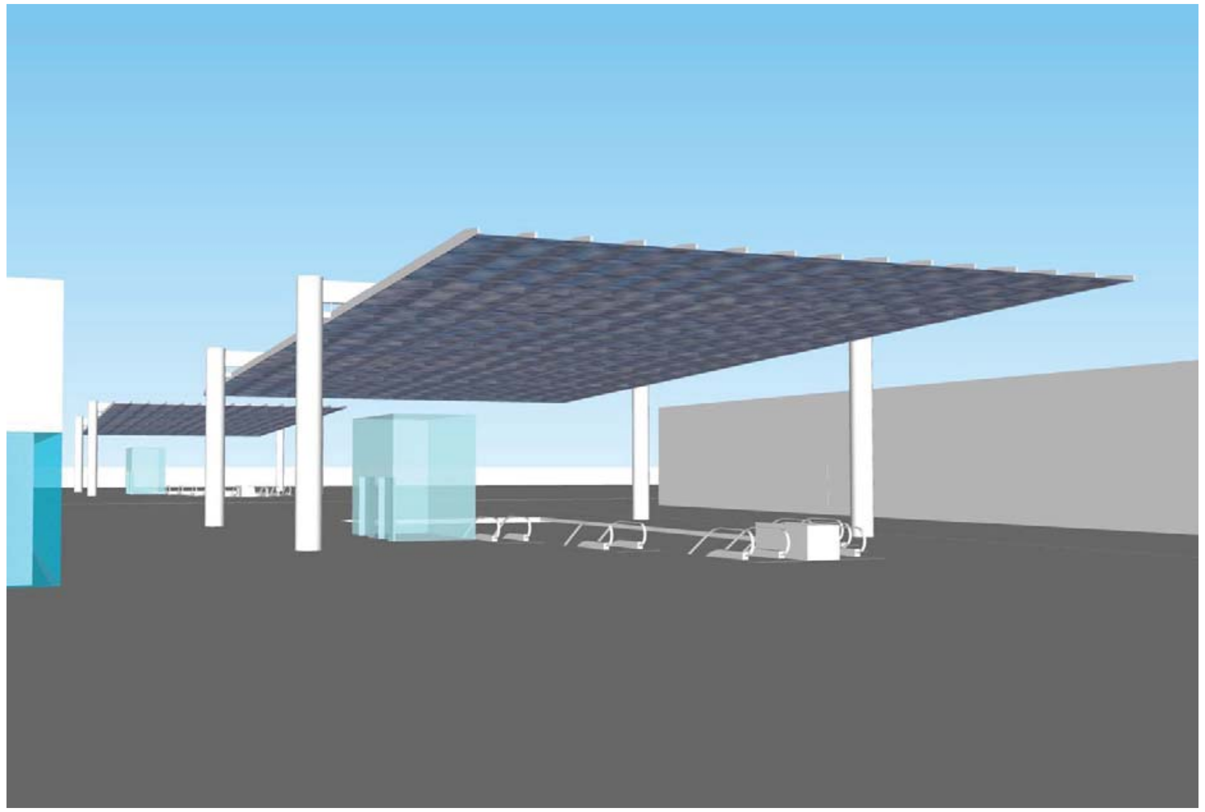
- Study of double moving sidewalk in multiple configuration.

6. CANOPY STUDY

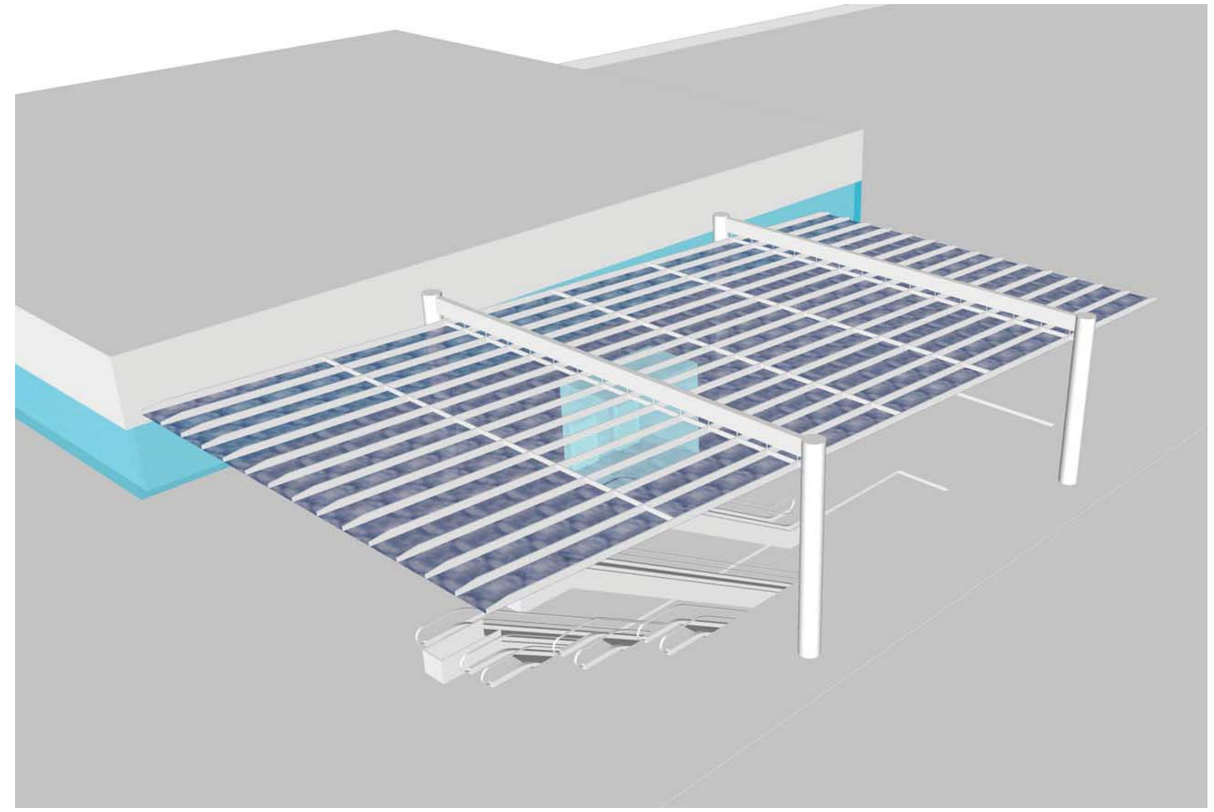
Canopies are recommended to provide a continuous sheltered pathway from the APM to the CSB lobbies and cores. The following are key factors in the design of the canopies:

-Provide weather protection for customers
-Provide weather protection for escalators and elevators and provide focal point for cores
-Compliment design of APM canopy
-Permit light transmittance from roof level to RAC levels below
-Size of canopies over cores to accommodate circulation around core openings

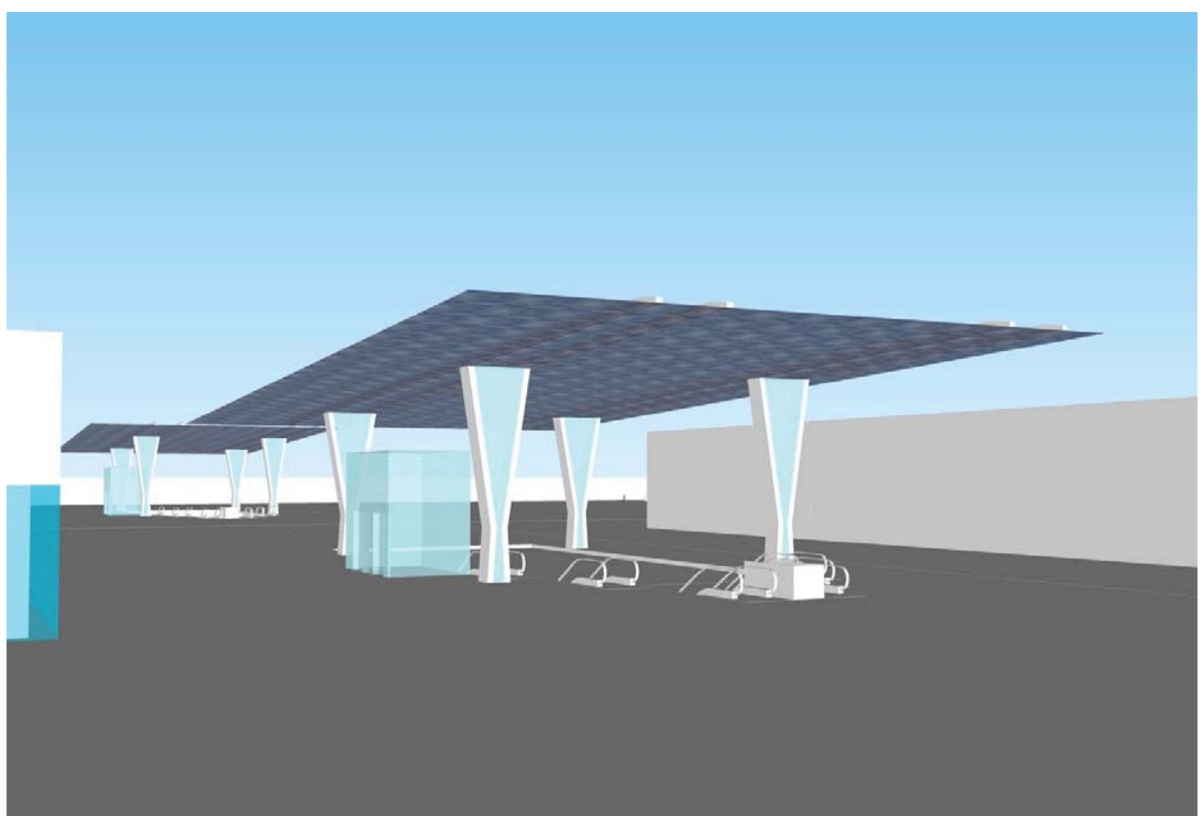
Design considerations included open canopies and canopies with vertical enclosures. The preferred canopy is one which meets the key factors and works with the architectural vocabulary of the CSB components and the APM enclosure.



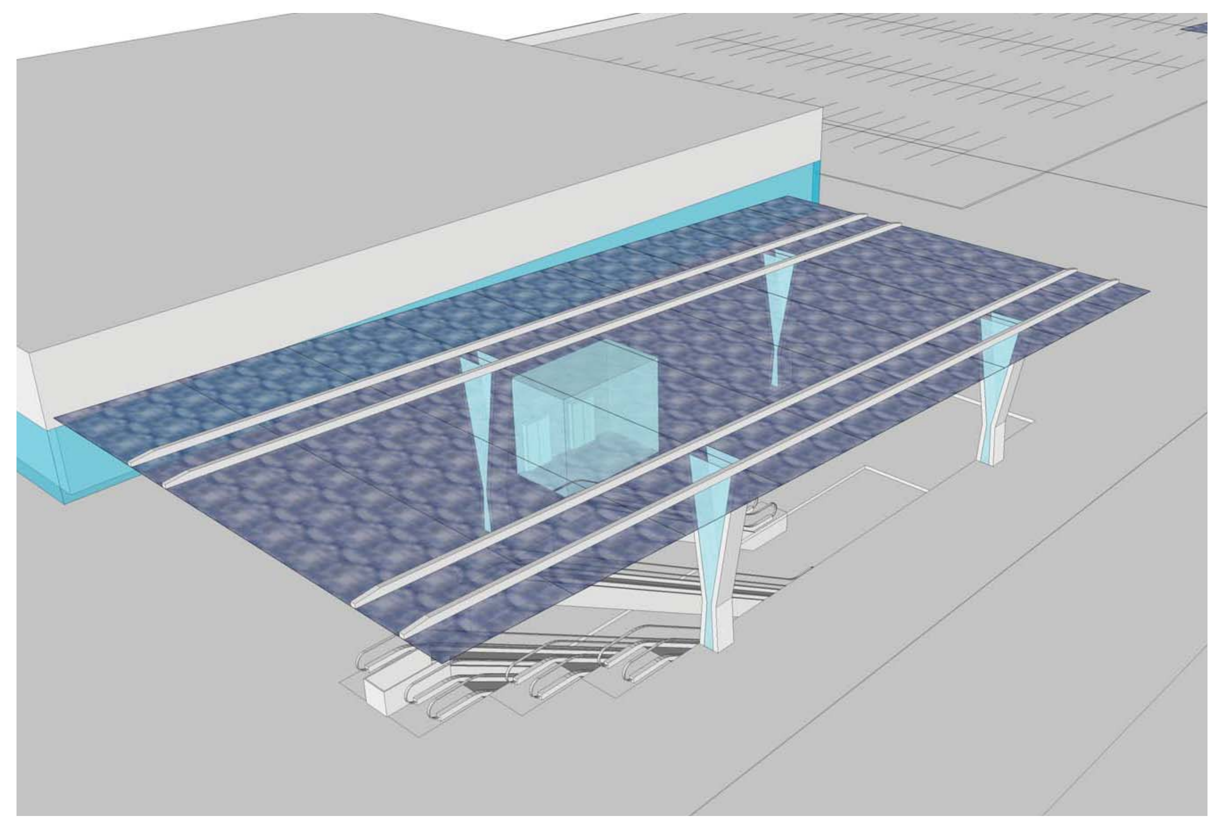
Angled "Post and Beam" canopy



Angled "Post and Beam" canopy

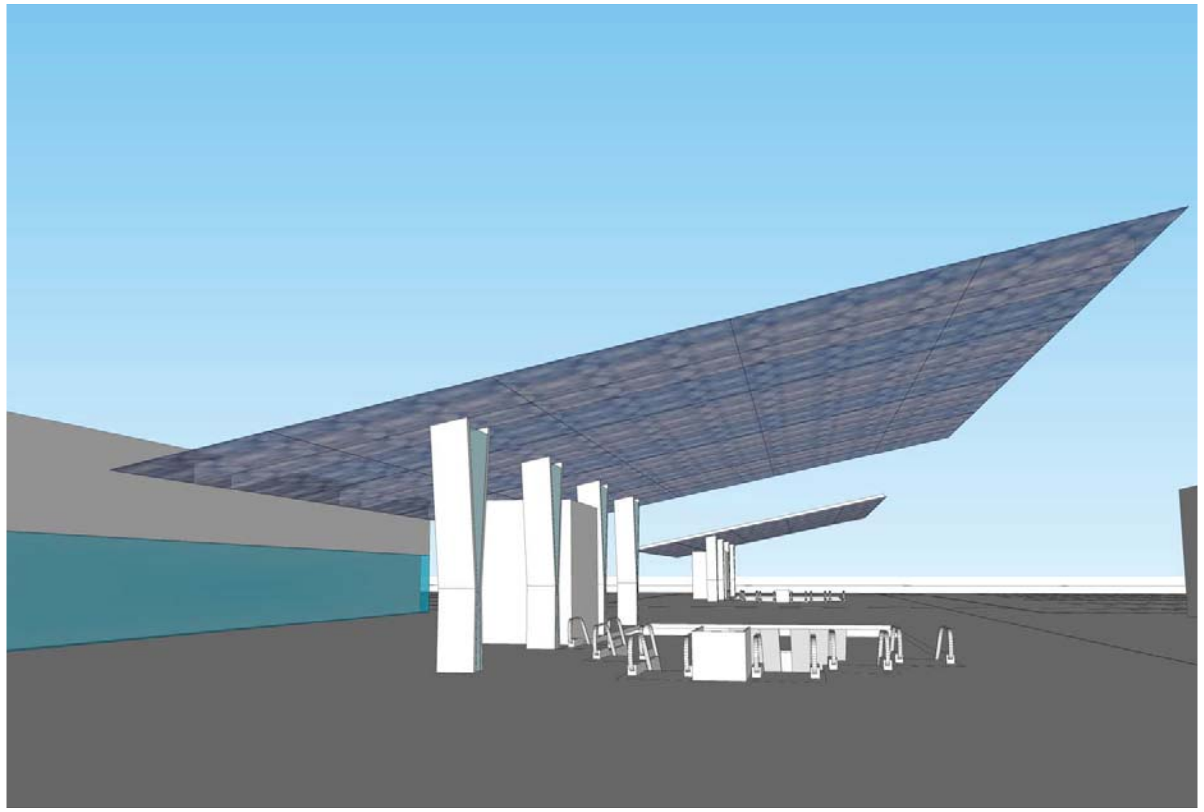


Canopy with double angled columns

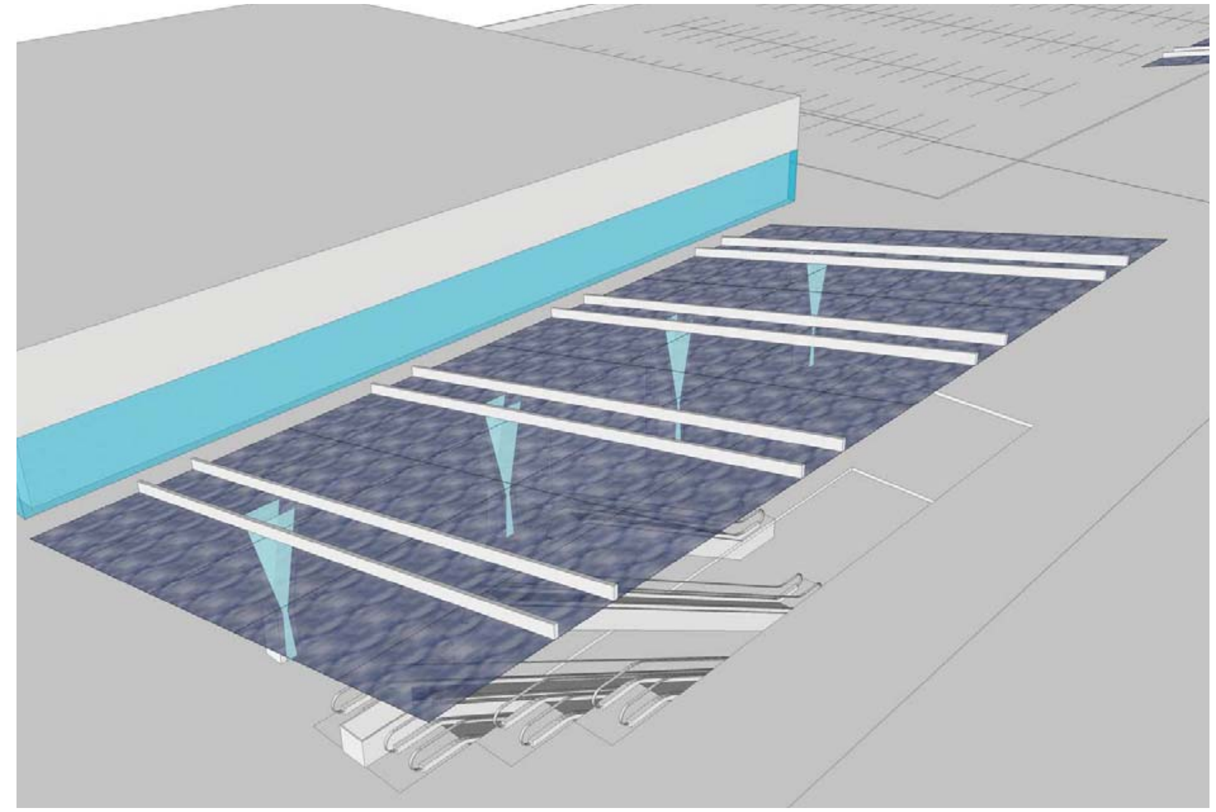


Canopy with double angled columns

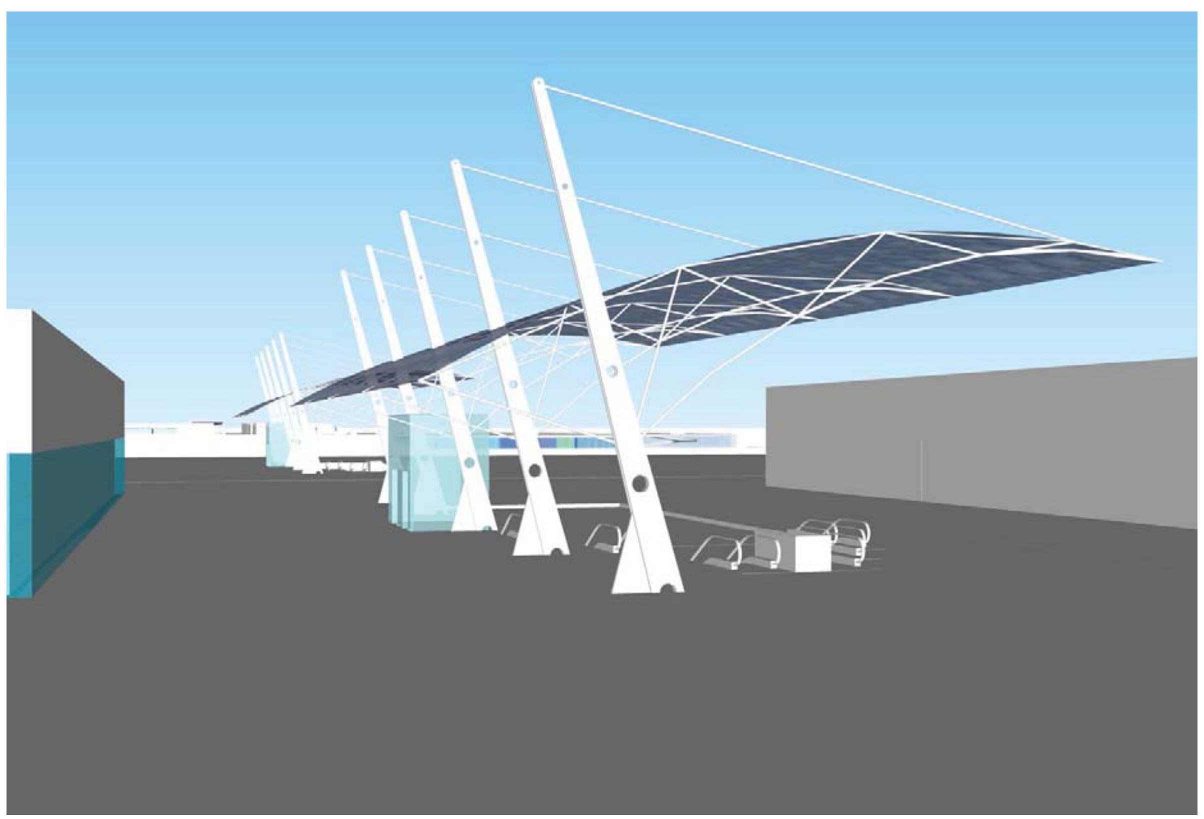
- 3-D modelling of canopy options at cores. Cores are unconditioned but require overhead weather protection. Roof material of canopy to be transparent or translucent to permit light transmittance down core to levels below.



