

Trip Generation Characteristics of a Regional Motorsports Park

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ABSTRACT

This paper presents the traffic generation and peaking characteristics of a 1,200 acre regional motorsports facility consisting of eight (8) racing venues, restaurants, retail shops, amusement arcades plus supporting infrastructure (light industrial uses providing materials, products, and services to the motorsports community and guests). The peak hours, peak days of the week, and number of events per year are estimated along with daily and peak hour auto, recreational vehicles (RV), and truck trip generation based on hourly, daily, and weekly attendance estimates generated by the project sponsor, plus surveys of average auto occupancy for motorsports events.

INTRODUCTION

This article is centered around the Riverside Motorsports Park (RMP) which would be located northeast of the City of Atwater and east of the City of Winton in an unincorporated area of Merced County (see Figure 1). RMP is a planned regional recreation and entertainment project based upon competitive professional and amateur motor sports. The facility comprises 1,200 contiguous acres. The following are some of the objectives that guide development of the proposed project:

- To construct a facility that is strategically located so as to maximize the attraction of patrons from within a 100-mile radius,\
- To build a multi-venue facility that supports the use of synchronic operations to maximize facility utilization and reduce peak ingress/egress impacts from the facility, and
- To provide a commercial motorsports facility that would meet Central and Northern California's demand for motorsports entertainment and recreation.

Figure 1



Source: <http://www.mapquest.com>, 2007.

RMP includes multiple tracks and features eight (8) racing venues that are intended to operate in tandem for family entertainment. The following would be the racing venues at the project site:

- A 7/8-mile paved speedway for oval-racing motor sports events with a 30,000-seat grandstand (expandable to seat 50,000),
- A 3.2-mile variable length paved road course for kart, motorcycle, sports car, open-wheel and stockcar racing with permanent seating for 10,000,
- A 4,800-foot long paved drag strip (with run-off and braking lanes) with permanent seating for 10,000 and temporary seating for 16,000,
- A 1/2-mile motocross course for motocross racing with temporary seating for 5,000,
- A one-mile long off-road course for truck, buggy, motorcycle and rally-cross automobile racing with temporary seating for 2,500,
- A 1/3-mile BMX bicycle track would be developed within the interior of the motocross track,
- A 3/4-mile kart course with temporary seating for 1,000,
- A 1/2-mile paved oval race track for mini-truck, stockcar, and open-wheel racing with a 6,500-seat grandstand, and
- A 3/8-mile dirt oval race track for sprint car, stock car, and motorcycle competitions with a 6,500-seat grandstand.

The “racing season” for sanctioned professional motor sports normally begins in mid-to-late February or early March and continues through November. An annual operations calendar for RMP allows for a 39-week racing season. RMP has planned four (4) tiers of program operating conditions during the racing season, which would include:

- 18 mid-week nights of summer concerts from late May through September with attendance of up to 6,000 (typically held on Thursday night),
- 31 weekends of Non-Feature Events with attendance of 1,000-15,000 for the actual race day (typically the Sunday of a weekend event),
- 8 weekends of Feature Events (approximately 1 event per month) and are in addition to the 31 non-feature weekends with attendance of 15,000 – 40,000 for the actual race day (typically the Sunday of a weekend event), and
- 2 weekends a year for a Major Feature Event with attendance of 40,000 to 50,000 for the actual race day (typically the Sunday of a weekend event). If such a Major Feature Event were to be held, it would replace a feature or non-feature event.

Other facilities such as an arcade, restaurants, retail establishments, an employee center, race team shops, technical motorsports schools, and support services is also included as part of the project and would be operated year round. The facility would be open for operation seven days a week.

SYNCHRONIC MARKETINGSM

As stated earlier, this is a multi-venue seven days a week operation. So how does one go about developing the trip generation for a project with these characteristics? Well you first start off with finding someone that has been in this type of business for many years. John F.S. Condren is the Founder and Chairman/CEO of Riverside Motorsports Park LLC and Chairman/CEO of Altamont Motorsports Park LLC. His background includes 25+ years of Silicon Valley (high-technology) corporate and international marketing management expertise, as well as 30 years of amateur and professional motorsports as a driver, team owner, business services supplier and professional series consultant. His expertise was utilized to develop the trip generation for this project.

One of the objectives of the project is to build a multi-venue facility that supports the use of synchronic operations to maximize facility utilization and reduce peak ingress/egress impacts from the facility. One way to do this is through the use of a “synchronic marketing” business strategy. Synchronic marketing is to provide multiple events – either simultaneously or sequentially - to meet the requirements of efficiently operating the park **AND** effectively satisfying the entertainment and recreational needs of the park’s guests. This is the type of operation that Disneyland, Disney World and Walt Disney Imagineering employs. RMP management (John Condren for one) believed that since this strategy works for Disneyland that they should adopt the strategy for their facility as well.

For example RMP has designed its motorsports park so that all of the competition events, the game arcades and the balance of the park's recreational features are available for a single admission price for the entire day (similar to Disneyland).

Given human nature, it's easy to see that once a person has paid for an admission ticket, someone who enjoys motorsports will take the opportunity to take-in as much of the sport as one can. Start with the road racing circuit, go the oval track, and end the day with night drag racing.

With multi-venue accessibility in mind, imagine that a feature event with 30,000 guests is on-going at RMP's 7/8-mile Speedway. The event is scheduled to end at 4:00pm. Knowing this approximate timeline, and not wanting 30,000 people and 8,600 cars to exit the parking lot at the same time, RMP's management initiates a "Synchronic Marketing" strategy by starting a road race at 3:30pm on the adjoining road course; starting a karting race at 4:00pm on the mid-way's kart course; and, starting a motocross event at 4:30pm. All of these events are promoted in the speedway event's program and, as guests leave the Speedway, announcements are made over the public-address system advising guests of the new events. Additionally, savory BBQ and home-cooked aromas emanate from the on-site restaurants within the park.

Here, "Synchronic Marketing" comes into practice. Of the total 50,000 guests attending a Major Feature Event at the speedway, RMP anticipates that 50% of the guests in the park will leave for the day when the event ends. However, the racing will continue at various venues throughout the park until 10:00pm, satisfying an estimated 40%-45% of the speedway event's guests. Additionally, the stores and arcades remain open. An estimated 5%-10% of the speedway event's guests will realize that, rather than sit in traffic, they can sit and enjoy dinner at one of RMP's on-site family restaurants or do some specialty shopping while a majority of the traffic subsides.

So, what happens: 4% enjoy a great meal on-site; another 18% stop to watch the road race; 9% head-off to the kart course; 14% walk down to the motocross course, and 5% go shopping or play in the gaming arcades.

The bottom line: 15,600 cars (50,000/3.2) do not leave the parking lot in one hour. They will leave eventually, over the course of the next 6 hours.

AVERAGE VEHICLE OCCUPANCY

Now that you know the business strategy and approximately how many people would attend a racing event, what type of automobile occupancy should be assumed? The Average Vehicle Occupancy (AVO) is a number that represents the average number of occupants to be found in either of the two primary vehicles utilized by attending guests; passenger cars or recreational vehicles. An AVO was determined based on actual vehicle occupancy studies of guests attending various motorsports events, as well as comparable studies applied to other, similar forms of sports-based recreation and general entertainment. In addition, site location and available public transportation infrastructure also influence the AVO.

A field survey of the AVO at motorsports events was conducted in June 1994 during a race weekend at Michigan International Speedway (MIS). The observed and recorded AVO was 3.6 people per vehicle. This number has been verified as representative for major motorsports events at MIS through the comparison of 5 years of historical attendance and vehicle parking data.

In 1998, an expanded study of vehicle occupancy was conducted at more than 16 NASCAR events throughout the United States. These studies, when compiled, identified an AVO of 3.0 passengers per car and 4.5 passengers per recreational vehicle. These studies and the 4.5 AVO for recreational vehicles were additionally referenced in 1999 as a basis for the *Sears Point Raceway's Master Plan EIR*.