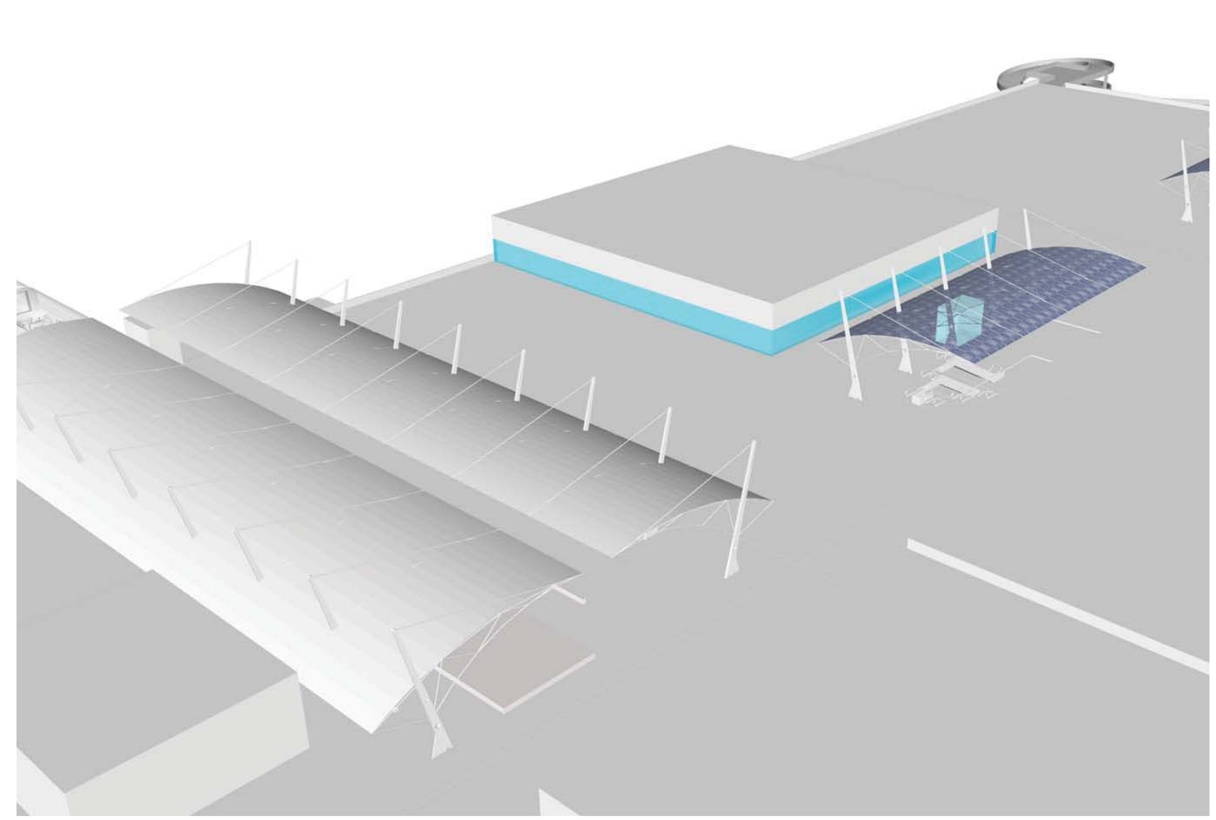
Canopy with double angled columns cantilevered from one side



Canopy with double angled columns cantilevered from one side

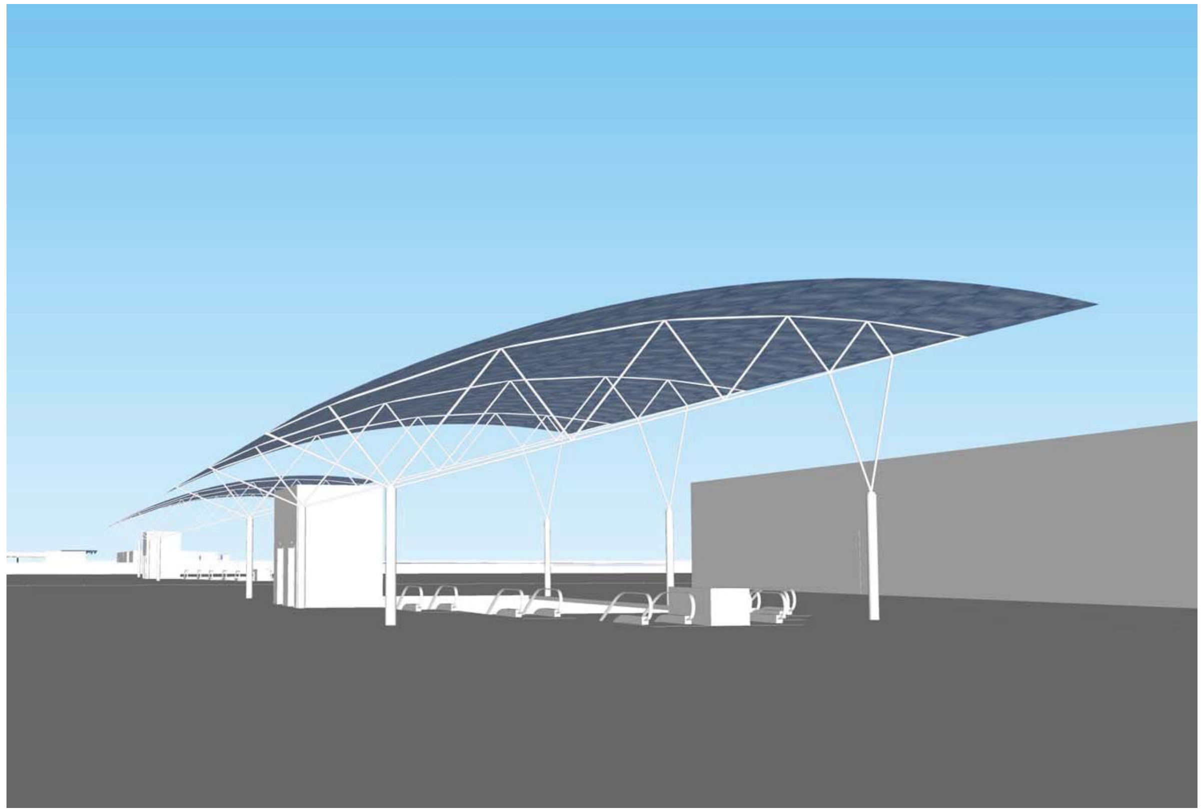


Curved canopy supported by masts and tension rods

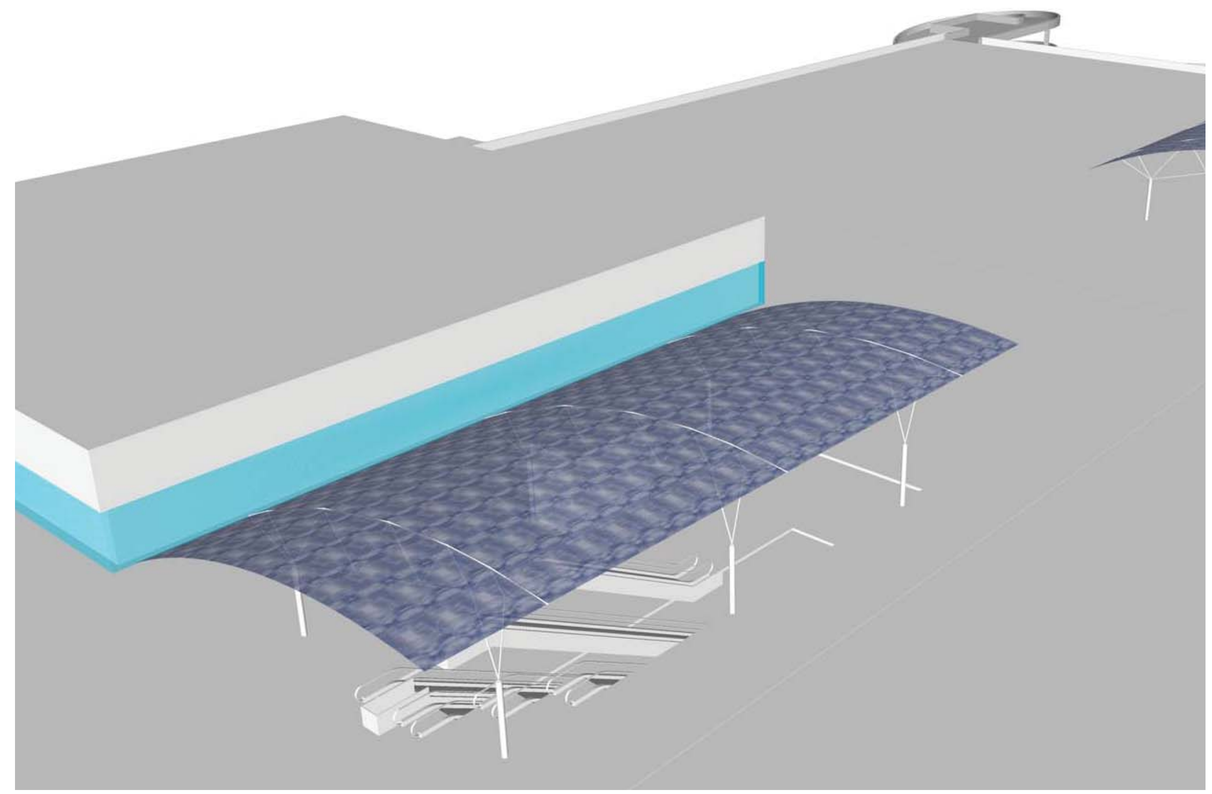


Curved canopy supported by masts and tension rods

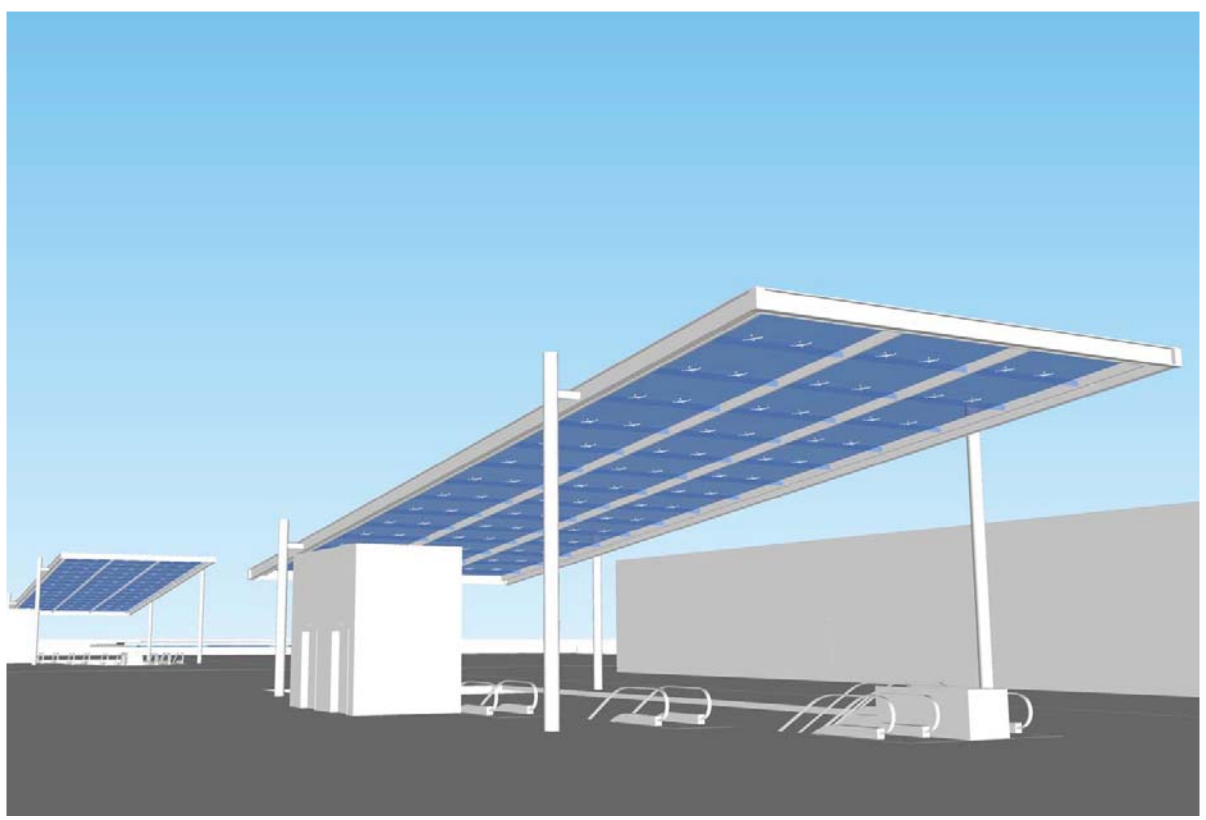
- 3-D modelling of canopy options at cores. Cores are unconditioned but require overhead weather protection. Roof material of canopy to be transparent or translucent to permit light transmittance down core to levels below.



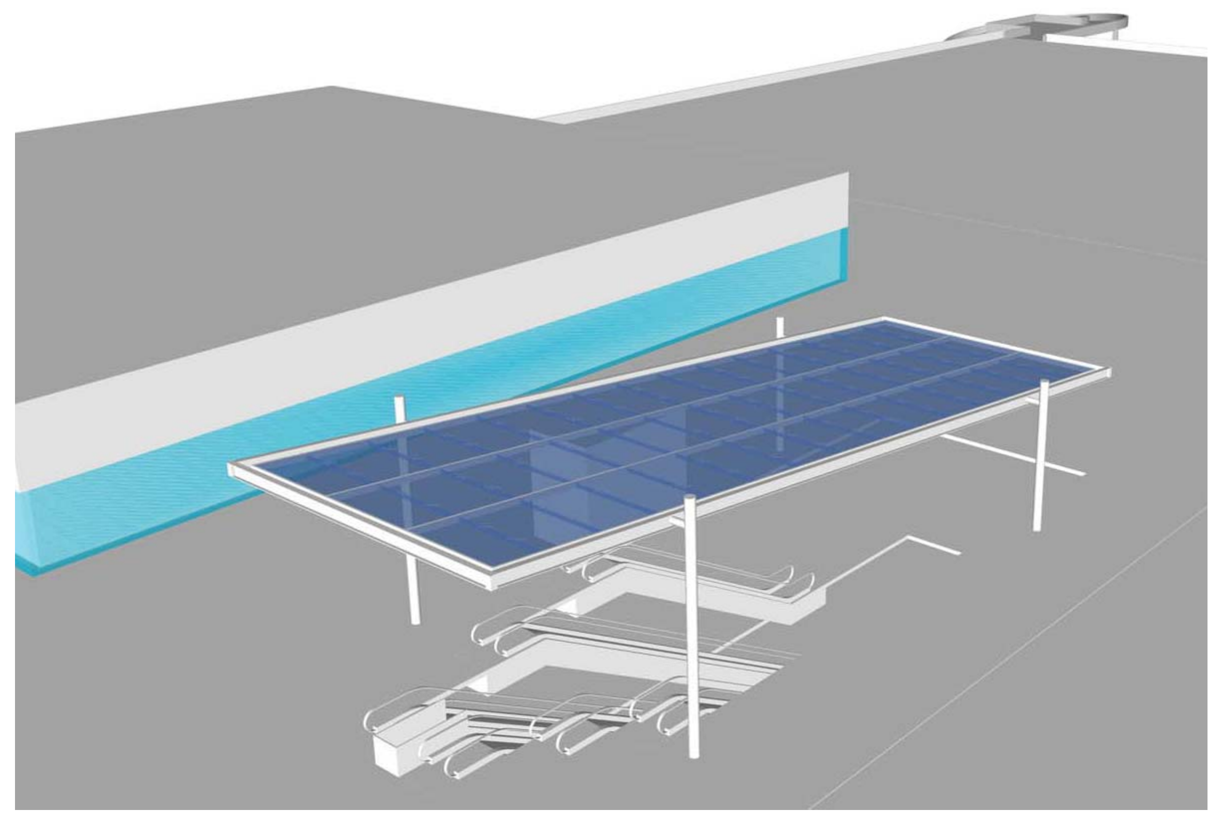
Curved canopy with tension support and columns



Curved canopy with tension support and columns

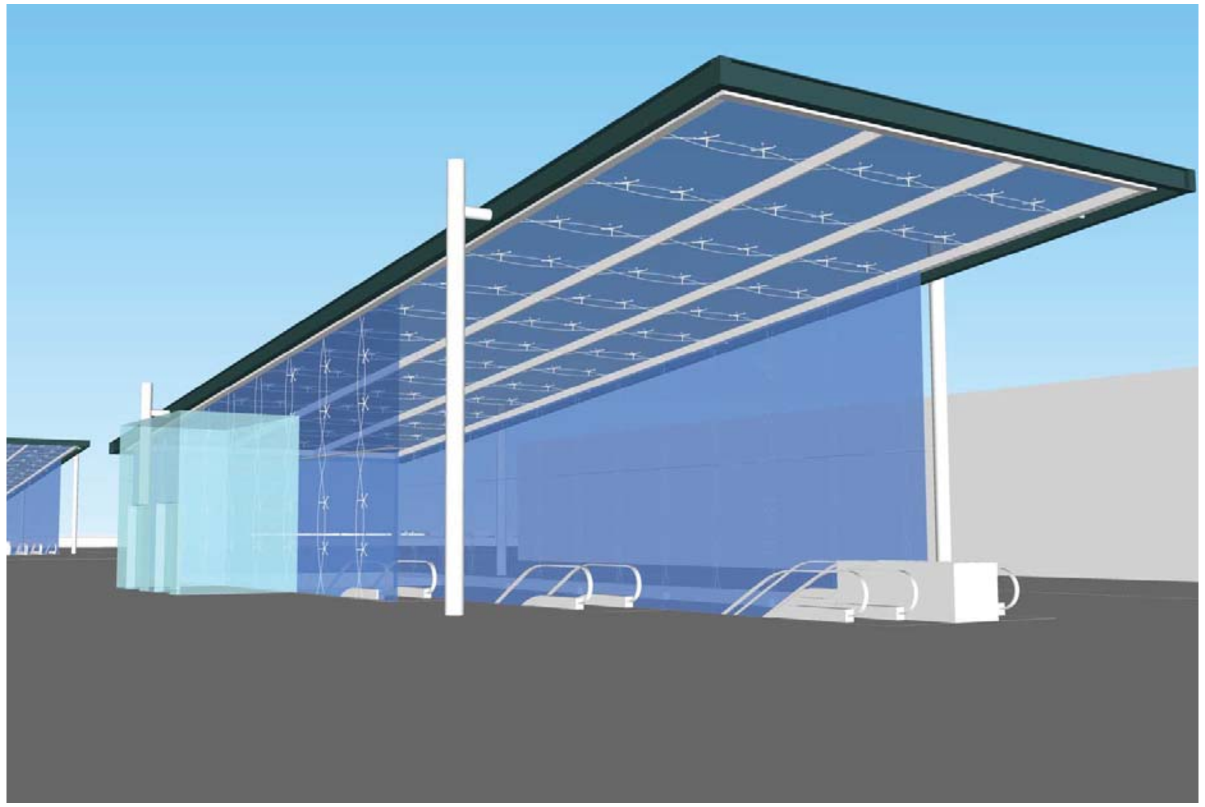


Canopy with spider glass connections with minimal structural beams

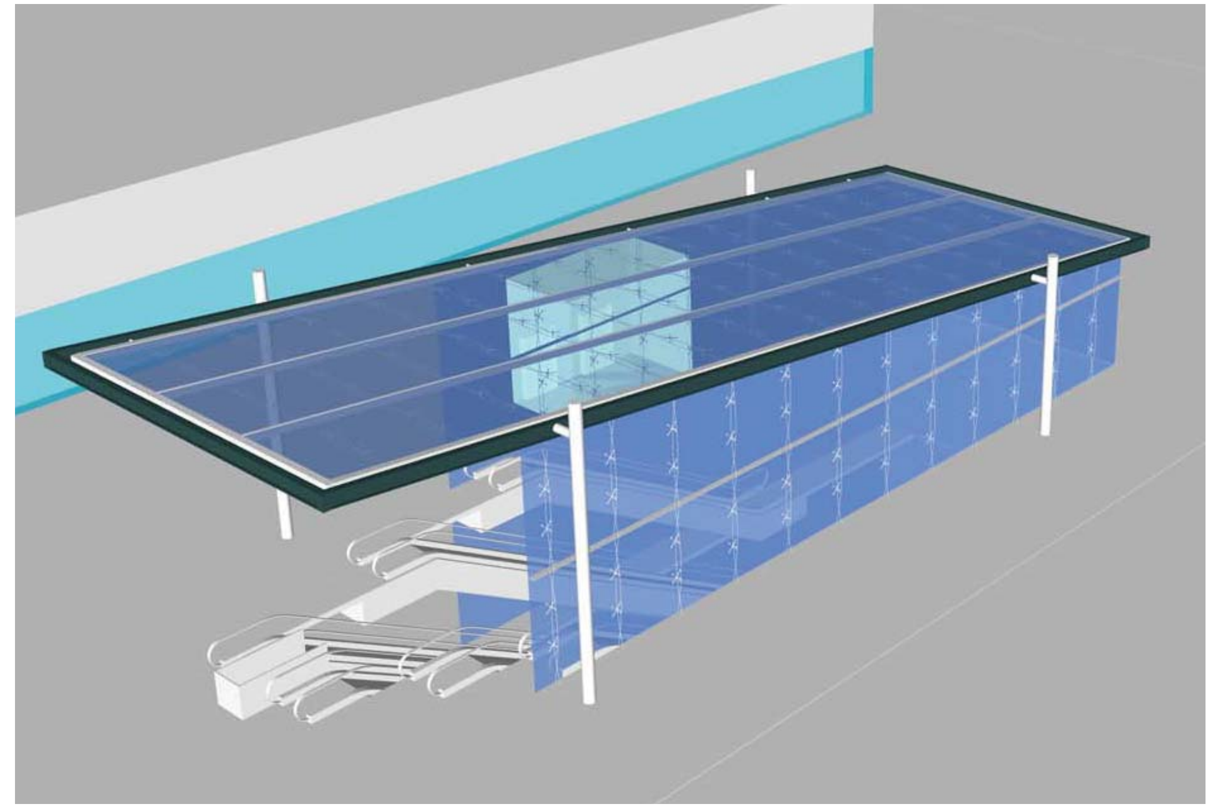


Canopy with spider glass connections with minimal structural beams

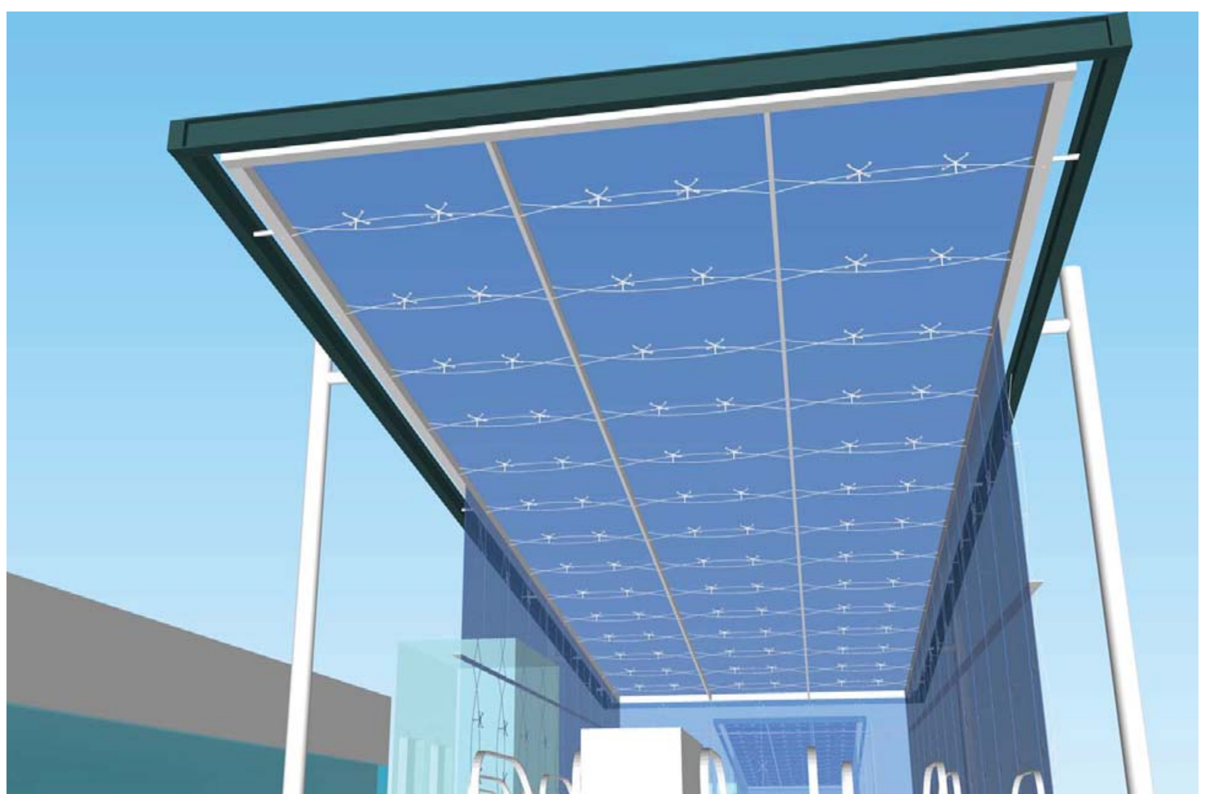
- 3-D modelling of canopy options at cores. Cores are unconditioned but require overhead weather protection. Roof material of canopy to be transparent or translucent to permit light transmittance down core to levels below.



Canopy with spider glass and tension rod connections at roof and side enclosures

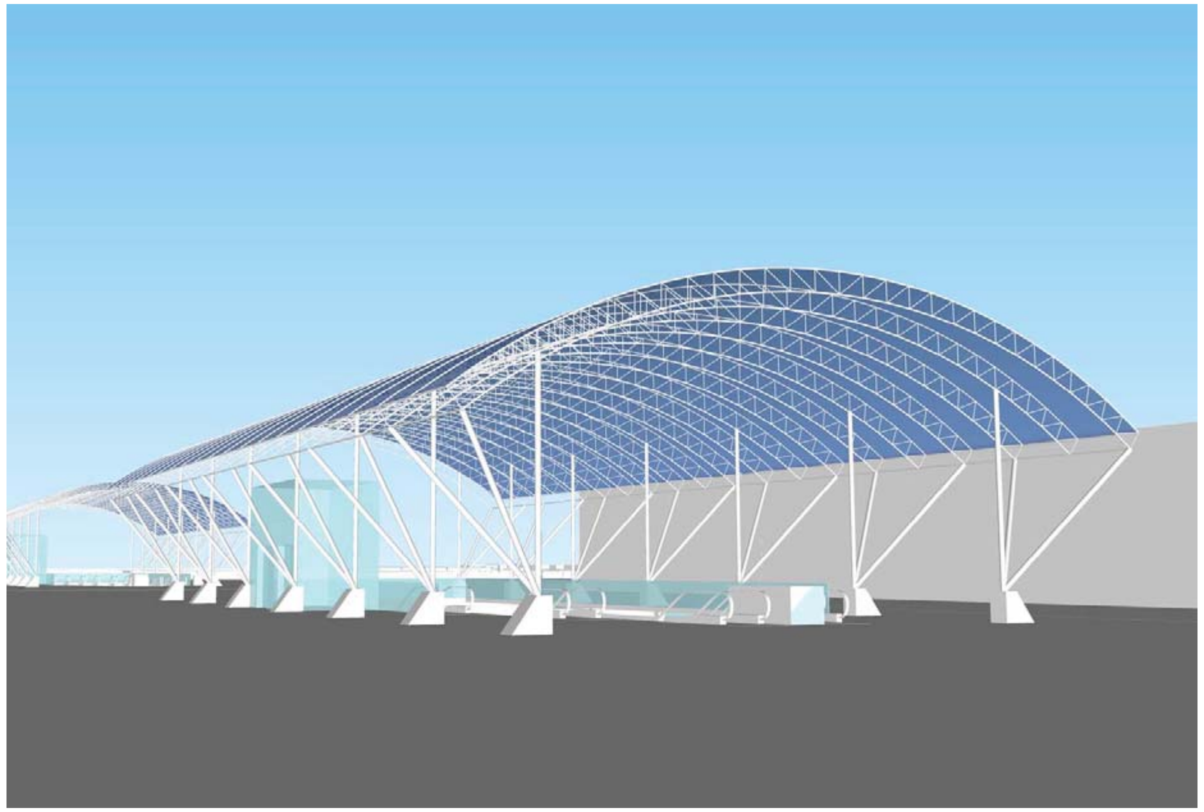


Canopy with spider glass and tension rod connections at roof and side enclosures

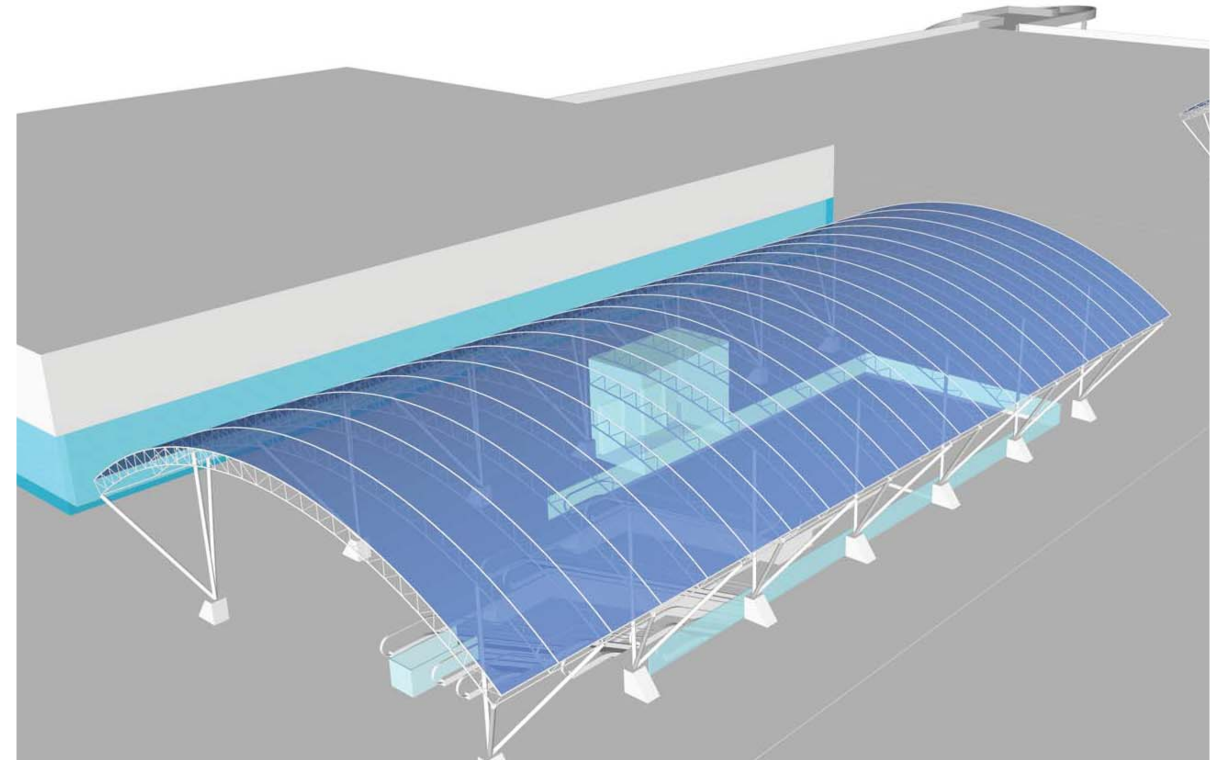


Canopy with spider glass and tension rod connections at roof and side enclosures

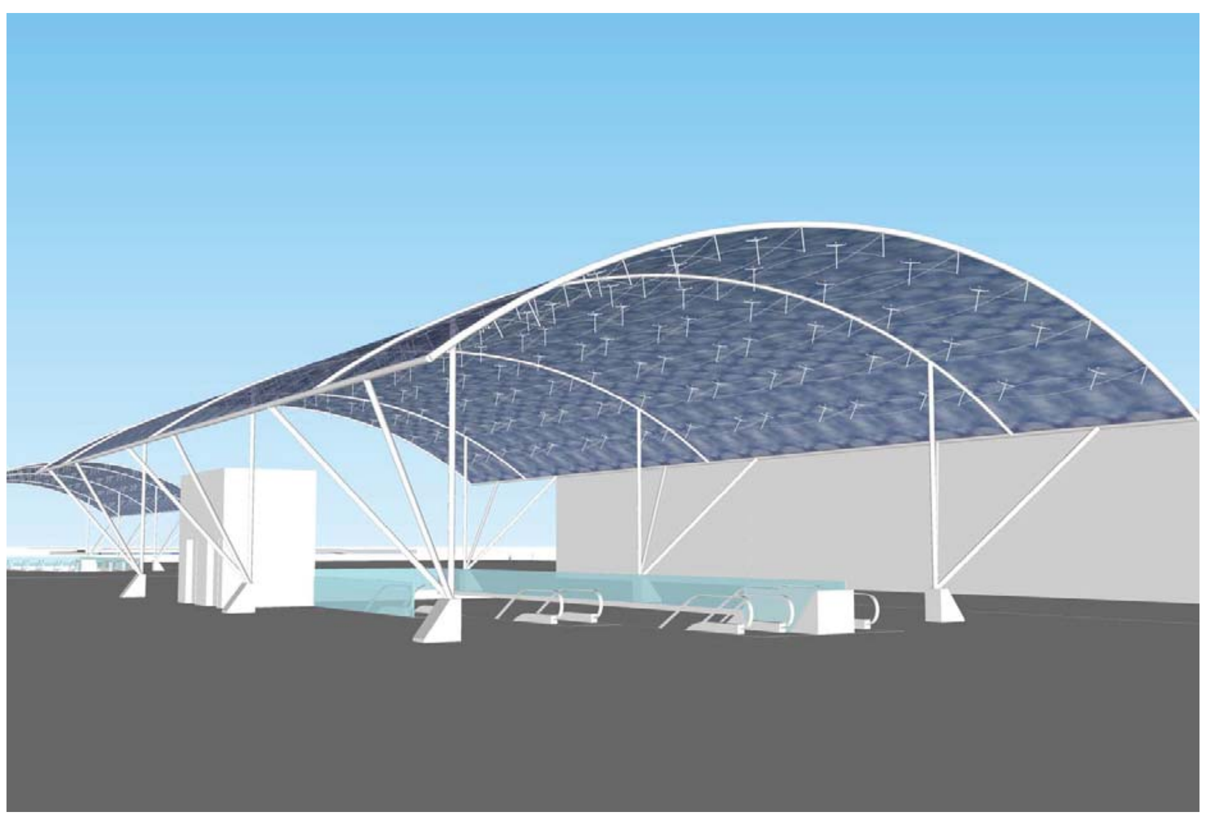
- 3-D modelling of canopy options at cores. Cores are unconditioned but require overhead weather protection. Roof material of canopy to be transparent or translucent to permit light transmittance down core to levels below. This option is enclosed on three sides.



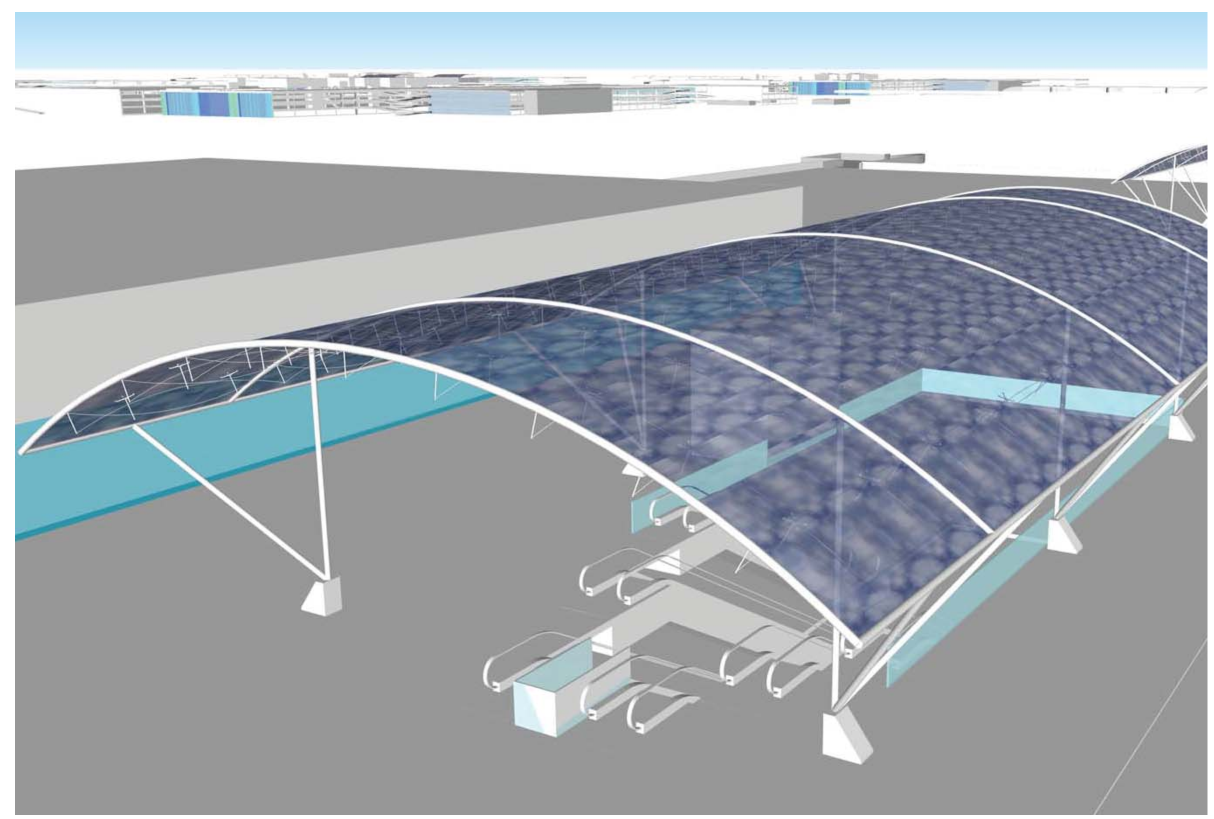
Curved canopy with tripod column supports and bowed truss frames



Curved canopy with tripod column supports and bowed truss frames



Curved canopy with tripod column supports and tension cable supports



Curved canopy with tripod column supports and tension cable supports

- 3-D modelling of canopy options at cores. Cores are unconditioned but require overhead weather protection. Roof material of canopy to be transparent or translucent to permit light transmittance down core to levels below. This study borrowed the tripod columns from the APM enclosure design.

Appendix 10.1 Concept Refinement Cost Estimate

LAX Consolidated Car Rental Facility (Phase 2)
Los Angeles, CA

CONCEPT REFINEMENT COST ESTIMATE
(DRAFT - FOR REVIEWS ONLY)

June 24, 2016

Faithful+Gould
3020 Old Ranch Parkway, Suite 180
Seal Beach, California

FGOULD.COM

INTRODUCTION

This opinion of Rough Order of Magnitude (ROM) costs, at the Concept Refinement stage, has been prepared to reflect the anticipated construction cost for the LAX Consolidated Car Rental Facility (ConRAC) , Los Angeles, California.

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other works not covered in the drawings and programs as stated in this document. The unit rates reflected herein are based on local prevailing wages and have been obtained from F+G's parametric Cost Data Basis. All unit rates relevant to subcontractor trades include the subcontractors' overheads and profit.

Scope of the Project

The project program includes for the following the construction works:

. Quick Turn Around Facilities (QTA) - Buildings A and B
. Idle Storage (IS) - Building C
. Ready / Return Garage (RR) and Customer Service Building (CSB) - Building D
. Employee Parking (EP) for Car Rental Companies including associated access Ramps and Helices.

On-Site Improvements includes for a Bus Plaza, drought resistant landscaping, paving, irrigation, wayfinding signage, site lighting and service utilities to the ConRAC site only.

Documentations

The preparation of this estimate is based on the following documents and information received:

Architectural Design development Drawings dated 02/28/2016
Project Definition Document issued 2/28/16
Updates for some major cost impact items identified in the 6/3/2016 Second Refinement Set
Workshop meetings and notes
Discussions with Architect and Engineers

Design Evolution Allowance

A Design Development Allowance has been included in this estimate. This is to allow for work not yet known and still to be developed at this stage of design.

Escalation

Escalation allowance has been provided for labor and material inflation from the date of the estimate to the projected mid point of construction in end of 2020, based on a projected average 2.25% per annum escalation rate.

Exclusions

Land acquisition and Right of Ways costs
Legal, accounting fees and financing costs
Hazardous material mitigations and removals
Removal of unforeseen underground obstructions
Relocation of owner's furniture, furnishings and equipment
CNG station (available facility adjacent to the site) and electrical vehicle charging stations
Cal Green Sustainability Measures - options and proposed measures have been prepared separately and currently in the process of pending final selections
FIDS, BIDS
APM systems and vehicles (in separate LAMP Budget)
Demolitions of existing residences and school
Operations & Maintenance

INTRODUCTION

Separate Projects

Driveways and Roadways based on standard asphalt on concrete sub-base, street lighting, sidewalks, curbs, traffic control signals/signs and utilities. Subways or underground passes are also incorporated.

Tenant Fit-Outs include standard painted gypboard demising partitions, standard finishes to floors and ceilings, Customer service counters, breakrooms, back offices, exit control equipment and stall location signage.

Tenants FF&E include Counter backwall signage, Customer Service Booths to RAC

Solar Installations includes for any required steel framing support structure, canopy coverings, type/size of PV panels (tbd), electrical hook ups and the electrical equipment room at roof tops (under separate design/budget by Specialist Engineers).

APM Integrated Station including any additional structural works to the RAC building to carry the APM Station/Guideway and mechanical room.

Airport Employee Parking level over the IS and RAC buildings including related access helix ramps.

Airport Check-in Facility at CSB level including any proposed BHS equipment and fit-outs.

Enabling Projects elsewhere included in LAMP Project (separate from ConRAC contract)

. Roadways and Driveways **in** the Manchester Square site including street lighting, sidewalks, curbs, traffic control signals and road utilities

. Roadways **off** the site for additional traffic street lane/s or slip ways to Manchester Square

. Off-Site upgrades to existing street sidewalks, street lighting and service utilities

Items that may affect the cost estimate

Modifications to the scope of work included in this estimate.
Unforeseen sub-surface conditions.
Special phasing requirements or how the scope is finally divided up into packages for procurements.
Restrictive technical specifications or excessive contract conditions.
Non-competitive bid/market situations.
Bids delayed beyond the projected schedule.

Recommendation for Cost Control

Faithful+Gould recommends that the owner, architect and engineers carefully review this document, including line item descriptions, unit prices, clarifications, exclusions, inclusions and assumptions, contingencies, escalation, and mark-ups. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding into the next design phase.

Requests for modifications of any apparent errors or omissions to this document must be made to Faithful+Gould within ten (10) working days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred with and accepted.

Opinion of Probable Cost

This opinion has been based on a competition open bid situation with a recommended 5 - 7 bona fide reputable bids from general contractors and a minimum of 3 bidders for all items of sub-contracted work. Experience indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.

Since Faithful+Gould has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over competitive bidding or market conditions, the opinion of probable construction cost provided for herein is made on the basis of professional experience and qualifications. The opinion represents Faithful+Gould's best judgment as a professional construction consultant familiar with the construction industry. However, Faithful+Gould cannot and does not guarantee that proposals, bids, or the construction cost will not vary from opinions of probable cost prepared by them.