Many of the motorsports and sports-recreation facilities where an AVO or traffic study has been completed lies within an urban or metropolitan area where patrons also have access to pedestrian, bicycle or public transportation to and from the facility. Unfortunately, this is not the case for the RMP project. It lies in a rural area where one has limited to no access to pedestrian, bicycle or public transportation to and from the facility. Patrons attending an event more than likely would be students from the University of California at Merced (UCM) campus and very few of these patrons would have a vehicle to travel to the site. For the reasons just stated, a higher AVO was chosen for patrons attending an event instead of ones found for other facilities. The AVO that was used for this project was 3.2 passengers per car and 5.0 passengers per recreational vehicle. In conclusion, one has to consider not only other studies that have been completed but also location and access to public facilities in order to determine an appropriate AVO for a project of this nature.

DAILY TRIP GENERATION

So now that an appropriate AVO has been selected, the number of vehicles entering and leaving the site can now be determined. As stated earlier a summer concert would generate approximately 6,000 attendants, a non-feature event would generate approximately 15,000 attendants, a feature event would generate approximately 40,000 attendants and a major feature event would generate approximately 50,000 attendants. The daily trip generation for the RMP project by event and day can be seen in Table 1.

However not only a daily trip generation was developed for this project but, an hour by hour for each day of the week and each event type was also developed by the project sponsor. The trip generation was developed by the project sponsor based in part on an RMP Economic Impact Study that was done in 2004 and in part by industry experience. The trip generation estimates included people accessing the site such as competitors and their staff, spectators, RMP employees, tenant employees, tenant clients, and retail visitors. The estimates also reflect the staggering of multiple events on a single day. The AVO was once again used to determine the number of vehicles and RVs entering and leaving hour by hour. What also must be taken into consideration while developing the trip generation is that on average, 2 days prior to the race-day event, RVs arrive and stay on-site through the conclusion of the event. One would not know this unless you have been in the business for many years. Table 2 displays the hour by hour vehicle trip

generation while Figure 2 is a graphic representation of information provided in Table 2 for a feature event. Positive values in Table 2 display vehicles arriving at the site while negative numbers denote vehicles leaving the site. The shaded areas in Figure 2 represents when a 15,000 person attendance or more is at the site at any one time and a traffic management plan should be in place and would be required. Table 3 presents a final summary of the daily, peak hour, and peak hour of generator vehicle trip generation for RMP.

As can be seen in Figure 2, the maximum number of vehicles leaving or arriving at the project site is on a Sunday. The peak arrival rate of a feature event is approximately 3,000 vehicles per hour (vph) and would occur around 11 AM on a Sunday and the peak departure rate would be approximately 2,700 vph around 5 PM on Sunday.

Table 1

Scenario	Frequency (Weeks/yr)	Daily Trip Rate per Maximum Daily Attendance	Daily (Vehicles)
Weekday, non-feature event	18	0.70	4,186
Saturday, non-feature event	31	0.39	5,881
Sunday, feature event	8	0.66	26,202
Sunday, maximum event	2	0.65	32,343