GROSS AREAS

	GFA	
Customer Service Building (CSB)	96,476	SF
Circulation Cores (4 total)	24,123	SF
Baggage Claim	N.I.C	SF
APM Mechanical Room	N.I.C	SF
APM Station	N.I.C	SF
Bus Plaza at Level 1 (covered)	82,230	SF
Courtyard (w Canopies & Covered Walkways)	199,079	SF
Quick Turn Around (QTA)		
QTA Building A (North)	589,117	SF
QTA Building B (South)	236,078	SF
QTA Support (Basement and Level 1 Bldg. A)	36,996	SF
QTA Bridges (15 Total)	48,042	SF
Helix to QTA	61,270	SF
Helix Bridges (5 total)	17,055	SF
Ramps	-	SF
Ready and Return (RAC)		
RAC Garage	2,459,247	SF
Ramps	4,477	SF
Helix Bridges (4 total)	7,406	SF
Helix to RAC/Storage/Rental Employee Parking (3 Total)	54,612	SF
Idle Storage/Support Garage	1,869,345	SF
Ramps	7,852	SF
IS Bridges (15 Total)	32,400	SF
Roof Canopy	N.I.C	
Employees Parking over RAC and IS (for Rental Operations)	391,789	SF
Visitors Parking over RAC (open at roof deck)	26,266	SF
Fire Control Room/Electrical Building	6,236	SF
Total ConRAC	**6,250,096**	SF

AIRPORT SCOPE

Employee Parking over IS and RAC (for Airport Operations)	675,836	SF
Helix and Helix Bridge (1 Level pro-rated for access):		
Helix from QTA to IS/Airport Employee Parking	12,254	SF
Helix from RAC/Airport Employee Parking	9,102	SF
Helix Bridge (from QTA to IS/Airport Employee Parking,)	3,411	SF
Helix Bridge (RAC/Airport Employee Parking)	2,261	SF
Airport Check-In Facility	4,306	SF

BUDGET COST PLAN - SUMMARY

		QUICK TURN AROUND (QTA) BLDG. A		QUICK TURN AROUND (QTA) BLDG. B		IDLE STORAGE (IS) BLDG. C		READY AND RETURN (RAC) BLDG. D		RAC EMPLOYEE PARKING over RAC and IS		CUSTOMER SERVICE BUILDING (CSB)		SITE WORKS	OVERALL TOTAL	
Building GFA:		699,188	$/SF	289,371	$/SF	1,909,597	$/SF	2,525,742	$/SF	391,789	$/SF	345,944	$/SF	88,466	6,250,096	$/SF
1 Foundation/Substructure		12,373,751	17.70	3,088,569	10.67	18,585,410	9.73	29,878,535	11.83	3,001,824	7.66	132,000	0.38		67,060,089	10.73
2 Superstructure		31,211,074	44.64	11,791,845	40.75	55,539,239	29.08	96,615,253	38.25	16,322,036	41.66	6,400,673	18.50		217,880,120	34.86
3 Exterior Closure		1,916,690	2.74	1,232,816	4.26	1,506,720	0.79	1,642,930	0.65	1,632,950	4.17	3,526,067	10.19		11,458,173	1.83
4 Roofing & Waterproofing		2,601,068	3.72	1,222,906	4.23	7,446,631	3.90	9,809,936	3.88	0	0.00	5,097,927	14.74		26,178,468	4.19
5 Interior Construction		4,755,287	6.80	2,448,896	8.46	84,096	0.04	2,414,288	0.96	0	0.00	337,776	0.98		10,040,343	1.61
6 Stairs		1,945,555	2.78	909,590	3.14	1,991,830	1.04	2,528,587	1.00	0	0.00	412,188	1.19		7,787,749	1.25
7 Interior Finishes		2,654,556	3.80	929,875	3.21	93,920	0.05	1,417,969	0.56	0	0.00	1,991,605	5.76		7,087,925	1.13
8 Specialties		402,340	0.58	173,330	0.60	549,300	0.29	1,016,440	0.40	205,000	0.52	455,354	1.32		2,801,764	0.45
9 Conveying		575,000	0.82	575,000	1.99	0	0.00	0	0.00	0	0.00	33,670,000	97.33		34,820,000	5.57
10 Plumbing		5,021,426	7.18	2,082,208	7.20	1,215,074	0.64	6,655,898	2.64	1,120,517	2.86	1,139,661	3.29		17,234,784	2.76
11 HVAC		11,987,874	17.15	4,808,479	16.62	167,890	0.09	3,040,874	1.20	0	0.00	5,595,237	16.17		25,600,354	4.10
12 Fire Protection		3,600,150	5.15	1,357,449	4.69	5,570,889	2.92	7,761,670	3.07	0	0.00	741,684	2.14		19,031,842	3.05
13 Electrical		21,475,676	30.72	8,168,299	28.23	13,197,576	6.91	24,773,550	9.81	3,349,796	8.55	4,866,170	14.07		75,831,066	12.13
14 Equipment		24,614,865	35.20	10,123,996	34.99	0	0.00	0	0.00	0	0.00	0	0.00		34,738,861	5.56
15a Special Construction (Bridges, Helices, Ramps)		7,161,422	10.24	4,256,126	14.71	2,878,400	1.51	4,960,779	1.96	0	0.00	0	0.00		19,256,726	3.08
15b Special Construction (Screens)		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	320,000	0.93		320,000	0.05
16a Site Improvements		1,828,198	2.61	773,514	2.67	0	0.00	0	0.00	0	0.00	18,587,769	53.73	41,291,287	62,480,768	10.00
16b Bus Plaza		-		-		-		-		-		-		12,395,062	12,395,062	1.98
16c Fire Control Room/Electrical Building		-		-		-		-		-		-		1,135,400	1,135,400	0.18
SUBTOTAL TRADE COSTS		***134,124,932***	***191.83***	***53,942,898***	***186.41***	***108,826,974***	***56.99***	***192,516,709***	***76.22***	***25,632,123***	***65.42***	***83,274,108***	***240.72***	***54,821,749***	***653,139,493***	***104.50***
GC Mark Ups incl. Fee	10%-12%	16,094,992	23.02	6,473,148	22.37	11,426,832	5.98	20,214,254	8.00	2,691,373	6.87	9,992,893	28.89	6,578,610	73,472,102	11.76
Design Evolution Contingency	5.0%	6,706,247	9.59	2,697,145	9.32	5,441,349	2.85	9,625,835	3.81	1,281,606	3.27	4,163,705	12.04	2,741,087	32,656,975	5.23
Escalation Allowance	11.75%	18,438,825	26.37	7,415,800	25.63	14,769,181	7.73	26,126,924	10.34	3,478,599	8.88	11,448,108	33.09	7,536,620	89,214,057	14.27
TOTAL CONSTRUCTION COSTS (FUTURE)		***175,364,995***	***250.81***	***70,528,991***	***243.73***	***140,464,336***	***73.56***	***248,483,722***	***98.38***	***33,083,701***	***84.44***	***108,878,814***	***314.73***	***71,678,066***	***848,482,626***	***135.76***
Other Special Costs																
Arts in Public	1.0%	N/a		N/a		N/a		N/a		N/a		832,741	2.41	N/a	832,741	0.13
Insurance & Bond (i.l.o OCIP)	4.0%	7,014,600	10.03	2,821,160	9.75	5,618,573	2.94	9,939,349	3.94	1,323,348	3.38	4,355,153	12.59	2,867,123	33,939,305	5.43
LAWA Soft Costs	18.5%	32,442,524	46.40	13,047,863	45.09	25,985,902	13.61	45,969,489	18.20	6,120,485	15.62	20,142,581	58.22	13,260,442	156,969,286	25.11
Program/Design Management																
Design Consultants Team																
Construction Administration Services																
Construction Management Consultant																
Airport Administration																
Testing/Inspection and Permitting																
Project/Construction Contingency	5.0%	8,768,250	12.54	3,526,450	12.19	7,023,217	3.68	12,424,186	4.92	1,654,185	4.22	5,443,941	15.74	3,583,903	42,424,131	6.79
TOTAL PROJECT CONSTRUCTION COSTS		***223,590,369***	***319.79***	***89,924,463***	***310.76***	***179,092,029***	***93.79***	***316,816,746***	***125.44***	***42,181,719***	***107.66***	***139,653,229***	***403.69***	***91,389,535***	***1,082,648,090***	***173.22***

Note : Concrete piers are included in the IS and RAC Roof Level but the PV Solar Panel System and steel framing supports in separate contract

ENABLING PROJECTS & SEPARATE AIRPORT PROJECTS:

Driveways and Roadways	**14,170,000**
Employee Parking over IS and RAC (for Airport Operations)	**78,084,000**

COST SUMMARY - QUICK TURN AROUND Building A

			QTA Building A	
	Building Area:		**699,188**	**$/SF**
1	Substructure		12,373,751	17.70
2	Superstructure		31,211,074	44.64
3	Exterior Closure		1,916,690	2.74
4	Roofing & Waterproofing		2,601,068	3.72
5	Interior Construction		4,755,287	6.80
6	Stairs		1,945,555	2.78
7	Interior Finishes		2,654,556	3.80
8	Specialties		402,340	0.58
9	Conveying		575,000	0.82
10	Plumbing		5,021,426	7.18
11	HVAC		11,987,874	17.15
12	Fire Protection		3,600,150	5.15
13	Electrical		21,475,676	30.72
14	Equipment		24,614,865	35.20
15a	Special Construction (Bridges, Helices, Ramps)		7,161,422	10.24
15b	Special Construction (Screens)		0	0.00
16	Site Improvement		1,828,198	2.61
	SUBTOTAL TRADE COSTS		***134,124,932***	***191.83***
GC Mark Ups		12.0%	16,094,992	23.02
Design Evolution Contingency		5.0%	6,706,247	9.59
Escalation Allowance		11.8%	18,438,825	26.37
	TOTAL CONSTRUCTION COSTS (FUTURE)		***175,364,995***	***250.81***
Other Special Costs				
Insurance & Bond (i.l.o OCIP)		4.0%	7,014,600	10.03
LAWA Soft Costs		18.5%	32,442,524	46.40
Program/Design Management				
Design Consultants Team				
Construction Administration Services				
Construction Management Consultant				
Airport Administration				
Testing/Inspection and Permitting				
Project/Construction Contingency		5.0%	8,768,250	12.54
	TOTAL PROJECT CONSTRUCTION COSTS		***223,590,369***	***319.79***

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
1.1	**Special Foundations**				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	1,433	EA	1,750.00	2,507,750
	Pile testing	1	LS	33,000.00	33,000
1.2	**Foundations**				
	Isolated footing	24	CY	765.00	18,360
	Grade Beams	320	CY	715.00	228,800
	Pile Caps, concrete formwork & rebar	7,537	CY	590.00	4,446,830
	Excavation	10,649	CY	26.00	276,874
	Backfill, allowance	2,768	CY	25.00	69,200
	Haul away to LAX site	7,881	CY	15.00	118,215
1.3	**Floors**				
	8" Slab on grade, including thickening, miscellaneous accessories	192,949	SF	12.00	2,315,388
	Elevator pits and sump pits	1	LS	12,000.00	12,000
1.4	**Basement Construction**				
	Shoring, allowance	13,294	SF	40.00	531,760
	Basement excavation	16,795	CY	18.00	302,312
	Backfill, allowance	1,680	CY	50.00	302,312
	Haul away to LAX site	15,116	CY	15.00	83,976
	Basement retaining wall, 14" incl. foundation, allowance	11,569	SF	56.50	653,649
	Basement slab on grade, allowance	19,716	SF	12.00	236,592
	Dewatering, allowance	1	LS	10,000.00	226,734
	Perimeter drain, allowance	578	LF	30.00	10,000
	TOTAL SUBSTRUCTURE				**12,373,751**
2	**SUPERSTRUCTURE**				
2.1	*Floor Construction*				
	Precast double tee floor slab	413,448	SF	17.00	7,028,616
	Columns	2,407	CY	1,000.00	2,407,000
	Shear wall	6,588	CY	712.00	4,690,656
	Beams and Girder	5,695	CY	992.00	5,649,440
	Topping slab, 6"	413,448	SF	7.50	3,100,860

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
2.2	*Roof Construction*				
	Precast double tee floor slab	212,908	SF	17.00	3,619,436
	Roof Beams and Girder	2,726	CY	992.00	2,704,192
	Parapet wall, allow 8" thick at roof	12,940	SF	32.00	414,064
	Topping slab, 6"	212,908	SF	7.50	1,596,810
	TOTAL SUPERSTRUCTURE				**31,211,074**
3	**EXTERIOR ENCLOSURE**				
3.1	Exterior Walls, allowance				
	CMU walls	30,656	SF	25.00	766,400
	Barrier wall, allowance	2,649	LF	110.00	291,390
	Other exterior wall, allowance	1	LS	500,000.00	500,000
3.2	Exterior Windows at L1 Support and Admin Offices, allowance	27	EA	2,200.00	59,400
3.3	Exterior Doors				
	Single Leaf Doors	1	LS	47,500	47,500
	Overhead coiling doors, allowance	1	LS	168,000	168,000
	Other doors not yet shown, allowance	1	LS	84,000	84,000
	TOTAL EXTERIOR ENCLOSURE				**1,916,690**
4	**ROOFING AND WATERPROOFING**				
	PVC membrane roofing incl. back of parapet wall	212,908	SF	11.00	2,341,988
	Sheet metal flashing	4,136	LF	15.50	64,108
	Caulking and sealant, allowance	212,908	SF	0.50	106,454
	Miscellaneous roof accessories, allowance	212,908	SF	0.35	74,518
	Roof openings , allowance	1	LS	14,000.00	14,000
	TOTAL ROOFING AND WATERPROOFING				**2,601,068**

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
5	**INTERIOR CONSTRUCTION**				
5.1	Interior Partition				
	CMU walls, allowance	102,823	SF	25.00	2,570,583
	Interior Partition, to other areas, allowance	548,266	SF	0.10	54,827
	Interior Partition				
	to Admin offices	39,331	GFA		TI Separate
	to LM Offices	6,901	GFA		TI Separate
	to Restroom, allowance	3,920	SF	12.00	47,040
	to Support Offices	30,257	GFA		TI Separate
5.2	Interior Doors and Windows				
	Overhead coiling doors, allowance	64	EA	12,000	768,000
	Window fire shutter, allowance	626,113	SF	0.50	313,057
	Other doors not yet shown, allowance	626,113	SF	1.60	1,001,781
	TOTAL INTERIOR CONSTRUCTION				**4,755,287**
6	**STAIRS**				
6.1	*Stair Construction*				
	17'-0" High Interior Enclosed Metal Pan Stairs including steel tube railings, L1 to L3	24	FLT	24,100	578,400
	20'-0" High Interior Enclosed Metal Pan Stairs including steel tube railings, to roof/L4	2	FLT	28,400	56,800
	Steel columns and beams	44	TON	5,000	220,000
	Stair from Basement to Level 1, allowance	2	FLT	24,100	48,200
	CMU Stair Enclosure Walls, allowance	39,270	SF	20.00	785,400
6.2	*Stair Well Finishes*				
	Wall finish, internal paint and external sealer	96,690	SF	2.00	193,380
	Floor finish	9,750	SF	6.50	63,375
	TOTAL STAIRS				**1,945,555**
7	**INTERIOR FINISHES**				
7.1	Wall Finishes				
	Epoxy paint to CMU walls, allowance	205,647	SF	1.10	226,211
	Ceramic tiles to restroom walls, allowance	5,684	SF	17.00	96,628
7.2	Floor Finishes, allowance				
	Carpet, to Admin offices	39,331	GFA		TI Separate
	Vinyl tiles, to LM Offices	6,901	GFA		TI Separate
	Ceramic Tiles, to Restroom	1,358	SF	14.00	19,012
	Floor Finish, to Support Offices, allowance	30,257	GFA		TI Separate
	Floor Finish, to other areas	548,266	GFA	2.85	1,562,558

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
7.3	Ceiling Finishes, allowance				
	Acoustic Ceiling Tile				
	to Admin offices	39,331	GFA		TI Separate
	to LM Offices	6,901	GFA		TI Separate
	Ceiling Finish, to Support Offices	30,257	GFA		TI Separate
	Painted Gypsum board to Restroom	1,358	GFA	14.00	19,012
	Batt Insulation, allowance	1,358	GFA	2.10	2,852
	Fuel piping enclosure, allowance	18,960	SF	35.00	663,600
	Exposed structure (assumed no finish)	539,026	SF	0.12	64,683
	TOTAL INTERIOR FINISHES				**2,654,556**
8	**MISCELLANEOUS SPECIALTIES**				
	Restroom specialties, allowance	1	LS	75,000.00	75,000
	Signage to interiors , allowance	1	LS	100,000	100,000
	Building signage and identifications (by car rental co.)				NIC
	Parking stall, allowance	1	LS	4,200	4,200
	Striping, allowance	1	LS	33,600	33,600
	Car wash curtain, allowance	1,440	LF	54	77,040
	Clearance Bar, allowance	2	EA	2,000	4,000
	Entry and Exit Bar, allowance	2	EA	3,200	6,400
	Elevator pit ladder, allowance	1	EA	2,100	2,100
	Miscellaneous (Fire Extinguishers, bollards, etc)	1	LS	100,000	100,000
	TOTAL MISCELLANEOUS SPECIALTIES				**402,340**
9	**CONVEYING**				
	Passenger Elevator, 5,000 lbs, 3 stop, allowance	1	EA	500,000	500,000
	Passenger Elevator, 5,000 lbs, extra stop, allowance	1	EA	50,000	50,000
	Elevator Cab Finish	1	EA	25,000	25,000
	TOTAL CONVEYING				**575,000**
10	**PLUMBING**				
	Plumbing fixtures	626,113	SF	0.55	344,362
	Domestic hot and cold water distribution	626,113	SF	1.10	688,724
	Domestic water supply distribution equipment	626,113	SF	0.90	563,502
	Recycled water Equipment & distribution	626,113	SF	0.60	375,668
	Sanitary sewer piping	626,113	SF	2.40	1,502,671
	Sanitary sewer waste equipment	626,113	SF	0.15	93,917

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
	Storm water piping	626,113	SF	1.65	1,033,086
	Other Plumbing Systems				
	Gas service	626,113	SF	0.35	219,140
	Pipe Identification	626,113	SF	0.02	12,522
	Seismic Restraints	626,113	SF	0.05	31,306
	Flush, Clean and Testing	626,113	SF	0.25	156,528
	TOTAL PLUMBING				**5,021,426**
11	**HVAC**				
	Air distribution system with ductwork, insulation, dampers, diffusers grilles, etc.	626,113	SF	6.80	4,257,568
	Terminal and package units	626,113	SF	2.30	1,440,060
	HVAC Equipment				
	Boilers				
	B Q-1 and Q-2, 180 GPM, gas fired.	2	EA	64,578.00	129,156
	Air Separator				
	AS-Q-1, 180 GPM flow, manual blow down drain, dirt separation	1	EA	7,055.00	7,055
	Tanks				
	ET- Q-1, Expansion tank, 16" dia. X 36" high, 40 Gal.	1	EA	2,920.00	2,920
	Chemical Pot Feeder				
	CPF Q-1, hot water system #2, dome bottom filter feeder	1	EA	1,633.00	1,633
	Circulating Pumps				
	P Q-1, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
	P Q-2, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
	Rooftop Cooling Only VAV Air-Conditioning Unit				
	AC-01-1, 8,000 CFM, 20 tons, economizer w/power exhaust, 3,000 CFM,	9	EA	42,000.00	378,000
	AH/Fan Coil Unit Split System Indoor Unit				
	FC, 1,950 CFM, DX coil, 57,700 BTUH	39	EA	9,419.00	367,341

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
	Condensing Unit - Outdoor Unit				
	CU, 57,700 BTU cooling, 59,400 heating.	39	EA	6,170.00	240,630
	Tubing, insulation, connections for condensing unit to FC unit	39	EA	3,200.00	124,800
	Terminal Units Variable Air Volume Box (HW Heat Coil)				
	VAV box, hot water reheat coil, 10" inlet, 1.3GPM	626,113	SF	0.20	125,223
	Exhaust Fan				
	EF, 300 CFM, ceiling mounted, centrifugal	9	EA	285.00	2,565
	EF, 20,000 CFM, inline, centrifugal	6	EA	12,980.00	77,880
	EF, 1,000 CFM, roof mounted, centrifugal	10	EA	2,300.00	23,000
	EF, 2,300 CFM, inline, belt drive, centrifugal	16	EA	2,864.00	45,824
	Exhaust air, inline and rooftop fans	626,113	SF	0.15	93,917
	HVAC energy management and control system	626,113	SF	5.40	3,381,010
	Test & Balance HVAC system	626,113	SF	1.50	939,170
	Miscellaneous HVAC systems	626,113	SF	0.20	125,223
	Miscellaneous				
	Pipe Identification	626,113	SF	0.03	18,783
	Seismic Restraints and fire seals	626,113	SF	0.07	43,828
	Cleaning and Testing	626,113	SF	0.25	156,528
	TOTAL HVAC				**11,987,874**
12	**FIRE PROTECTION**				
	Fire protection systems including sprinklers, fire department connections, piping, valves and accessories	626,113	SF	4.85	3,036,648
	Standpipes and pumps	626,113	SF	0.55	344,362
	Fire protection systems, piping, valves and accessories	626,113	SF	0.35	219,140
	TOTAL FIRE PROTECTION				**3,600,150**
13	**ELECTRICAL**				
	Incoming service and distribution	626,113	SF	7.40	4,633,236
	Lighting and Branch Wiring	626,113	SF	8.50	5,321,961
	Power outlets and Branch Wiring	626,113	SF	1.30	813,947
	New emergency generator allowance	626,113	SF	1.35	845,253
	Lightning protection system	626,113	SF	0.20	125,223
	Grounding system	626,113	SF	0.15	93,917
	Raceway systems for communications & security systems	626,113	SF	0.75	469,585

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
	Temporary power & lighting during construction	626,113	SF	0.15	93,917
	Fire Alarm system	626,113	SF	3.80	2,379,229
	Data and Telephone Services	626,113	SF	1.50	939,170
	Comm Rooms & Equipment	626,113	SF	4.50	2,817,509
	Security Systems	626,113	SF	3.75	2,347,924
	Visual Information Systems	626,113	SF	0.30	187,834
	Facility Management Systems	626,113	SF	0.35	219,140
	Intermodal Transportation Systems (Empty Conduit)	626,113	SF	0.25	156,528
	Other Communication Systems	626,113	SF	0.05	31,306
	TOTAL ELECTRICAL				**21,475,676**
14	**EQUIPMENT**				
14.1	Compressed Air	1	LS	903,000.00	903,000
	(5) 15 HP air compressors, reg. safety devices.				
	Refrigerated air dryer.				
	Compressed Air piping, maintenance. Bay, WWF day tanks, motor oil tanks, used oil collection pumps.				
	Compressed air piping at Hose reels at work stations, tire changing.				
14.2	Motor Oil	1	LS	653,900.00	653,900
	New oil distribution overhead piping in maintenance bays				
	Oil pumps with controls				
	Oil distribution hose reels (1 reel for every (2) bays.				
	Oil storage tanks				
	Energy monitoring and fuel control and emergency stop system				
14.3	Used Oil	1	LS	249,100.00	249,100
	Collection station for each bank of four (4) bays				
	Pneumatic pump powered by compressed air, & shut-off valve				
	Collection tank 5,000 gallons				
	Emergency stop control systems				
14.4	Car Re-fueling System	1	LS	10,330,865.00	10,330,865
	Gasoline fueling system (160 fueling positions)				
14.5	Car Wash Bay System	32	EA	280,000.00	8,960,000
	Car wash includes flooder arch, wash arc, 5-brushes, including overhead brush, freshwater rinse, RO rinse arch, and blowers for drying. Drive thru system.				
14.6	Maintenance Vehicle Lifts	15	EA	110,000.00	1,650,000
14.7	Installed Vacuum System	1	LS	1,432,000.00	1,432,000
	Vacuum producer and collection units, 25 HP				
	Vacuum piping to fuel dispensing, selected stacking spaces in Idle Storage, metal collection tubing, and vacuum service wands				
	Vacuum emergency shut-off and controllers				