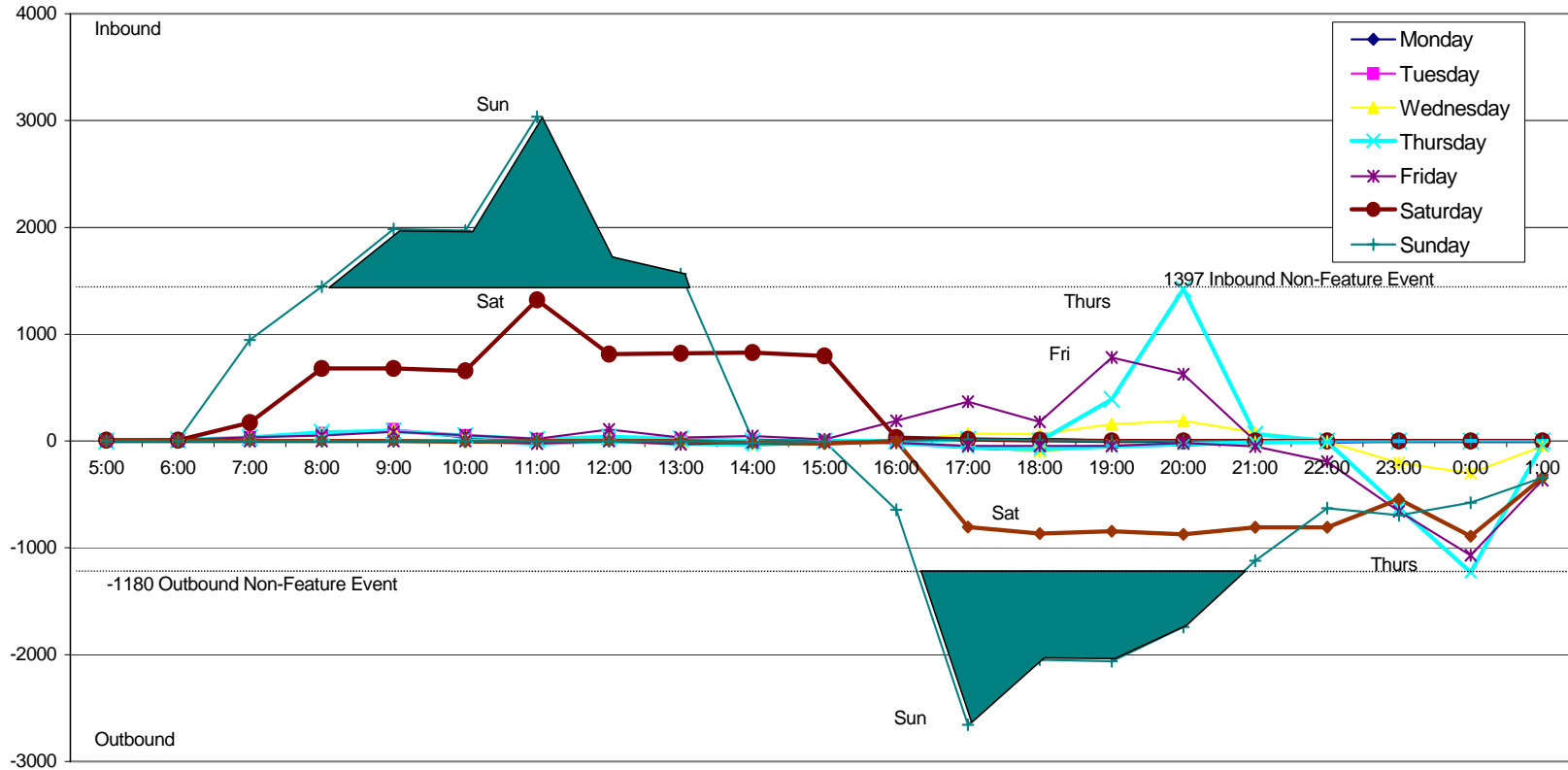
Table 2

Inbound	Non-Feature Event Week (15,000 Max Attendance)							Feature Event Week (40,000 Max Attendance)							Major Feature Event Week (50,000 Max Attendance)						
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
5:00	1	1	1	1	2	2	2	1	1	1	1	2	8	8	1	1	1	8	16	31	94
6:00	10	10	12	10	5	6	14	10	10	12	10	9	8	8	10	10	10	16	3	125	344
7:00	33	33	34	33	33	313	125	33	33	34	33	34	172	945	33	33	31	77	113	422	1156
8:00	72	71	70	80	66	434	266	72	71	70	80	52	680	1445	53	53	55	178	311	991	1508
9:00	100	108	100	94	55	456	347	100	108	100	94	86	680	1984	91	98	91	238	284	866	2813
10:00	49	49	47	49	19	430	489	33	49	47	49	55	656	1969	47	47	47	203	172	1331	3281
11:00	16	16	16	16	23	456	386	16	16	16	16	20	1320	3036	16	16	16	188	102	625	3906
12:00	23	23	31	39	22	270	403	23	23	31	39	109	813	1719	16	16	23	47	336	703	2344
13:00	23	23	23	23	2	258	0	23	16	23	23	31	820	1563	8	8	8	8	477	0	31
14:00	0	0	3	0	3	406	0	0	0	3	0	47	828	16	0	0	0	0	0	0	63
15:00	0	0	5	0	27	250	0	0	0	5	0	16	797	0	0	0	0	0	63	63	86
16:00	0	0	0	0	63	789	0	0	0	0	0	188	31	0	0	0	0	0	63	63	0
17:00	8	8	70	16	116	320	16	8	8	70	16	367	16	16	8	8	8	16	219	203	0
18:00	23	16	63	0	350	31	16	23	16	63	0	180	8	8	23	16	0	16	647	219	0
19:00	2	0	156	391	488	125	0	2	0	156	391	781	0	0	2	0	0	0	563	0	0
20:00	6	0	188	1397	878	156	0	6	0	188	1422	625	0	0	6	0	0	0	156	0	0
21:00	0	0	78	63	0	0	0	0	0	78	63	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Outbound	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	3	3	0	-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	-8	0	0	0	0	0	0	0	0
11:00	-23	-23	-23	-23	0	0	0	-8	-23	-23	-23	-23	0	0	-23	-23	-23	-23	0	0	0
12:00	0	0	0	0	0	-78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	-8	-9	-16	-23	-20	-78	-20	-8	-17	-16	-23	-31	0	0	-8	-8	-16	-31	-13	0	0
14:00	-30	-30	-30	-36	-14	-250	-70	-30	-14	-33	-36	-14	-16	-16	-30	-30	-33	-47	-8	-6	0
15:00	-9	-9	-8	-11	-36	-355	-50	-9	-9	-13	-11	-9	-23	-8	-25	-25	-28	-16	-175	-81	0
16:00	-16	-23	-17	-16	-53	-516	-313	-16	-23	-17	-16	-16	0	-645	-16	-23	-17	-156	-344	-550	-1790
17:00	-99	-94	-81	-78	-42	-475	-500	-68	-63	-50	-55	-47	-805	-2656	-53	-53	-47	-156	-359	-706	-4422
18:00	-63	-65	-56	-53	-34	-316	-344	-88	-90	-97	-78	-47	-867	-2047	-47	-47	-45	-117	-648	-813	-2734
19:00	-53	-45	-41	-41	-20	-409	-180	-52	-44	-44	-50	-47	-844	-2063	-45	-38	-39	-117	-94	-188	-2352
20:00	-38	-38	-20	-20	-6	-633	-117	-42	-42	-28	-30	-20	-875	-1742	-38	-38	-21	-208	-120	-188	-1281
21:00	-12	-12	-11	-11	-23	-422	-211	-15	-15	-14	-14	-50	-809	-1122	-12	-12	-11	-103	-16	-766	-672
22:00	-14	-6	-6	-6	-241	-406	-172	-14	-6	-6	-6	-194	-808	-628	-14	-6	-6	-15	-353	-578	-1094
23:00	-2	-2	-205	-627	-897	-461	-75	-2	-2	-205	-627	-658	-547	-695	-2	-2	-2	-2	-298	-617	-945
0:00	0	0	-297	-1180	-683	-266	-10	0	0	-302	-1227	-1070	-891	-578	0	0	0	0	-930	-906	-297
1:00	-1	-1	-47	-78	-78	-8	-1	0	0	-49	-38	-367	-342	-342	-1	-1	-1	-1	-164	-242	-39

Note: Positive values are inbound flows. Negative values are outbound.

Figure 2

Week of Feature Event (vph)



Note: Presumes synchronic scheduling of events.

Table 3

Scenario	Frequency (Weeks/yr)	Daily (Vehicles)	Peak Hour		Peak Hour of Generator	
			In (Veh.)	Out (Veh.)	In (Vehicles)	Out (Vehicles)
Weekday	--	--	94	71	--	--
Weekday, non-feature event	18	4,186	--	--	1397	1180
Saturday, non-feature event	31	5,881	--	--	467	490
Sunday, feature event	8	26,202	--	--	3036	2656
Sunday, maximum event	2	32,343	--	--	3906	4422

CONCLUSIONS

The trip generation and peaking characteristics of a regional motorsports park are discussed in this paper. There are a few items that would be needed to develop a trip generation for a multi-venue seven day a week operation. First of all a person that has been in the business for 25 plus years is definitely needed. Then a business strategy to minimize ingress/egress impacts from the facility such as the one used by Disneyland should be considered and adopted. An appropriate AVO for passenger cars and RVs should be selected based on location, other studies that have been conducted, and access to public facilities. Then, an hour by hour for every day of the week trip generation should be developed taking all of these items into consideration. Once the trip generation is developed, the peak hours and days of the week for each event can be determined and traffic control measures should be in place to manage the traffic.

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