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
14.8	Windshield Washer Fluid (WWF)	1	LS	436,000.00	436,000
	WWF storage tank, 20,000 gallon double walled, FRP UST.				
	Submersible pump (explosion proof)				
	Welded SS (2) pipe system.				
	WWF day tanks, 240 gallon, w/interstitial leak detection				
	WWF emergency control and shut off systems				
	TOTAL EQUIPMENT				**24,614,865**
15	**SPECIAL CONSTRUCTION**				
15a	**Bridges, Helix and Ramps**				
	QTA Bridges, assume with guard rail, no cover (9 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	114	EA	1,750.00	199,500
	Pile Caps including excavation, backfill and haul away	228	CY	650.00	148,200
	Concrete floor slab, 10" thick	33,912	SF	21.00	712,152
	Columns	186	CY	975.00	181,350
	Beams and Girders	531	CY	970.00	515,070
	Concrete Curb, allowance	1,728	LF	22.50	38,880
	Guard rail/parapet wall, 42" high, allowance	1,728	LF	140.00	241,920
	Seismic joint cover	353	LF	125.00	44,156
	Plumbing	33,912	SF	1.30	44,086
	Lighting	33,912	SF	3.50	118,692
	Helix Bridges, assume with guard rail, no cover (3 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	30	EA	1,750.00	52,500
	Pile Caps including excavation, backfill and haul away	60	CY	650.00	39,000
	Concrete floor slab, 10" thick	10,233	SF	21.00	214,893
	Columns	41	CY	975.00	39,975
	Beams and Girders	136	CY	970.00	131,920
	Concrete Curb, allowance	450	LF	22.50	10,125
	Guard rail/parapet wall, 42" high, allowance	450	LF	140.00	63,000
	Seismic joint cover	144	LF	125.00	18,000
	Plumbing	10,233	SF	1.30	13,303
	Lighting	10,233	SF	3.50	35,816

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING A

	Description	Quantity	Unit	Unit Cost $	Total $
	Helix oval shape, two lanes, three levels (1 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	208	EA	1,750.00	364,000
	Pile Caps including excavation, backfill and haul away	1,662	CY	650.00	1,080,300
	Concrete slab, 10" thick	36,762	SF	21.00	772,002
	Columns	22	CY	975.00	21,450
	Retaining wall	81	CY	750.00	60,750
	Shear walls	1,272	CY	785.00	998,520
	Beams and Girders	618	CY	970.00	599,460
	Concrete curb and striping, allowance	2,202	LF	22.50	49,545
	Guard rail/parapet wall, 42" high, allowance	1,260	LF	140.00	176,400
	Plumbing	36,762	SF	1.30	47,791
	Lighting	36,762	SF	3.50	128,667
15b	Green Roof, allowance	-			N/A
	TOTAL SPECIAL CONSTRUCTION				**7,161,422**
16	**SITE IMPROVEMENTS**				
	QTA Site functions				
	6' high Concrete curb, allowance	114	CY	450.00	51,100
	Raised floor slab, allowance	75,928	SF	12.00	911,134
	Fence enclosure, allowance	43,391	SF	10.25	444,762
	Chain link door, allowance	6	EA	600.00	3,600
	Lighting, allowance	75,928	SF	5.50	417,603
	TOTAL SITE IMPROVEMENTS				**1,828,198**

COST SUMMARY - QUICK TURN AROUND Building B

		QTA Building B	
Building Area:		**289,371**	**$/SF**
1 Substructure		3,088,569	10.67
2 Superstructure		11,791,845	40.75
3 Exterior Closure		1,232,816	4.26
4 Roofing & Waterproofing		1,222,906	4.23
5 Interior Construction		2,448,896	8.46
6 Stairs		909,590	3.14
7 Interior Finishes		929,875	3.21
8 Specialties		173,330	0.60
9 Conveying		575,000	1.99
10 Plumbing		2,082,208	7.20
11 HVAC		4,808,479	16.62
12 Fire Protection		1,357,449	4.69
13 Electrical		8,168,299	28.23
14 Equipment		10,123,996	34.99
15a Special Construction (Bridges, Helices, Ramps)		4,256,126	14.71
15b Special Construction (Screens)		0	0.00
16 Site Improvement		773,514	2.67
SUBTOTAL TRADE COSTS		***53,942,898***	***186.41***
GC Mark Ups	12.0%	6,473,148	22.37
Design Evolution Contingency	5.0%	2,697,145	9.32
Escalation Allowance	11.8%	7,415,800	25.63
TOTAL CONSTRUCTION COSTS (FUTURE)		***70,528,991***	***243.73***
Other Special Costs			
Insurance & Bond (i.l.o OCIP)	4.0%	2,821,160	9.75
LAWA Soft Costs	18.5%	13,047,863	45.09
Program/Design Management			
Design Consultants Team			
Construction Administration Services			
Construction Management Consultant			
Airport Administration			
Testing/Inspection and Permitting			
Project/Construction Contingency	5.0%	3,526,450	12.19
TOTAL PROJECT CONSTRUCTION COSTS		***89,924,463***	***310.76***

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
1.1	**Special Foundations**				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	366	EA	1,750.00	640,500
	Pile testing	1	LS	13,000.00	13,000
1.2	**Foundation**				
	Isolated footing	14	CY	765.00	10,710
	Grade Beams	193	CY	715.00	137,995
	Pile Caps, concrete formwork & rebar	1,622	CY	590.00	956,980
	Excavation	2,741	CY	26.00	71,266
	Backfill, allowance	914	CY	25.00	22,850
	Haul away to LAX site	1,828	CY	15.00	27,420
1.3	**Floors**				
	8" Slab on grade, including thickening, miscellaneous accessories	99,654	SF	12.00	1,195,848
	Elevator pits and sump pits	1	LS	12,000.00	12,000
	TOTAL SUBSTRUCTURE				**3,088,569**
2	**SUPERSTRUCTURE**				
2.1	*Floor Construction*				
	Precast double tee floor slab	147,008	SF	17.00	2,499,136
	Columns	978	CY	1,000.00	978,000
	Shear wall	2,190	CY	712.00	1,559,280
	Beams and Girder	1,969	CY	995.00	1,959,155
	Topping slab, 6"	147,008	SF	7.50	1,102,560
2.2	*Roof Construction*				
	Precast double tee floor slab	99,654	SF	17.00	1,694,118
	Roof Beams and Girder	997	CY	995.00	992,015
	Parapet wall, allow 8" thick at roof	8,131	SF	32.00	260,176
	Topping slab, 6"	99,654	SF	7.50	747,405
	TOTAL SUPERSTRUCTURE				**11,791,845**

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
3	**EXTERIOR ENCLOSURE**				
3.1	Exterior Walls, allowance				
	CMU walls	26,144	SF	25.00	653,606
	Barrier wall, allowance	1,631	LF	110.00	179,410
	Other exterior wall, allowance	1	LS	250,000.00	250,000
3.2	Exterior Windows at Admin Offices, allowance	4	EA	2,200.00	8,800
3.3	Exterior Doors				
	Single Leaf Doors	1	LS	15,000	15,000
	Overhead coiling doors, allowance	1	LS	90,000	90,000
	Other doors not yet shown, allowance	1	LS	36,000	36,000
	TOTAL EXTERIOR ENCLOSURE				**1,232,816**
4	**ROOFING AND WATERPROOFING**				
	PVC membrane roofing incl. back of parapet wall	99,654	SF	11.00	1,096,194
	Sheet metal flashing	2,323	LF	15.50	36,007
	Caulking and sealant, allowance	99,654	SF	0.50	49,827
	Miscellaneous roof accessories, allowance	99,654	SF	0.35	34,879
	Roof openings , allowance	1	LS	6,000.00	6,000
	TOTAL ROOFING AND WATERPROOFING				**1,222,906**
5	**INTERIOR CONSTRUCTION**				
5.1	Interior Partition				
	CMU walls, allowance	52,294	SF	25.00	1,307,338
	Interior Partition				
	to Admin offices	3,094	GFA		TI Separate
	to LM Offices	13,023	GFA		TI Separate
	to Restroom, allowance	964	SF	12.00	11,568
	to Support Offices	900	GFA		TI Separate
5.2	Interior Partition at BOH, allowance		SF		TI Separate
5.3	Interior Doors and Windows				
	Overhead coiling door, allowance	51	EA	12,000	612,000
	Window fire shutter, allowance	246,662	SF	0.50	123,331
	Other doors not shown, allowance	246,662	SF	1.60	394,659
	TOTAL INTERIOR CONSTRUCTION				**2,448,896**

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
6	**STAIRS**				
6.1	*Stair Construction*				
	17'-0" High Interior Enclosed Metal Pan Stairs including steel tube railings, L1 to L3	12	FLT	24,100	289,200
	20'-0" High Interior Enclosed Metal Pan Stairs including steel tube railings, to roof/L4	2	FLT	28,400	56,800
	Steel columns and beams	24	TON	5,000	121,000
	CMU Stair Enclosure Walls, allowance	20,295	SF	15.00	304,425
6.2	*Stair Well Finishes*				
	Wall finish, internal paint and external sealer	52,020	SF	2.00	104,040
	Floor finish	5,250	SF	6.50	34,125
	TOTAL STAIRS				**909,590**
7	**INTERIOR FINISHES**				
7.1	Wall Finishes				
	Epoxy paint to CMU walls, allowance	105,551	SF	1.10	116,106
	Ceramic tiles to restroom walls, allowance	964	SF	17.00	16,388
7.2	Floor Finishes, allowance				
	Carpet, to Admin offices	3,094	GFA	-	TI Separate
	Vinyl tiles, to LM Offices	13,023	GFA	-	TI Separate
	Ceramic Tiles, to Restroom	600	SF	14.00	8,400
	Floor Finish, to Support Offices, allowance	900	GFA	-	TI Separate
	Floor Finish, to other areas	229,045	SF	2.85	652,778
7.3	Ceiling Finishes, allowance				
	Acoustic Ceiling Tile				
	to Admin offices	3,094	GFA	-	TI Separate
	to LM Offices	13,023	GFA	-	TI Separate
	Ceiling Finish, to Support Offices, allowance	900	GFA	-	TI Separate
	Painted Gypsum board to Restroom	600	SF	14.00	8,400
	Batt Insulation, allowance	600	SF	2.10	1,260
	Fuel piping enclosure, allowance	2,835	SF	35.00	99,225
	Exposed structure (assumed no finish)	227,650	SF	0.12	27,318
	TOTAL INTERIOR FINISHES				**929,875**
8	**MISCELLANEOUS SPECIALTIES**				
	Restroom specialties, allowance	1	LS	35,000.00	35,000
	Signage to interiors , allowance	1	LS	50,000	50,000
	Building signage and identifications (by car rental co.)				NIC
	Parking stall, allowance	1	LS	1,800	1,800

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
	Striping, allowance	1	LS	14,400.00	14,400
	Car wash curtain, allowance	180	LF	54	9,630
	Clearance Bar, allowance	2	EA	2,000	4,000
	Entry and Exit Bar, allowance	2	EA	3,200	6,400
	Elevator pit ladder, allowance	1	EA	2,100	2,100
	Miscellaneous (Fire Extinguishers, bollards, etc.)	1	LS	50,000	50,000
	TOTAL MISCELLANEOUS SPECIALTIES				**173,330**
9	**CONVEYING**				
	Passenger Elevator, 5,000 lbs, 3 stop, allowance	1	EA	500,000	500,000
	Passenger Elevator, 5,000 lbs, extra stop, allowance	1	EA	50,000	50,000
	Elevator Cab Finish	1	EA	25,000	25,000
	TOTAL CONVEYING				**575,000**
10	**PLUMBING**				
	Plumbing fixtures	236,078	SF	0.55	129,843
	Domestic hot and cold water distribution	236,078	SF	1.90	448,548
	Domestic water supply distribution equipment	236,078	SF	0.90	212,470
	Recycled water Equipment & distribution	236,078	SF	0.60	141,647
	Sanitary sewer piping	236,078	SF	2.40	566,587
	Sanitary sewer waste equipment	236,078	SF	0.15	35,412
	Storm water piping	236,078	SF	1.65	389,529
	Other Plumbing Systems				
	Gas service	236,078	SF	0.35	82,627
	Pipe Identification	236,078	SF	0.02	4,722
	Seismic Restraints	236,078	SF	0.05	11,804
	Flush, Clean and Testing	236,078	SF	0.25	59,020
	TOTAL PLUMBING				**2,082,208**
11	**HVAC**				
	Air distribution system with ductwork, insulation, dampers, diffusers grilles, etc.	236,078	SF	6.80	1,605,330
	Terminal and package units	236,078	SF	2.90	684,626

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
	HVAC Equipment				
	Circulating Pumps				
	P Q-1, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
	P Q-2, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
	Rooftop Cooling Only VAV Air-Conditioning Unit				
	AC-01-1, 8,000 CFM, 20 tons, economizer w/power exhaust, 3,000 CFM,	9	EA	42,000.00	378,000
	AH/Fan Coil Unit Split System Indoor Unit				
	FC, 1,950 CFM, DX coil, 57,700 BTUH	14	EA	9,419.00	131,866
	Condensing Unit - Outdoor Unit				
	CU, 57,700 BTU cooling, 59,400 heating.	14	EA	6,170.00	86,380
	Tubing, insulation, connections for condensing unit to FC unit	14	EA	3,200.00	44,800
	Exhaust Fan				
	EF, 300 CFM, ceiling mounted, centrifugal	4	EA	285.00	1,140
	EF, 20,000 CFM, inline, centrifugal	2	EA	12,980.00	25,960
	EF, 1,000 CFM, roof mounted, centrifugal	2	EA	2,300.00	4,600
	EF, 2,300 CFM, inline, belt drive, centrifugal	16	EA	2,864.00	45,824
	Exhaust air, inline and rooftop fans	236,078	SF	0.15	35,412
	HVAC energy management and control system	236,078	SF	5.40	1,274,821
	Test & Balance HVAC system	236,078	SF	1.50	354,117
	Miscellaneous HVAC systems	236,078	SF	0.20	47,216
	Miscellaneous				
	Pipe Identification	236,078	SF	0.03	7,082
	Seismic Restraints and fire seals	236,078	SF	0.07	16,525
	Cleaning and Testing	236,078	SF	0.25	59,020
	TOTAL HVAC				**4,808,479**
12	**FIRE PROTECTION**				
	Fire protection systems including sprinklers, fire department connections, piping, valves and accessories	236,078	SF	4.85	1,144,978
	Standpipes and pumps	236,078	SF	0.55	129,843
	Fire protection systems, piping, valves and accessories	236,078	SF	0.35	82,627
	TOTAL FIRE PROTECTION				**1,357,449**

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
13	**ELECTRICAL**				
	Incoming service and distribution	236,078	SF	7.40	1,746,977
	Lighting and Branch Wiring	236,078	SF	8.50	2,006,663
	Power outlets and Branch Wiring	236,078	SF	1.30	306,901
	New emergency generator allowance	236,078	SF	1.65	389,529
	Lightning protection system	236,078	SF	0.20	47,216
	Grounding system	236,078	SF	0.15	35,412
	Raceway systems for communications & security systems	236,078	SF	0.75	177,059
	Temporary power & lighting during construction	236,078	SF	0.15	35,412
	Fire Alarm system	236,078	SF	3.80	897,096
	Data and Telephone Services	236,078	SF	1.50	354,117
	Communications Rooms & Equipment	236,078	SF	4.50	1,062,351
	Security Systems	236,078	SF	3.75	885,293
	Visual Information Systems	236,078	SF	0.30	70,823
	Facility Management Systems	236,078	SF	0.35	82,627
	Intermodal Transportation Systems (Empty Conduit)	236,078	SF	0.25	59,020
	Other Communication Systems	236,078	SF	0.05	11,804
	TOTAL ELECTRICAL				**8,168,299**
14	**EQUIPMENT**				
14.1	Compressed Air	1	LS	334,000.00	334,000
	(5) 15 HP air compressors, reg. safety devices.				
	Refrigerated air dryer.				
	Compressed Air piping, maintenance. Bay, WWF day tanks, motor oil tanks, used oil collection pumps.				
	Compressed air piping at Hose reels at work stations, tire changing.				
14.2	Motor Oil	1	LS	242,000.00	242,000
	New oil distribution overhead piping in maintenance bays				
	Oil pumps with controls				
	Oil distribution hose reels (1 reel for every (2) bays.				
	Oil storage tanks				
	Energy monitoring and fuel control and emergency stop system				
14.3	Used Oil	1	LS	92,000.00	92,000
	Collection station for each bank of four (4) bays				
	Pneumatic pump powered by compressed air, & shut-off valve				
	Collection tank 5,000 gallons				
	Emergency stop control systems				

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
14.4	Car Re-fueling System	1	LS	1,973,296.00	1,973,296
	Gasoline fueling system (20 fueling positions)				
14.5	Car Wash Bay Complete	5	EA	280,000.00	1,400,000
	Car wash includes flooder arch, wash arc, 5-brushes, including overhead brush, freshwater rinse, RO rinse arch, and blowers for drying. Drive thru system.				
14.6	Maintenance Vehicle Lifts	49	EA	110,000.00	5,390,000
14.7	Installed Vacuum System	1	LS	530,700.00	530,700
	Vacuum producer and collection units, 25 HP				
	Vacuum piping to fuel dispensing, selected stacking spaces in Idle Storage, metal collection tubing, and vacuum service wands				
	Vacuum emergency shut-off and controllers				
14.8	Windshield Washer Fluid (WWF)	1	LS	162,000.00	162,000
	WWF storage tank, 3,000 gallon double walled, FRP UST.				
	Submersible pump (explosion proof)				
	Welded SS (2) pipe system.				
	WWF day tanks, 240 gallon, w/interstitial leak detection				
	WWF emergency control and shut off systems				
	TOTAL EQUIPMENT				**10,123,996**

15 SPECIAL CONSTRUCTION

	Description	Quantity	Unit	Unit Cost $	Total $
15a	**Bridges, Helix and Ramps**				
	QTA Bridges, assume with guard rail, no cover (6 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	60	EA	1,750.00	105,000
	Pile caps	119	CY	650.00	77,350
	Concrete floor slab, 10" thick	14,130	SF	21.00	296,730
	Columns	81	CY	975.00	78,867
	Beams and Girders	212	CY	970.00	205,640
	Concrete Curb, allowance	720	LF	22.50	16,200
	Guard rail/parapet wall, 42" high, allowance	720	LF	140.00	100,800
	Seismic joint cover	236	LF	125.00	29,438
	Plumbing	14,130	SF	1.30	18,369
	Lighting	14,130	SF	3.50	49,455

DETAILED ESTIMATE - QUICK TURN AROUND BUILDING B

	Description	Quantity	Unit	Unit Cost $	Total $
	Helix Bridges, assume with guard rail, no cover (2 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	20	EA	1,750.00	35,000
	Pile caps	40	CY	650.00	26,000
	Concrete floor slab, 10" thick	6,822	SF	21.00	143,262
	Columns	27	CY	975.00	26,650
	Beams and Girders	91	CY	970.00	87,947
	Concrete Curb, allowance	300	LF	22.50	6,750
	Guard rail/parapet wall, 42" high, allowance	300	LF	140.00	42,000
	Seismic joint cover	96	LF	125.00	12,000
	Plumbing	6,822	SF	1.30	8,869
	Lighting	6,822	SF	3.50	23,877
	Helix oval shape, two lanes, two levels (1 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	139	EA	1,750.00	242,667
	Pile Caps including excavation, backfill and haul away	1,108	CY	650.00	720,200
	Concrete slab, 10" thick	24,508	SF	21.00	514,668
	Columns	15	CY	975.00	14,300
	Retaining wall	54	CY	750.00	40,500
	Shear walls	848	CY	785.00	665,680
	Beams and Girders	412	CY	970.00	399,640
	Concrete Curb and striping, allowance	1,468	LF	22.50	33,030
	Guard rail/parapet wall, 42" high, allowance	840	LF	140.00	117,600
	Plumbing	24,508	SF	1.30	31,860
	Lighting	24,508	SF	3.50	85,778
15b	Green Roof, allowance	-			N/A
	TOTAL SPECIAL CONSTRUCTION				**4,256,126**
16	**SITE IMPROVEMENT**				
	QTA Site functions				
	6' high Concrete curb, allowance	85	CY	450.00	38,115
	Raise slab, allowance	31,988	SF	12.00	383,854
	Fence enclosure, allowance	14,149	SF	10.25	145,023
	Chain link door, allowance	3	EA	600.00	1,800
	Lighting, allowance	31,988	SF	6.40	204,722
	TOTAL SITE IMPROVEMENT				**773,514**

COST SUMMARY - IDLE STORAGE (IS)

			Idle Storage	
	Building Area:		**1,909,597**	**$/SF**
1	Substructure		18,585,410	9.73
2	Superstructure		55,539,239	29.08
3	Exterior Closure		1,506,720	0.79
4	Roofing & Waterproofing		7,446,631	3.90
5	Interior Construction		84,096	0.04
6	Stairs		1,991,830	1.04
7	Interior Finishes		93,920	0.05
8	Specialties		549,300	0.29
9	Conveying		0	0.00
10	Plumbing		1,215,074	0.64
11	HVAC		167,890	0.09
12	Fire Protection		5,570,889	2.92
13	Electrical		13,197,576	6.91
14	Equipment		0	0.00
15	Special Construction		2,878,400	1.51
16	Site Improvement		0	0.00
	SUBTOTAL TRADE COSTS		***108,826,974***	***56.99***
	GC Mark Ups	10.5%	11,426,832	5.98
	Design Evolution Contingency	5.0%	5,441,349	2.85
	Escalation Allowance	11.8%	14,769,181	7.73
	TOTAL CONSTRUCTION COSTS (FUTURE)		***140,464,336***	***73.56***
	Other Special Costs			
	Arts in Public		0	0.00
	Insurance & Bond (i.l.o OCIP)	4.0%	5,618,573	2.94
	LAWA Soft Costs	18.5%	25,985,902	13.61
	Program/Design Management			
	Design Consultants Team			
	Construction Administration Services			
	Construction Management Consultant			
	Airport Administration			
	Testing/Inspection and Permitting			
	Project/Construction Contingency	5.0%	7,023,217	3.68
	TOTAL PROJECT CONSTRUCTION COSTS		***179,092,029***	***93.79***

DETAILED ESTIMATE - IDLE STORAGE (IS)

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
1.1	**Special Foundations**				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	2,270	EA	1,750.00	3,971,625
	Pile testing	1	LS	33,000.00	33,000
1.2	**Foundation**				
	Isolated footing	33	CY	765.00	25,245
	Grade Beams	827	CY	715.00	590,948
	Excavation	17,117	CY	26.00	445,029
	Backfill, allowance	4,436	CY	25.00	110,888
	Haul away to LAX site	12,681	CY	15.00	190,215
	Pile Caps	11,855	CY	550.00	6,519,975
1.3	**Floors**				
	6" Slab on grade, including thickening, miscellaneous accessories	623,115	SF	10.75	6,698,486
	TOTAL SUBSTRUCTURE				**18,585,410**
2	**SUPERSTRUCTURE**				
2.1	*Floor Construction*				
	Precast double tee floor slab	623,115	SF	17.00	10,592,955
	Columns	4,374	CY	1,000.00	4,374,000
	Shear wall	8,906	CY	712.00	6,341,072
	Beams and Girder	6,800	CY	995.00	6,766,000
	Topping slab, 6"	623,115	SF	7.50	4,673,363
	Expansion joint cover, allowance	4,320	LF	125.00	540,000
2.2	*Roof Construction*				
	Precast double tee floor slab	623,115	SF	17.00	10,592,955
	Roof Beams and Girder	6,932	CY	995.00	6,897,340
	Topping slab, 6"	623,115	SF	7.50	4,673,363
	Parapet wall, allow 8" thick at roof	2,756	SF	32.00	88,192
	TOTAL SUPERSTRUCTURE				**55,539,239**

DETAILED ESTIMATE - IDLE STORAGE (IS)

	Description	Quantity	Unit	Unit Cost $	Total $
3	**EXTERIOR ENCLOSURE**				
	Crash barriers/guard rail	12,402	LF	110.00	1,364,220
	Exterior Walls, allowance	1	LS	75,000.00	75,000
	Exterior Doors, single leaf, allowance	27	EA	2,500	67,500
	TOTAL EXTERIOR ENCLOSURE				**1,506,720**
4	**ROOFING AND WATERPROOFING**				
	PVC membrane roofing incl. back of parapet wall	623,115	SF	11.00	6,854,265
	Sheet metal flashing	2,756	LF	15.50	42,718
	Caulking and sealant, allowance	623,115	SF	0.50	311,558
	Miscellaneous roof accessories, allowance	623,115	SF	0.35	218,090
	Roof openings , allowance	1	LS	20,000.00	20,000
	TOTAL ROOFING AND WATERPROOFING				**7,446,631**
5	**INTERIOR CONSTRUCTION**				
	Mechanical Rooms:				
	CMU wall to mech/elec rooms, allowance	1,600	SF	15.00	24,000
	Interior Dbl PM Doors, allowance	12	PR	4,000.00	48,000
	PM Louvers, allowance	288	SF	42.00	12,096
	TOTAL INTERIOR CONSTRUCTION				**84,096**
6	**STAIRS**				
6.1	*Stair Construction*				
	17'-0" High Metal Pan Stairs including steel tube railings	22	FLT	24,100.00	530,200
	20'-0" High Metal Pan Stairs including steel tube railings	5	FLT	28,400.00	142,000
	Steel columns and beams	54	TON	5,000	270,000
	CMU Stair Enclosure Walls, allowance	54,264	SF	15.00	813,960
6.2	*Stair Well Finishes*				
	Wall finish, internal paint and external sealer	108,528	SF	2.00	217,056
	Floor finish, sealer	10,341	SF	1.80	18,614
	TOTAL STAIRS				**1,991,830**

DETAILED ESTIMATE - IDLE STORAGE (IS)

	Description	Quantity	Unit	Unit Cost $	Total $
7	**INTERIOR FINISHES**				
	Interior Finishes, allowance				
	Interior wall finish	1	LS	5,000.00	5,000
	Epoxy floor finish, to mech rooms, allow	6,840	SF	13.00	88,920
	Ceilings - unpainted concrete		SF	0.00	0
	TOTAL INTERIOR FINISHES				**93,920**
8	**MISCELLANEOUS SPECIALTIES**				
	Signage (fire code signage and painted graphics to columns only), allowance	1	LS	350,000	350,000
	Parking stall striping, (in TI allowance)			-	TI separate
	Striping to three levels for vehicle entry/exit lanes only	1	LS	38,000	38,000
	Clearance Bar, allowance	2	EA	2,000	4,000
	Entry and Exit Bar, allowance	2	EA	3,200	6,400
	Standard secure jersey concrete barriers, 4' unit length	1,100	LF	69.00	75,900
	Miscellaneous (Fire Extinguishers, bollards, etc.)	1	LS	75,000	75,000
	TOTAL MISCELLANEOUS SPECIALTIES				**549,300**
9	**CONVEYING (NOT APPLICABLE)**				
	TOTAL CONVEYING (NOT APPLICABLE)				**0**
10	**PLUMBING**				
	Plumbing	1,869,345	SF	0.65	1,215,074
	TOTAL PLUMBING				**1,215,074**
11	**HVAC**				
	Miscellaneous ducting and exhaust fan on lower level only	1,526,271	SF	0.09	137,364
	Miscellaneous HVAC	1,526,271	SF	0.02	30,525
	TOTAL HVAC				**167,890**

DETAILED ESTIMATE - IDLE STORAGE (IS)

	Description	Quantity	Unit	Unit Cost $	Total $
12	**FIRE PROTECTION**				
	Fire protection systems including sprinklers, fire department connections, piping, valves and accessories	1,526,271	SF	2.75	4,197,245
	Standpipes and pumps	1,526,271	SF	0.55	839,449
	Fire protection systems, piping, valves and accessories	1,526,271	SF	0.35	534,195
	TOTAL FIRE PROTECTION				**5,570,889**
13	**ELECTRICAL**				
	Incoming service and distribution	1,869,345	SF	1.05	1,962,812
	Lighting and Branch Wiring and controls	1,869,345	SF	3.00	5,608,035
	Power outlets and Branch Wiring	1,869,345	SF	0.20	373,869
	New emergency generator allowance	1,869,345	SF	0.45	841,205
	Lightning protection system	1,869,345	SF	0.20	373,869
	Grounding system	1,869,345	SF	0.15	280,402
	Raceway systems for communications & security systems	1,869,345	SF	0.05	93,467
	Temporary power & lighting during construction	1,869,345	SF	0.03	56,080
	Fire Alarm system	1,869,345	SF	0.90	1,682,411
	Tel/Data	1,869,345	SF	0.03	56,080
	Communications Rooms & Equipment	1,869,345	SF	0.05	93,467
	Access Control System	1,869,345	SF	0.02	37,387
	CCTV System	1,869,345	SF	0.90	1,682,411
	Paging System	1,869,345	SF	0.02	37,387
	Other Communication Systems	1,869,345	SF	0.01	18,693
	TOTAL ELECTRICAL				**13,197,576**
14	**EQUIPMENT (NOT APPLICABLE)**				
	TOTAL EQUIPMENT (NOT APPLICABLE)				**0**

DETAILED ESTIMATE - IDLE STORAGE (IS)

	Description	Quantity	Unit	Unit Cost $	Total $
15	**SPECIAL CONSTRUCTION**				
15a	**Bridges, Helix and Ramps**				
	IS Bridges, assume with guard rail, no cover (15 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	161	EA	1,750.00	281,250
	Pile Caps including excavation, backfill and haul away	317	CY	650.00	206,143
	Concrete floor slab, 10" thick	32,400	SF	21.00	680,400
	Columns	136	CY	975.00	132,670
	Beams and Girders	500	CY	970.00	485,000
	Concrete Curb, allowance	1,755	LF	22.50	39,488
	Guard rail/parapet wall, 42" high, allowance	1,755	LF	140.00	245,700
	Seismic joint	540	LF	125.00	67,500
	Plumbing	32,400	SF	1.30	42,120
	Lighting	32,400	SF	3.50	113,400
	Ramp, assume with guard rail, no cover				
	Concrete floor slab, 10" thick	7,852	SF	24.00	188,448
	Columns, allow	33	CY	975.00	32,152
	Beams and Girders, allow	121	CY	970.00	117,538
	Concrete Curb, allowance	537	LF	22.50	12,083
	Guard rail/parapet wall, 42" high, allowance	537	LF	140.00	75,180
	Seismic joint	40	LF	125.00	5,000
	Plumbing	7,852	SF	1.30	10,208
	Lighting	7,852	SF	3.50	27,482
15b	Concrete piers for future PV panels, allow 2' x 2' x 3' deep	243	EA	480.00	116,640
	TOTAL SPECIAL CONSTRUCTION				**2,878,400**

COST SUMMARY - READY AND RETURN (RAC)

			Ready and Return	
		Building Area:	**2,525,742**	**$/SF**
1	Substructure		29,878,535	11.83
2	Superstructure		96,615,253	38.25
3	Exterior Closure		1,642,930	0.65
4	Roofing & Waterproofing		9,809,936	3.88
5	Interior Construction		2,414,288	0.96
6	Stairs		2,528,587	1.00
7	Interior Finishes		1,417,969	0.56
8	Specialties		1,016,440	0.40
9	Conveying		0	0.00
10	Plumbing		6,655,898	2.64
11	HVAC		3,040,874	1.20
12	Fire Protection		7,761,670	3.07
13	Electrical		24,773,550	9.81
14	Equipment		0	0.00
15	Special Construction		4,960,779	1.96
16	Site Improvement		0	0.00
	SUBTOTAL TRADE COSTS		***192,516,709***	***76.22***
	GC Mark Ups	10.5%	20,214,254	8.00
	Design Evolution Contingency	5.0%	9,625,835	3.81
	Escalation Allowance	11.8%	26,126,924	10.34
	TOTAL CONSTRUCTION COSTS (FUTURE)		***248,483,722***	***98.38***
	Other Special Costs			
	Arts in Public		0	0.00
	Insurance & Bond (i.l.o OCIP)	4.0%	9,939,349	3.94
	LAWA Soft Costs	18.5%	45,969,489	18.20
	Program/Design Management			
	Design Consultants Team			
	Construction Administration Services			
	Construction Management Consultant			
	Airport Administration			
	Testing/Inspection and Permitting			
	Project/Construction Contingency	5.0%	12,424,186	4.92
	TOTAL PROJECT CONSTRUCTION COSTS		***316,816,746***	***125.44***

DETAILED ESTIMATE - READY AND RETURN (RAC)

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
1.1	**Special Foundations**				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	4,228	EA	1,750.00	7,399,416
	Pile testing	1	LS	40,000.00	40,000
1.2	**Foundation**				
	Isolated footing	76	CY	765.00	58,198
	Grade Beams	2,551	CY	715.00	1,824,051
	Excavation	28,103	CY	26.00	730,677
	Backfill, allowance	7,625	CY	25.00	190,621
	Haul away to LAX site	20,478	CY	15.00	307,172
	Pile Caps	18,810	CY	560.00	10,533,404
1.3	**Floors**				
	6" Slab on grade, including thickening, miscellaneous accessories	817,023	SF	10.75	8,782,997
	Elevator pits and sump pits	1	LS	12,000.00	12,000
	TOTAL SUBSTRUCTURE				**29,878,535**
2	**SUPERSTRUCTURE**				
2.1	*Floor Construction*				
	Precast double tee floor slab	1,197,714	SF	17.00	20,361,138
	Columns	9,064	CY	1,000.00	9,064,000
	Buttress wall	3,936	CY	740.00	2,912,640
	Shear wall	14,928	CY	712.00	10,628,736
	Beams and Girder	19,548	CY	995.00	19,450,260
	Topping slab, 6"	1,197,714	SF	7.50	8,982,855
2.2	*Roof Construction*				
	Precast double tee floor slab	821,112	SF	17.00	13,958,904
	Roof Beams and Girder	5,124	CY	995.00	5,098,380
	Topping slab, 6"	821,112	SF	7.50	6,158,340
	TOTAL SUPERSTRUCTURE				**96,615,253**

DETAILED ESTIMATE - READY AND RETURN (RAC)

	Description	Quantity	Unit	Unit Cost $	Total $
3	**EXTERIOR ENCLOSURE**				
	Crash barriers/guard rail	14,163	LF	110.00	1,557,930
	Exterior Doors, single leaf, allowance	34	EA	2,500.00	85,000
	TOTAL EXTERIOR ENCLOSURE				**1,642,930**
4	**ROOFING AND WATERPROOFING**				
	PVC membrane roofing incl. back of parapet wall	821,112	SF	11.00	9,032,232
	Sheet metal flashing	4,178	LF	15.50	64,759
	Caulking and sealant, allowance	821,112	SF	0.50	410,556
	Miscellaneous roof accessories, allowance	821,112	SF	0.35	287,389
	Roof openings , allowance	1	LS	15,000.00	15,000
	TOTAL ROOFING AND WATERPROOFING				**9,809,936**
5	**INTERIOR CONSTRUCTION**				
	3" raised slab	28,454	SF	10.00	284,540
	Elevator wall	16,092	SF	12.00	193,104
	CMU wall, allow 15' high	67,140	SF	25.00	1,678,500
	Louvers to Data/Elec/Mech rooms, allowance	432	SF	42.00	18,144
	Double glazed door, allow	0	EA	4,500.00	
	Single door	96	EA	2,500.00	240,000
	TOTAL INTERIOR CONSTRUCTION				**2,414,288**

DETAILED ESTIMATE - READY AND RETURN (RAC)

	Description	Quantity	Unit	Unit Cost $	Total $
6	**STAIRS**				
6.1	*Stair Construction*				
	17'-0" High Metal Pan Stairs including steel tube railings	32	FLT	24,100	771,200
	20'-0" High Metal Pan Stairs including steel tube railings	2	FLT	28,400	56,800
	Steel columns and beams	68	TON	5,000	340,000
	CMU Stair Enclosure Walls, allowance	70,414	SF	15.00	1,056,210
6.2	*Stair Well Finishes*				
	Wall finish, internal paint and external sealer	140,828	SF	2.00	281,656
	Floor finish, sealer	12,623	SF	1.80	22,721
	TOTAL STAIRS				**2,528,587**
7	**INTERIOR FINISHES**				
7.1	Wall Finishes				
	Paint to wall	123,132	SF	1.50	184,698
	Ceramic tile, restroom	27,240	SF	18.50	503,940
7.2	Floor Finishes, including base				
	Carpet, RAC offices	9,000	SF		Separate TI
	Ceramic tile, restroom	8,964	SF	17.00	152,388
	Sealed concrete, Data/Elec/Mech rooms	3,720	SF	1.20	4,464
	Sealed concrete, storage rooms	6,770	SF	1.20	8,124
7.3	Ceiling Finishes				
	Acoustic Ceiling Tile, RAC offices	9,000	SF		Separate TI
	Painted Gypsum board, restroom	8,964	SF	14.00	125,496
	Exposed structure, Data/Elec/Mech rooms	3,720	SF	0.12	446
	Exposed structure, Storage rooms	6,770	SF	0.12	812
	Glass railing around escalator light well, 42" high, allow	1,094	LF	400.00	437,600
	TOTAL INTERIOR FINISHES				**1,417,969**

DETAILED ESTIMATE - READY AND RETURN (RAC)

	Description	Quantity	Unit	Unit Cost $	Total $
8	**MISCELLANEOUS SPECIALTIES**				
	Restroom specialties, allowance				
	Toilet partitions, standard	36	EA	1,500.00	54,000
	Toilet partitions, h/c	24	EA	1,750.00	42,000
	Countertop	180	LF	170.00	30,600
	Toilet paper/seat cover combo	72	EA	155.00	11,160
	Grab bars	36	EA	240.00	8,640
	Soap dispenser	60	EA	150.00	9,000
	Paper towel dispenser	36	EA	165.00	5,940
	Signage (fire code signage and painted graphics to columns only), allowance	1	LS	225,000.00	225,000
	Parking stall striping, (in TI allowance)			-	TI separate
	Striping to three levels for vehicle entry/exit lanes only	1	LS	60,000	60,000
	Clearance Bar, allowance	2	EA	2,000.00	4,000
	Entry and Exit Bar, allowance	2	EA	3,200.00	6,400
	Standard secure jersey concrete barriers, 4' unit length	6,300	LF	69.00	434,700
	Miscellaneous (Fire Extinguishers, bollards, etc.)	1	LS	125,000.00	125,000
	TOTAL MISCELLANEOUS SPECIALTIES				**1,016,440**
9	**CONVEYING**				included in CSB
	TOTAL CONVEYING				**0**
10	**PLUMBING**				
	Plumbing fixtures	2,126,485	SF	0.70	1,488,540
	Domestic hot and cold water distribution	2,126,485	SF	0.55	1,169,567
	Domestic water supply distribution equipment	2,126,485	SF	0.15	318,973
	Recycled water Equipment & distribution	2,126,485	SF	0.20	425,297
	Sanitary sewer piping	2,126,485	SF	0.55	1,169,567
	Sanitary sewer waste equipment	2,126,485	SF	0.10	212,649
	Storm water piping	2,126,485	SF	0.80	1,701,188
	Miscellaneous Plumbing				
	Gas service	2,126,485	SF	0.04	85,059
	Seismic Restraints	2,126,485	SF	0.01	21,265
	Flush, Clean and Testing	2,126,485	SF	0.03	63,795
	TOTAL PLUMBING				**6,655,898**

DETAILED ESTIMATE - READY AND RETURN (RAC)

	Description	Quantity	Unit	Unit Cost $	Total $
11	**HVAC**				
	Air distribution system with ductwork, insulation, dampers, diffusers grilles, etc.	2,126,485	SF	0.70	1,488,540
	Mechanical Ventilation, allowance	2,126,485	SF	0.45	956,918
	HVAC energy management and control system	2,126,485	SF	0.20	425,297
	Test & Balance HVAC system	2,126,485	SF	0.03	63,795
	Miscellaneous HVAC systems	2,126,485	SF	0.02	42,530
	Miscellaneous				
	Seismic Restraints	2,126,485	SF	0.03	63,795
	TOTAL HVAC				**3,040,874**
12	**FIRE PROTECTION**				
	Fire protection systems including sprinklers, fire department connections, piping, valves and accessories	2,126,485	SF	2.75	5,847,834
	Standpipes and pumps	2,126,485	SF	0.55	1,169,567
	Fire protection systems, piping, valves and accessories	2,126,485	SF	0.35	744,270
	TOTAL FIRE PROTECTION				**7,761,670**
13	**ELECTRICAL**				
	Incoming service and distribution	2,126,485	SF	1.20	2,551,782
	Lighting and Branch Wiring	2,126,485	SF	3.30	7,017,401
	Power outlets and Branch Wiring	2,126,485	SF	0.25	531,621
	New emergency generator and power distribution	2,126,485	SF	0.95	2,020,161
	Lightning protection system	2,126,485	SF	0.15	318,973
	Grounding system	2,126,485	SF	0.10	212,649
	Raceway systems for communications & security systems	2,126,485	SF	0.15	318,973
	Temporary power & lighting during construction	2,126,485	SF	0.10	212,649
	Fire Alarm system	2,126,485	SF	2.45	5,209,888
	Data and Telephone Services	2,126,485	SF	0.65	1,382,215
	Communications Rooms & Equipment	2,126,485	SF	0.70	1,488,540
	Security Systems	2,126,485	SF	1.30	2,764,431
	Visual Information Systems	2,126,485	SF	0.25	531,621
	Miscellaneous Special Electrical Systems	2,126,485	SF	0.10	212,649
	TOTAL ELECTRICAL				**24,773,550**

DETAILED ESTIMATE - READY AND RETURN (RAC)

	Description	Quantity	Unit	Unit Cost $	Total $
14	**EQUIPMENT (NOT APPLICABLE)**				
	TOTAL EQUIPMENT (NOT APPLICABLE)				**0**
15	**SPECIAL CONSTRUCTION**				
	Helix Bridges, assume with guard rail, no cover (5 ea.)				
	Concrete floor slab, 10" thick	7,406	SF	21.00	155,526
	Beams and Girders, allowance	148	CY	970.00	143,676
	Concrete Curb, allowance	996	LF	22.50	22,410
	Guard rail/parapet wall, 42" high, allowance	996	LF	140.00	139,440
	Seismic joint cover	120	LF	125.00	15,000
	Plumbing	7,406	SF	1.30	9,628
	Lighting	7,406	SF	3.50	25,921
	Helix round shape, one lane, two levels (3 ea.)				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	62	EA	1,750.00	108,000
	Pile Caps including excavation, backfill and haul away	126	CY	650.00	81,900
	Concrete floor slab, 10" thick	54,612	SF	21.00	1,146,852
	Columns	127	CY	975.00	123,825
	Shear walls	1,230	CY	785.00	965,550
	Beams and Girders, allowance	1,092	CY	970.00	1,059,473
	Concrete Curb, allowance	2,238	LF	22.50	50,355
	Guard rail/parapet wall, 42" high, allowance	2,238	LF	140.00	313,320
	Plumbing	54,612	SF	1.30	70,996
	Lighting	54,612	SF	3.50	191,142
	Ramp, assume with guard rail, no cover (1 ea.)				
	Concrete floor slab, 10" thick	4,477	SF	21.00	94,017
	Columns, allow	10	CY	975.00	10,151
	Beams and Girders, allowance	69	CY	970.00	67,017
	Concrete Curb, allowance	435	LF	22.50	9,788
	Guard rail/parapet wall, 42" high, allowance	435	LF	140.00	60,900
	Plumbing	4,477	SF	1.30	5,820
	Lighting	4,477	SF	3.50	15,670
15b	Concrete piers for future PV panels, allow 2' x 2' x 3' deep	155	EA	480.00	74,404
	TOTAL SPECIAL CONSTRUCTION				**4,960,779**

COST SUMMARY - EMPLOYEE PARKING above RAC and IS

			EMPLOYEE PARKING above RAC and IS	
		Building Area:	**391,789**	**$/SF**
1	Substructure		3,001,824	7.66
2	Superstructure		16,322,036	41.66
3	Exterior Closure		1,632,950	4.17
4	Roofing & Waterproofing		0	0.00
5	Interior Construction		0	0.00
6	Stairs		0	0.00
7	Interior Finishes		0	0.00
8	Specialties		205,000	0.52
9	Conveying		0	0.00
10	Plumbing		1,120,517	2.86
11	HVAC		0	0.00
12	Fire Protection		0	0.00
13	Electrical		3,349,796	8.55
14	Equipment		0	0.00
15	Special Construction		0	0.00
16	Site Improvement		0	0.00
	SUBTOTAL TRADE COSTS		***25,632,123***	***65.42***
	GC Mark Ups	10.5%	2,691,373	6.87
	Design Evolution Contingency	5.0%	1,281,606	3.27
	Escalation Allowance	11.8%	3,478,599	8.88
	TOTAL CONSTRUCTION COSTS (FUTURE)		***33,083,701***	***84.44***
	Other Special Costs			
	Arts in Public		0	0.00
	Insurance & Bond (i.l.o OCIP)	4.0%	1,323,348	3.38
	LAWA Soft Costs	18.5%	6,120,485	15.62
	Program/Design Management			
	Design Consultants Team			
	Construction Administration Services			
	Construction Management Consultant			
	Airport Administration			
	Testing/Inspection and Permitting			
	Project/Construction Contingency	5.0%	1,654,185	4.22
	TOTAL PROJECT CONSTRUCTION COSTS		***42,181,719***	***107.66***

DETAILED ESTIMATE - EMPLOYEE PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
	Special Foundations (pro-rated)				
1.1	*IS Building C*				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	340	EA	1,750.00	594,977
	Pile testing	1	LS	10,000.00	10,000
1.2	*RAC Building D*				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	167	EA	1,750.00	291,578
	Pile testing	1	LS	10,000.00	10,000
	Foundations (pro-rated)				
1.3	*IS Building C*				
	Isolated footing	5	CY	765.00	3,782
	Grade Beams	124	CY	715.00	88,528
	Excavation	2,564	CY	26.00	66,668
	Backfill, allowance	664	CY	25.00	16,612
	Haul away to LAX site	1,900	CY	15.00	28,496
	Pile Caps	2,256	CY	590.00	1,331,294
1.4	*RAC Building D*				
	Isolated footing	3	CY	765.00	2,293
	Grade Beams	101	CY	715.00	71,878
	Excavation	1,107	CY	26.00	28,793
	Backfill, allowance	300	CY	25.00	7,512
	Haul away to LAX site	807	CY	15.00	12,104
	Pile Caps	741	CY	590.00	437,310
	TOTAL SUBSTRUCTURE				**3,001,824**
2	**SUPERSTRUCTURE**				
	IS Building C				
2.1	*Floor Construction*				
	Precast double tee floor slab	280,041	SF	17.00	4,760,697
	Columns	1,160	CY	1,000.00	1,159,506
	Shear wall	1,760	CY	712.00	1,253,120
	Beams and Girder	3,112	CY	995.00	3,096,680
	Topping slab, 6"	280,041	SF	7.50	2,100,308

DETAILED ESTIMATE - EMPLOYEE PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
	RAC Building D				
2.2	*Floor Construction*				
	Precast double tee floor slab	111,748	SF	17.00	1,899,716
	Beams and Girder	1,220	CY	995.00	1,213,900
	Topping slab, 6"	111,748	SF	7.50	838,110
	TOTAL SUPERSTRUCTURE				**16,322,036**
3	**EXTERIOR ENCLOSURE**				
	Crash barriers/guard rail, IS Building C	1,702	LF	110.00	187,220
	Crash barriers/guard rail, RAC Building D	819	LF	110.00	90,090
	Glazed screens, 8' high to roof	10,428	SF	130.00	1,355,640
	TOTAL EXTERIOR ENCLOSURE				**1,632,950**
4	**ROOFING AND WATERPROOFING (NOT APPLICABLE)**				
	TOTAL ROOFING AND WATERPROOFING (NOT APPLICABLE)				**0**
5	**INTERIOR CONSTRUCTION (NOT APPLICABLE)**				
	TOTAL INTERIOR CONSTRUCTION (NOT APPLICABLE)				**0**

DETAILED ESTIMATE - EMPLOYEE PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
6	**STAIRS (NOT APPLICABLE)**				
	Stair Construction (incl in IS or RAC building)				
	TOTAL STAIRS (NOT APPLICABLE)				**0**
7	**INTERIOR FINISHES (NOT APPLICABLE)**				
	TOTAL INTERIOR FINISHES (NOT APPLICABLE)				**0**
8	**MISCELLANEOUS SPECIALTIES**				
	Signage , allowance	1	LS	50,000.00	50,000
	Parking stall striping, allowance	1	LS	45,000.00	45,000
	Striping, allowance	1	LS	40,000.00	40,000
	Access control equipment including arm bar	1	SET	15,000.00	15,000
	Miscellaneous (Fire Extinguishers, bollards, etc.)	1	LS	55,000.00	55,000
	TOTAL MISCELLANEOUS SPECIALTIES				**205,000**
9	**CONVEYING (NOT APPLICABLE)**				
	TOTAL CONVEYING (NOT APPLICABLE)				**0**
10	**PLUMBING**				
	Plumbing fixtures	391,789	SF	0.65	254,663
	Domestic hot and cold water distribution	391,789	SF	0.45	176,305
	Domestic water supply distribution equipment	391,789	SF	0.10	39,179
	Recycled water Equipment & distribution	391,789	SF	0.20	78,358
	Sanitary sewer piping	391,789	SF	0.50	195,895
	Sanitary sewer waste equipment	391,789	SF	0.10	39,179
	Storm water piping	391,789	SF	0.75	293,842

DETAILED ESTIMATE - EMPLOYEE PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
	Miscellaneous Plumbing				
	Seismic Restraints	391,789	SF	0.01	3,918
	Flush, Clean and Testing	391,789	SF	0.10	39,179
	TOTAL PLUMBING				**1,120,517**
11	**HVAC**				
	Not applicable to open roof deck parking				
	TOTAL HVAC				**0**
12	**FIRE PROTECTION**				
	Not applicable to open roof deck parking				
	TOTAL FIRE PROTECTION				**0**
13	**ELECTRICAL**				
	Incoming service and distribution	391,789	SF	1.40	548,505
	Lighting and Branch Wiring	391,789	SF	3.30	1,292,904
	Power outlets and Branch Wiring	391,789	SF	0.10	39,179
	New emergency generator allowance	391,789	SF	0.90	352,610
	Lightning protection system	391,789	SF	0.15	58,768
	Grounding system	391,789	SF	0.10	39,179
	Raceway systems for communications & security systems	391,789	SF	0.15	58,768
	Temporary power & lighting during construction	391,789	SF	0.10	39,179
	Tel/Data	391,789	SF	0.45	176,305
	Communications Rooms & Equipment	391,789	SF	0.85	333,021
	Access Control System	391,789	SF	0.80	313,431
	CCTV System	391,789	SF	0.10	39,179
	Paging System	391,789	SF	0.10	39,179
	Other Communication Systems	391,789	SF	0.05	19,589
	TOTAL ELECTRICAL				**3,349,796**

COST SUMMARY - CUSTOMER SERVICE BUILDING (CSB)

		Customer Service Building	
Building Area:		**345,944**	**$/SF**
1 Substructure		132,000	0.38
2 Superstructure		6,400,673	18.50
3 Exterior Closure		3,526,067	10.19
4 Roofing & Waterproofing		5,097,927	14.74
5 Interior Construction		337,776	0.98
6 Stairs		412,188	1.19
7 Interior Finishes		1,991,605	5.76
8 Specialties		455,354	1.32
9 Conveying		33,670,000	97.33
10 Plumbing		1,139,661	3.29
11 HVAC		5,595,237	16.17
12 Fire Protection		741,684	2.14
13 Electrical		4,866,170	14.07
14 Equipment		0	0.00
15 Special Construction		320,000	0.93
16 Site Improvement		18,587,769	53.73
SUBTOTAL TRADE COSTS		***83,274,108***	***240.72***
GC Mark Ups	12.0%	9,992,893	28.89
Design Evolution Contingency	5.0%	4,163,705	12.04
Escalation Allowance	11.8%	11,448,108	33.09
TOTAL CONSTRUCTION COSTS (FUTURE)		***108,878,814***	***314.73***
Other Special Costs			
Arts in Public	1.0%	832,741	2.41
Insurance & Bond (i.l.o OCIP)	4.0%	4,355,153	12.59
LAWA Soft Costs	18.5%	20,142,581	58.22
Program/Design Management			
Design Consultants Team			
Construction Administration Services			
Construction Management Consultant			
Airport Administration			
Testing/Inspection and Permitting			
Project/Construction Contingency	5.0%	5,443,941	15.74
TOTAL PROJECT CONSTRUCTION COSTS		***139,653,229***	***403.69***

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
	Foundation				
	Elevator and escalator pits , allowance	1	LS	132,000.00	132,000
	TOTAL SUBSTRUCTURE				**132,000**
2	**SUPERSTRUCTURE**				
	Raised slab to floors above office and support area, allowance	106,547	SF	8.00	852,376
	Structural framing to roof				
	Concrete encased steel columns 18 x 18 x 20' high, allowance	72	EA	8,400.00	604,800
	Steel Beam	668	TON	5,000.00	3,340,000
	Steel Bracing, allowance	24	TON	5,000.00	120,000
	Steel, unidentified, allowance	33	TON	5,000.00	167,000
	Fire proofing to structural steel framing	820	TON	450.00	369,198
	Intumescent paint to exposed interior steel framing, allow	1	LS	5,000.00	5,000
	Metal deck, to flat roofs	102,324	SF	7.50	767,430
	Rough carpentry	120,599	SF	0.45	54,270
	Miscellaneous metals	120,599	SF	1.00	120,599
	TOTAL SUPERSTRUCTURE				**6,400,673**
3	**EXTERIOR ENCLOSURE**				
	Exterior Walls, allowance				
	CMU Walls	11,880	SF	25.00	297,000
	Storefront glazing walls	28,920	SF	96.00	2,776,320
	Core walls at CSB Level	5,920	SF	25.00	148,000
	Exterior Doors, allowance	1	LS	75,000.00	75,000
	Exterior finish, to roof overhang	2,954	SF	60.00	177,223
	Exterior finish, to CMU walls	11,880	SF	1.50	17,820
	Caulking and sealant	28,920	SF	1.20	34,704
	TOTAL EXTERIOR ENCLOSURE				**3,526,067**

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

	Description	Quantity	Unit	Unit Cost $	Total $
4	**ROOFING AND WATERPROOFING**				
	Flat roof system including substrate, sloping, allowance	102,324	SF	43.00	4,399,932
	Roofing to Elevator Core	24,123	SF	21.50	518,645
	Caulking and sealant, allowance	140,680	SF	0.50	70,340
	Miscellaneous roof accessories, allowance	140,680	SF	0.75	105,510
	Roof openings , allowance	1	LS	3,500.00	3,500
	TOTAL ROOFING AND WATERPROOFING				**5,097,927**
5	**INTERIOR CONSTRUCTION**				
	Interior Partition				
	Office areas, allowance	84,921	GFA		In TI Allowance
	Support areas (core & shell)	9,058	SF	11.00	99,638
	Restroom partitions, allowance	11,841	SF	18.00	213,138
	Interior Doors and Windows, allowance	1	LS	25,000.00	25,000
	TOTAL INTERIOR CONSTRUCTION				**337,776**
6	**STAIRS**				
6.1	*Stair Construction*				
	20'-0" High Exterior Metal Pan Stairs including steel tube railings	5	FLT	28,400	142,000
	Steel columns and beams	10	TON	5,000	50,000
	CMU Stair Enclosure Walls, allowance	8,000	SF	20.00	160,000
6.2	*Stair Finishes*				
	Wall finish, internal and external	16,000	SF	3.00	48,000
	Floor finish	1,875	SF	6.50	12,188
	TOTAL STAIRS				**412,188**

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

	Description	Quantity	Unit	Unit Cost $	Total $
7	**INTERIOR FINISHES**				
7.1	Wall Finishes				
	Office, allowance	84,921	GFA		In TI Allowance
	Support areas (core & shell)	12,054	SF	1.00	12,054
	Restroom, allowance	23,682	SF	17.00	402,594
7.2	Floor Finishes, allowance				
	Office	84,921	GFA	6.00	509,526
	Support areas (core & shell)	7,814	GFA		In TI Allowance
	Restroom	3,741	GFA	14.00	52,374
	Circulation core lobbies, Terrazzo floors	10,071	GFA	40.00	402,840
7.3	Ceiling Finishes, allowance				
	Office	84,921	GFA	6.50	551,987
	Support areas (core & shell)	7,814	GFA		In TI Allowance
	Restroom	3,741	GFA	16.10	60,230
	Circulation core lobbies	10,071	GFA		part of canopy
	TOTAL INTERIOR FINISHES				**1,991,605**
8	**MISCELLANEOUS SPECIALTIES**				
	Restroom specialties, allowance				
	Recessed waste receptacle	4	EA	400.00	1,600
	Paper towel dispenser	4	EA	150.00	600
	Hand dryer	4	EA	1,000.00	4,000
	Seat cover dispenser	12	EA	165.00	1,980
	Soap dispenser	12	EA	150.00	1,800
	Sanitary napkin vendor	2	EA	650.00	1,300
	Grab bars	8	EA	240.00	1,920
	Baby changing station	2	EA	320.00	640
	Mirror with frame	240	SF	44.00	10,560
	Toilet compartments, std	7	EA	1,500.00	10,500
	Toilet compartments, h/c	2	EA	1,750.00	3,500
	Urinal screen	2	EA	1,300.00	2,600
	Toilet tissue dispenser, recessed	12	EA	80.00	960
	Tissue dispenser and sanitary napkin disposal combo, partition mount	8	EA	160.00	1,280
	Countertop w/ backsplash	80	LF	170.00	13,600
	Coat hook	12	EA	35.00	420
	Miscellaneous toilet accessories	3,741	SF	3.50	13,094

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

	Description	Quantity	Unit	Unit Cost $	Total $
	Specialties (counters, cabinets, etc.) allowance	1	LS	80,000	80,000
	Signage , allowance	1	LS	250,000	250,000
	Miscellaneous (Fire Extinguishers, corner guards, etc.)	1	LS	55,000	55,000
	TOTAL MISCELLANEOUS SPECIALTIES				**455,354**
9	**CONVEYING**				
	Elevator, 4 stops, 54' high, allowance	8	EA	500,000	4,000,000
	Elevator cab Finish	8	EA	25,000	200,000
	Escalators, 20' rising	7	EA	760,000	5,320,000
	Escalators, 37' rising	7	EA	1,400,000	9,800,000
	Escalators, 54' rising	7	EA	2,050,000	14,350,000
	TOTAL CONVEYING				**33,670,000**
10	**PLUMBING**				
	Plumbing fixtures	120,599	SF	1.30	156,779
	Domestic hot and cold water distribution	120,599	SF	1.90	229,138
	Domestic water supply distribution equipment	120,599	SF	0.90	108,539
	Recycled water Equipment & distribution	120,599	SF	0.60	72,359
	Sanitary sewer piping	120,599	SF	2.40	289,438
	Sanitary sewer waste equipment	120,599	SF	0.15	18,090
	Storm water piping	120,599	SF	1.80	217,078
	Other Plumbing Systems				
	Seismic Restraints	120,599	SF	0.05	6,030
	Flush, Clean and Testing	120,599	SF	0.35	42,210
	TOTAL PLUMBING				**1,139,661**
11	**HVAC**				
	Air distribution system with ductwork, insulation, dampers, diffusers grilles, etc.	120,599	SF	9.00	1,085,391
	Split system Heat Pump, Split System Furnace, Packaged small Rooftop Heat Pump, Packaged Large Rooftop DX VAV AHU, w/HW reheat.	120,599	SF	0.30	36,180
	HVAC equipment and piping	120,599	SF	5.80	699,474
	HVAC Equipment				
	<u>Boilers</u>				
	B C-1 and C-2, 180 GPM, gas fired.	2	EA	64,578.00	129,156

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

Description	Quantity	Unit	Unit Cost $	Total $
Air Separator				
AS-C-1, C-2, 180 GPM flow, manual blow down drain, dirt separation	2	EA	7,055.00	14,110
Tanks				
ET- C-1, C-2, Expansion tank, 16" dia. X 36" high, 40 Gal.	2	EA	2,920.00	5,840
Chemical Pot Feeder				
CPF C-1, C-2, hot water system #2, dome bottom filter feeder	2	EA	1,633.00	3,266
Circulating Pumps				
P C-1, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
P C-2, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
P C-3, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
P C-4, Inline, 180 GPM, hot water, base mounted, VFD,	1	EA	2,880.00	2,880
Rooftop Cooling Only VAV Air-Conditioning Unit				
AC-01-1, 8,000 CFM, 20 tons, economizer w/power exhaust, 3,000 CFM,	21	EA	42,000.00	882,000
AH/Fan Coil Unit Split System Indoor Unit				
FC, 1,950 CFM, DX coil, 57,700 BTUH	72	EA	9,419.00	678,168
Condensing Unit - Outdoor Unit				
CU, 57,700 BTU cooling, 59,400 heating.	72	EA	6,170.00	444,240
Tubing, insulation, connections for condensing unit to FC unit	72	EA	3,200.00	230,400
Terminal Units Variable Air Volume Box (HW Heat Coil)				
VAV box, hot water reheat coil, 10" inlet, 1.3GPM	91	EA	4,500.00	409,500
Exhaust Fan				
EF, 2,300 CFM, inline, belt drive, centrifugal	24	EA	2,864.00	68,736
Exhaust air, inline and rooftop fans	120,599	SF	0.15	18,090

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

	Description	Quantity	Unit	Unit Cost $	Total $
	HVAC energy management and control system	120,599	SF	5.50	663,295
	Test & Balance HVAC system	120,599	SF	1.50	180,899
	Miscellaneous HVAC systems	120,599	SF	0.20	24,120
	Miscellaneous				
	Fire Seals	120,599	SF	0.05	6,030
	Seismic Restraints	120,599	SF	0.04	4,824
	TOTAL HVAC				**5,595,237**
12	**FIRE PROTECTION**				
	Fire protection systems including sprinklers, fire department connections, piping, valves and accessories	120,599	SF	5.10	615,055
	Standpipes, pumps, FD connections	120,599	SF	0.65	78,389
	Fire protection systems, fire department connections, piping, valves and accessories	120,599	SF	0.40	48,240
	TOTAL FIRE PROTECTION				**741,684**
13	**ELECTRICAL**				
	Incoming service and distribution	120,599	SF	6.50	783,894
	Lighting and Branch Wiring	120,599	SF	8.50	1,025,092
	Power outlets and Branch Wiring	120,599	SF	1.90	229,138
	New emergency generator allowance	120,599	SF	2.00	241,198
	Lightning protection system	120,599	SF	0.20	24,120
	Grounding system	120,599	SF	0.20	24,120
	Raceway systems for communications & security systems	120,599	SF	0.75	90,449
	Temporary power & lighting during construction	120,599	SF	0.20	24,120
	Fire Alarm system	120,599	SF	3.80	458,276
	Data and Telephone Services	120,599	SF	2.50	301,498
	Communications Rooms & Equipment	120,599	SF	6.50	783,894
	Security Systems	120,599	SF	4.20	506,516
	Visual Information Systems	120,599	SF	2.00	241,198
	Facility Management Systems	120,599	SF	0.60	72,359
	Intermodal Transportation Systems (Empty Conduit)	120,599	SF	0.30	36,180
	Other Communication Systems	120,599	SF	0.20	24,120
	TOTAL ELECTRICAL				**4,866,170**
14	**EQUIPMENT (NOT APPLICABLE)**				
	TOTAL EQUIPMENT (NOT APPLICABLE)				**0**

DETAILED ESTIMATE - CUSTOMER SERVICE BUILDING (CSB)

	Description	Quantity	Unit	Unit Cost $	Total $
15	**SPECIAL CONSTRUCTION**				
	Green screen, allowance	1	LS	320,000.00	320,000
	TOTAL SPECIAL CONSTRUCTION				**320,000**
16	**SITE IMPROVEMENT**				
16.1	*Courtyard (w Canopies & Covered Walkways)*				0
	Terrazzo paving raised over roof level, allowance	199,079	SF	30.00	5,972,370
	Sidewalk, concrete paving, raised	2,852	SF	10.00	28,520
	Waterproofing to courtyard floors	199,079	SF	6.00	1,194,474
	Glazed screens, addt'l 4' high to roof parapet	4,164	SF	130.00	541,320
	Parapet wall	4,164	SF	55.00	229,020
	Concrete curb at elevator and service cores	3,050	LF	8.50	25,925
	Bollards, allowance	1	LS	30,000.00	30,000
	Covered walkways with glazing 24' wide, height 20'	938	LF	2,880.00	2,701,440
	24' high Canopy above escalator, flat	38,356	SF	150.00	5,753,400
	Glass railing around escalator light well, 42" high, allowance	1,446	LF	400.00	578,400
	Benches, 20' long, allowance	10	EA	7,000.00	70,000
	Trash bins, allowance	1	LS	6,000.00	6,000
	Planter boxes and pots, allowance	1	LS	25,000.00	25,000
	Information Kiosk, allowance	1	EA	18,000.00	18,000
	Directional, Signage	1	LS	by Car Rental Co.	
	Plumbing - additional storm water drainage, allowance	199,079	SF	1.00	199,079
	Lighting, allowance	199,079	SF	2.00	398,158
	Communications, PA systems, Music	1	LS	250,000.00	250,000
	CCTV	4	EA	4,000.00	16,000
16.2	*Visitor Parking*				
	Trafficable surface finish to concrete roof decks, allowance	26,266	SF	10.00	262,660
	Fencing and gate, allow	1	LS	7,500.00	7,500
	Perforated metal screen slats, 8' high, allowance	361	LF	280.00	101,080
	Parking stall striping, allowance	1	LS	4,000.00	4,000
	Concrete curbs, allowance	1	LS	2,000.00	2,000
	Crash barriers/guard rail	120	LF	110.00	13,200
	Plumbing	26,266	SF	1.80	47,279
	Lighting, allowance	26,266	SF	3.00	78,798
	Special Electrical Systems	26,266	SF	1.30	34,146
	TOTAL SITE IMPROVEMENT				**18,587,769**

COST SUMMARY - SITE WORKS

		SITE WORKS
16a Site Improvement		41,291,287
16b Bus Plaza		12,395,062
16c Fire Control Room/Electrical Building		1,135,400
SUBTOTAL TRADE COSTS		***54,821,749***
GC Mark Ups	12.0%	6,578,610
Design Evolution Contingency	5.0%	2,741,087
Escalation Allowance	11.8%	7,536,620
TOTAL CONSTRUCTION COSTS (FUTURE)		***71,678,066***
Other Special Costs		
Arts in Public		0
Insurance & Bond (i.l.o OCIP)	4.0%	2,867,123
LAWA Soft Costs	18.5%	13,260,442
Program/Design Management		
Design Consultants Team		
Construction Administration Services		
Construction Management Consultant		
Airport Administration		
Testing/Inspection and Permitting		
Project/Construction Contingency	5.0%	3,583,903
TOTAL PROJECT CONSTRUCTION COSTS		***91,389,535***

DETAILED ESTIMATE - SITE WORKS

	Description	Quantity	Unit	Unit Cost $	Total $
16a	**SITE IMPROVEMENT**				
16a.1	**Site Preparations, Infrastructure and Rough Grading**				
	Site preparation, clearing, rough grading and leveling (utilities separately), allow	1	LS	8,000,000.00	8,000,000
	Sewer/Mechanical infrastructures and removals, provisions	1	LS	1,078,480.00	1,078,480
	Electrical infrastructure removals, provisions	1	LS	896,520.00	896,520
	Sub-total Site Preparations, Infrastructure and Rough Grading				**9,975,000**
16a.2	**Site Improvements**				
	QTA				
	Asphalt concrete pavement	443,469	SF	6.00	2,660,814
	PCC pavement	14,321	SF	12.00	171,852
	Landscaping, minimum drought resistant	21,632	SF	3.00	64,896
	Concrete curbs and s/w gutter	940	LF	25.00	23,500
	Concrete curbs	2,392	LF	17.00	40,664
	Fixed Bollards	8	EA	900.00	7,200
	Chain link fence	2,699	LF	10.25	27,665
	Chain link gate, double leaf	7	EA	1,300.00	9,100
	General				
	Asphalt concrete pavement	12,119	SF	6.00	72,714
	PCC pavement	17,601	SF	12.00	211,212
	Landscaping, minimum drought resistant	322,257	SF	3.00	966,771
	Gravel	103,430	SF	2.50	258,575
	Removable Bollards	25	EA	600.00	15,000
	Chain link fence	193	LF	10.25	1,978
	Chain link gate	1	EA	600.00	600
	Mechanical Utilities:				
	Water Line				
	Fire Water Lines				
	Water line 16" PVC pipe	10,780	LF	97.00	1,045,660
	Water valve, 16"	19	EA	9,370.00	178,030
	Tee 16"	42	EA	2,860.00	120,120
	Bend 16"	4	EA	1,930.00	7,720
	Insertion valve 16"	4	EA	13,240.00	52,960
	Fire hydrant and valve	30	EA	13,870.00	416,100
	Water main point of connection	5	EA	8,500.00	42,500
	Water line connections to laterals	1	LS	130,000.00	130,000
	Thrust blocks	1	LS	134,800.00	134,800
	Miscellaneous laterals and valves, BFP	1	LS	80,000.00	80,000
	Water meters, BFP, conc. boxes and valves	1	LS	430,000.00	430,000
	Unclassified excavation, backfill and compaction	1	LS	93,000.00	93,000
	Water line flush and test	1	LS	75,000.00	75,000

DETAILED ESTIMATE - SITE WORKS

Description	Quantity	Unit	Unit Cost $	Total $
Reclaimed Water Lines (Irrigation only)				
Irrigation system including reclaimed water lines	1	LS	345,000.00	345,000
Sanitary Sewer, Forced Main & Ventilation Lines, MH's	1	LS	1,755,000.00	1,755,000
Sanitary Sewer				
Sanitary Sewer Pipe 8"	2,348	LF	68.00	159,664
Precast manholes	19	EA	5,350.00	101,650
Oil water separator	2	EA	70,000.00	140,000
Intercept and Connect SS Pipe to Existing	1	EA	11,000.00	11,000
Sanitary sewer piping, connections to laterals	1	LS	32,000.00	32,000
Sanitary sewer piping cleanouts	1	LS	28,000.00	28,000
Sanitary sewer forced mains with pumps	1	LS	150,000.00	150,000
Sanitary sewer drainage pipe re-route, and additions	180	LF	156.00	28,080
Miscellaneous laterals	1	LS	30,000.00	30,000
Unclassified excavation, backfill and compaction	1	LS	19,000.00	19,000
Sanitary Sewer line flush and test	1	LS	15,000.00	15,000
Storm Water				
Storm Drainage System:				
12" RCP	940	LF	48.00	45,120
15" RCP	78	LF	55.00	4,290
18" RCP	859	LF	63.00	54,117
24" RCP	532	LF	156.00	82,992
30" RCP	308	LF	315.00	97,020
36" RCP	5,903	LF	356.00	2,101,468
48" RCP	587	LF	425.00	249,475
Storm water drainage pipe re-route, and additions	330	LF	156.00	51,480
SD Catch Basins	69	EA	5,500.00	379,500
SD Manholes	28	EA	8,500.00	238,000
Storm water filtration device	6	EA	140,000.00	840,000
Storm water Cistern 40'W x 144' L x 12'D	7	EA	450,000.00	3,150,000
Storm water Cistern 72'W x 160' L x 12'D	1	EA	550,000.00	550,000
Storm drain pump station	1	LS	400,000.00	400,000
Connection to manholes, existing pipes and CB's	1	LS	250,000.00	250,000
Unclassified excavation, backfill and compaction and shorin	1	LS	325,000.00	325,000
Oil/Water Separator for 1500 cfs	5	EA	70,000.00	350,000
Gas Supply	1	LS	400,000.00	400,000
Site Electrical	1	LS	8,740,000.00	8,740,000
Site lighting	1	LS	1,755,000.00	1,755,000
CCTV systems near building on site	1	LS	300,000.00	300,000
Traffic light at intersection				N.I.C
Site Signage and Way Finding Signage	1	LS	800,000.00	800,000
TOTAL SITE IMPROVEMENT				**41,291,287**

DETAILED ESTIMATE - SITE WORKS

	Description	Quantity	Unit	Unit Cost $	Total $
16b	**BUS PLAZA**	82,230	SF		
	Sidewalk, raised	44,737	SF	10.00	447,370
	Landscaping, minimum drought resistant	8,400	SF	3.10	26,040
	Concrete curbs and s/w gutter	873	LF	25.00	21,825
	Crash barrier to driveway, south of bus plaza, allow	246	LF	78.00	19,188
	Bollards, heavy duty, allowance	26	EA	650.00	16,900
	Concrete bus wheel stops	12	EA	150.00	1,800
	Canopy	31,920	SF	150.00	4,788,000
	Shelters with glazed back screen and overhead cover including lighting, including bench, each 20' long	3	SETS	50,000.00	150,000
	Stair Construction				
	17'-0" High Exterior Metal Pan Stairs including steel tube railings	8	FLT	24,100	192,800
	20'-0" High Exterior Metal Pan Stairs including steel tube railings	4	FLT	38,400	153,600
	Steel columns and beams	26	TON	5,000	128,000
	CMU Stair Enclosure Walls, allowance	23,256	SF	15.00	348,840
	Exterior Doors, single leaf, allowance	12	EA	2,500.00	30,000
	Stair Well Finishes				
	Wall finish, internal paint and external sealer	46,512	SF	2.00	93,024
	Floor finish, sealer	4,500	SF	1.80	8,100
	Elevator Cores:				
	Elevator shaft core steel framing with glazed to all sides	3,708	SF	195.00	723,060
	Elevator shaft with metal panel cladding	6,192	SF	50.00	309,600
	Roofing to Elevator Core	511	SF	21.50	10,987
	Elevator, 2 stops, glazed cab	3	EA	700,000.00	2,100,000
	Elevator, 3 stops	3	EA	550,000.00	1,650,000
	Elevator cab Finish to 3 stops	3	EA	25,000.00	75,000
	Elevator cab Finish to 2 stops, glazed	3	EA	35,000.00	105,000
	Elevator pit	1	LS	30,000.00	30,000
	Slab at L4 to connect to CSB	460	SF	19.00	8,740
	Lighting, allow mounted on canopy	31,920	SF	5.50	175,560
	Storm Drainage /sumps provision	82,230	SF	2.00	164,460
	CCTV to exterior sidewalk, allow	2	EA	4,000.00	8,000
	Paging system, allow	82,230	SF	0.23	18,913
	Emergency phones, allow	82,230	SF	0.29	23,847
	Signage - Main Signage and Bus wayfinding (entry/exit), allow	1	LS	50,000.00	50,000
	Slipway for Bus Plaza:				
	Asphalt paving for bus parking	29,093	SF	13.00	378,209
	Asphalt concrete entry slip lane	7,400	SF	13.00	96,200
	Lighting to driveway, allow wall mounted exterior type	15	EA	2,800.00	42,000
	TOTAL BUS PLAZA				**12,395,062**

DETAILED ESTIMATE - SITE WORKS

	Description	Quantity	Unit	Unit Cost $	Total $
16c	**FIRE CONTROL ROOM/ELECTRICAL BUILDING**				
	Fire Control Room/Electrical Building	6,236	SF	150.00	935,400
	MEP, allowance	1	LS	200,000.00	200,000
	TOTAL FIRE CONTROL ROOM/ELECTRICAL BUILDING				**1,135,400**

DETAILED ESTIMATE - SITE WORKS

	Description	Quantity	Unit	Unit Cost $	Total $
	<u>SEPARATE PROJECTS</u>				
	Driveways and Roadways (ROM Allowance)				
.1	<u>On Grade</u>				
	Excavation, backfill/embankment and disposal, allowance	1	LS	330,000.00	330,000
	Driveways in concrete asphalt	156,316	SF	13.00	2,032,108
	Concrete curbs and gutters to driveways	4,619	LF	25.00	115,475
	Concrete curbs to driveways	4,619	LF	17.00	78,523
	Retaining walls, allowance	8,982	SF	55.00	493,983
	Guard rail above retaining walls, allowance	781	LF	140.00	109,340
	Lighting to driveways, poles w/ circuits/foundation/lamps	47	EA	7,100.00	333,700
	SW drainage to driveways	1	LS	660,000.00	660,000
.2	<u>Underpass</u>				
	Excavation, backfill/Embankment and disposal, allowance	1	LS	178,000.00	178,000
	Driveways in concrete asphalt	3,388	SF	13.00	44,044
	Concrete curbs to driveways	276	LF	17.00	4,692
	Retaining walls, allowance	6,348	SF	55.00	349,140
	Lighting to driveways, wall mounted	11	EA	3,500.00	38,500
	SW drainage to driveways	1	LS	300,000.00	300,000
	Suspended slab over the underpass (in LAMP Roadways)				
.3	<u>Outside site boundary (south of 98th St)</u>				
	Excavation, backfill/Embankment and disposal, allowance	1	LS	440,000.00	440,000
	Driveways in concrete asphalt	18,247	SF	13.00	237,211
	Concrete curbs to driveways	1,137	LF	17.00	19,329
	Retaining walls, allowance	26,151	SF	55.00	1,438,305
	Guard rail above retaining walls, allowance	1,137	LF	140.00	159,180
	Lighting to driveways, poles w/ circuits/foundation/lamps	8	EA	7,100.00	56,800
	SW drainage to driveways	1	LS	50,000.00	50,000
.4	<u>Driveways to QTA</u>				
	Driveways in concrete asphalt	47,094	SF	13.00	612,222
	Concrete curbs to driveways	3,980	LF	17.00	67,660
	Lighting to driveways, poles w/ circuits/foundation/lamps	20	EA	7,100.00	142,000
	SW drainage to driveways	1	LS	210,000.00	210,000
.5	<u>Signage to Roadways</u>				In LAMP
	Sub-total Driveways and Roadways (ROM Allowance)				8,500,212
	Add GC, Soft Costs and Contingency Mark ups				*5,669,901*
	TOTAL Driveways and Roadways (ROM Allowance)				**14,170,113**

COST SUMMARY - AIRPORT PARKING above RAC and IS

			EMPLOYEE PARKING above RAC and IS	
	Building Area:		**702,864**	**$/SF**
1	Substructure		5,165,357	7.35
2	Superstructure		26,640,126	37.90
3	Exterior Closure		2,130,210	3.03
4	Roofing & Waterproofing		0	0.00
5	Interior Construction		0	0.00
6	Stairs		986,616	1.40
7	Interior Finishes		0	0.00
8	Specialties		230,000	0.33
9	Conveying		0	0.00
10	Plumbing		1,174,697	1.67
11	HVAC		216,268	0.31
12	Fire Protection		2,466,801	3.51
13	Electrical		5,778,398	8.22
14	Equipment		0	0.00
15	Special Construction		2,660,131	3.78
16	Site Improvement		0	0.00
	SUBTOTAL TRADE COSTS		***47,448,605***	***67.51***
	GC Mark Ups	10.5%	4,982,104	7.09
	Design Evolution Contingency	5.0%	2,372,430	3.38
	Escalation Allowance	11.8%	6,439,369	9.16
	TOTAL CONSTRUCTION COSTS (FUTURE)		***61,242,507***	***87.13***
	Other Special Costs			
	Arts in Public		0	0.00
	Insurance & Bond (i.l.o OCIP)	4.0%	2,449,700	3.49
	LAWA Soft Costs	18.5%	11,329,864	16.12
	Program/Design Management			
	Design Consultants Team			
	Construction Administration Services			
	Construction Management Consultant			
	Airport Administration			
	Testing/Inspection and Permitting			
	Project/Construction Contingency	5.0%	3,062,125	4.36
	TOTAL PROJECT CONSTRUCTION COSTS		***78,084,197***	***111.09***

DETAILED ESTIMATE - PUBLIC/AIRPORT PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
1	**SUBSTRUCTURE**				
	Special Foundations				
1.1	*IS Building C*				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	417	EA	1,750.00	728,898
	Pile testing	1	LS	10,000.00	10,000
1.2	*RAC Building D*				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	496	EA	1,750.00	868,257
	Pile testing	1	LS	10,000.00	10,000
	Foundations				
1.3	*IS Building C*				
	Isolated footing	6	CY	765.00	4,633
	Grade Beams	152	CY	715.00	108,454
	Excavation	3,141	CY	26.00	81,675
	Backfill, allowance	814	CY	25.00	20,351
	Haul away to LAX site	2,327	CY	15.00	34,909
	Pile Caps	2,764	CY	590.00	1,630,948
1.4	*RAC Building D*				
	Isolated footing	9	CY	765.00	6,829
	Grade Beams	299	CY	715.00	214,036
	Excavation	3,298	CY	26.00	85,739
	Backfill, allowance	895	CY	25.00	22,368
	Haul away to LAX site	2,403	CY	15.00	36,044
	Pile Caps	2,207	CY	590.00	1,302,217
	TOTAL SUBSTRUCTURE				**5,165,357**
2	**SUPERSTRUCTURE**				
2.1	**IS Building C**				
	Floor Construction				
	Precast double tee floor slab	343,074	SF	17.00	5,832,258
	Columns	1,420	CY	1,000.00	1,420,494
	Shear wall	1,760	CY	712.00	1,253,120
	Beams and Girder	3,813	CY	995.00	3,793,695
	Topping slab, 6"	343,074	SF	7.50	2,573,055

DETAILED ESTIMATE - PUBLIC/AIRPORT PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
2.2	**RAC Building D**				
	Floor Construction				
	Precast double tee floor slab	332,762	SF	17.00	5,656,954
	Beams and Girder	3,633	CY	995.00	3,614,835
	Topping slab, 6"	332,762	SF	7.50	2,495,715
	TOTAL SUPERSTRUCTURE				**26,640,126**
3	**EXTERIOR ENCLOSURE**				
	Crash barriers/guard rail, IS Building C	2,422	LF	110.00	266,420
	Crash barriers/guard rail, RAC Building D	2,071	LF	110.00	227,810
	Glazed screens, 8' high to roof	12,296	SF	130.00	1,598,480
	Exterior Doors, single leaf, allowance	15	EA	2,500.00	37,500
	TOTAL EXTERIOR ENCLOSURE				**2,130,210**
4	**ROOFING AND WATERPROOFING (NOT APPLICABLE)**				
	TOTAL ROOFING AND WATERPROOFING (NOT APPLICABLE)				**0**
5	**INTERIOR CONSTRUCTION (NOT APPLICABLE)**				
	TOTAL INTERIOR CONSTRUCTION (NOT APPLICABLE)				**0**
6	**STAIRS**				
6.1	*Stair Construction*				
	20'-0" High Metal Pan Stairs including steel tube railings - prorated from IS	6	FLT	28,400.00	170,400
	20'-0" High Metal Pan Stairs including steel tube railings - prorated from RAC	9	FLT	28,400.00	255,600
	Steel columns and beams	18	TON	5,000	90,000
	CMU Stair Enclosure Walls, allowance	24,225	SF	15.00	363,375
6.2	*Stair Well Finishes*				
	Wall finish, internal paint and external sealer	48,450	SF	2.00	96,900
	Floor finish, sealer	5,745	SF	1.80	10,341
	TOTAL STAIRS				**986,616**

DETAILED ESTIMATE - PUBLIC/AIRPORT PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
7	**INTERIOR FINISHES (NOT APPLICABLE)**				
	TOTAL INTERIOR FINISHES (NOT APPLICABLE)				**0**
8	**MISCELLANEOUS SPECIALTIES**				
	Signage , allowance	1	LS	50,000.00	50,000
	Parking stall, allowance	1	LS	90,000.00	90,000
	Striping, allowance	1	LS	40,000.00	40,000
	Miscellaneous (Fire Extinguishers, bollards, etc.)	1	LS	50,000.00	50,000
	TOTAL MISCELLANEOUS SPECIALTIES				**230,000**
9	**CONVEYING (NOT APPLICABLE)**				
	Not pro-rated				**NIC**
	TOTAL CONVEYING (NOT APPLICABLE)				**0**
10	**PLUMBING**				
	Plumbing works/Plumbing fixtures	675,836	SF	0.65	439,293
	Domestic hot and cold water distribution	332,762	SF	0.45	149,743
	Domestic water supply distribution equipment	332,762	SF	0.10	33,276
	Recycled water Equipment & distribution	332,762	SF	0.20	66,552
	Sanitary sewer piping	332,762	SF	0.50	166,381
	Sanitary sewer waste equipment	332,762	SF	0.10	33,276
	Storm water piping	332,762	SF	0.75	249,572
	Miscellaneous Plumbing				
	Seismic Restraints	332,762	SF	0.01	3,328
	Flush, Clean and Testing	332,762	SF	0.10	33,276
	TOTAL PLUMBING				**1,174,697**
11	**HVAC**				
	Test & Balance HVAC system	675,836	SF	0.05	33,792
	Miscellaneous HVAC systems	675,836	SF	0.20	135,167
	Seismic Restraints	675,836	SF	0.07	47,309
	TOTAL HVAC				**216,268**

DETAILED ESTIMATE - PUBLIC/AIRPORT PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
12	**FIRE PROTECTION**				
	Fire protection systems including sprinklers, fire department connections, piping, valves and accessories	675,836	SF	2.75	1,858,549
	Standpipes and pumps	675,836	SF	0.55	371,710
	Fire protection systems, piping, valves and accessories	675,836	SF	0.35	236,543
	TOTAL FIRE PROTECTION				**2,466,801**
13	**ELECTRICAL**				
	Incoming service and distribution	675,836	SF	1.40	946,170
	Lighting and Branch Wiring	675,836	SF	3.30	2,230,259
	Power outlets and Branch Wiring	675,836	SF	0.10	67,584
	New emergency generator allowance	675,836	SF	0.90	608,252
	Lightning protection system	675,836	SF	0.15	101,375
	Grounding system	675,836	SF	0.10	67,584
	Raceway systems for communications & security systems	675,836	SF	0.15	101,375
	Temporary power & lighting during construction	675,836	SF	0.10	67,584
	Tel/Data	675,836	SF	0.45	304,126
	Communications Rooms & Equipment	675,836	SF	0.85	574,461
	Access Control System	675,836	SF	0.80	540,669
	CCTV System	675,836	SF	0.10	67,584
	Paging System	675,836	SF	0.10	67,584
	Other Communication Systems	675,836	SF	0.05	33,792
	TOTAL ELECTRICAL				**5,778,398**
14	**EQUIPMENT (NOT APPLICABLE)**				
	TOTAL EQUIPMENT (NOT APPLICABLE)				**0**

DETAILED ESTIMATE - PUBLIC/AIRPORT PARKING above RAC and IS

	Description	Quantity	Unit	Unit Cost $	Total $
15	**SPECIAL CONSTRUCTION**				
15a	**Bridges, Helix and Ramps**				
	Helix Bridges, assume with guard rail, no cover (1 ea.) - prorated from QTA				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	10	EA	1,750.00	17,500
	Pile caps	20	CY	650.00	13,000
	Concrete floor slab, 10" thick	3,411	SF	21.00	71,631
	Columns	14	CY	975.00	13,325
	Beams and Girders	45	CY	970.00	43,973
	Concrete Curb, allowance	150	LF	22.50	3,375
	Guard rail/parapet wall, 42" high, allowance	150	LF	140.00	21,000
	Seismic joint cover	48	LF	125.00	6,000
	Plumbing	3,411	SF	1.30	4,434
	Lighting	3,411	SF	3.50	11,939
	Helix oval shape, two lanes, one level (1 ea.) - prorated from QTA				
	Piling, allowance pending Soils Report (based on preliminary assumed average depth)	69	EA	1,750.00	121,333
	Pile Caps including excavation, backfill and haul away	554	CY	650.00	360,100
	Concrete slab, 10" thick	12,254	SF	21.00	257,334
	Columns	7	CY	975.00	7,150
	Retaining wall	27	CY	750.00	20,250
	Shear walls	636	CY	785.00	499,260
	Beams and Girders	206	CY	970.00	199,820
	Concrete Curb and striping, allowance	734	LF	22.50	16,515
	Guard rail/parapet wall, 42" high, allowance	420	LF	140.00	58,800
	Plumbing	12,254	SF	1.30	15,930
	Lighting	12,254	SF	3.50	42,889
	Helix Bridges, assume with guard rail, no cover (1 ea.) - prorated from RAC				
	Concrete floor slab, 10" thick	2,261	SF	21.00	47,481
	Beams and Girders, allowance	45	CY	970.00	43,863
	Concrete Curb, allowance	233	LF	22.50	5,243
	Guard rail/parapet wall, 42" high, allowance	233	LF	140.00	32,620
	Seismic joint cover	30	LF	125.00	3,750
	Plumbing	2,261	SF	1.30	2,939
	Lighting	2,261	SF	3.50	7,914

DETAILED ESTIMATE - PUBLIC/AIRPORT PARKING above RAC and IS

Description	Quantity	Unit	Unit Cost $	Total $
Helix round shape, one lane, one levels (1 ea.) - prorated from RAC				
Piling, allowance pending Soils Report (based on preliminary assumed average depth)	10	EA	1,750.00	18,000
Pile Caps including excavation, backfill and haul away	21	CY	650.00	13,650
Concrete floor slab, 10" thick	9,102	SF	21.00	191,142
Columns	24	CY	975.00	23,400
Shear walls	234	CY	785.00	183,690
Beams and Girders, allowance	182	CY	970.00	176,579
Concrete Curb, allowance	373	LF	22.50	8,393
Guard rail/parapet wall, 42" high, allowance	373	LF	140.00	52,220
Plumbing	9,102	SF	1.30	11,833
Lighting	9,102	SF	3.50	31,857
TOTAL SPECIAL CONSTRUCTION				**2,660,131**