Anaheim Resort Transportation

I**ntroduction** – The purpose of this paper is to describe, using quantitative measures of effectiveness to the extent feasible, the air quality and traffic congestion mitigation benefits of Anaheim Resort Transportation (ART). ART is the public transportation system operating within The Anaheim Resort™ District and surrounding areas. Every year, over 9.5 million residents, visitors, and employees use ART to connect with local destinations, job centers, theme parks, sport venues, shopping centers, hotels, restaurants and the ARTIC regional transportation center. As described herein, ART not only offers visitors, employees and residents a convenient, low-cost transportation option, but delivers important environmental and quality of life co-benefits.

Summary of Environmental Benefits – The following sections of this paper discuss in greater detail the environmental benefits of ART public transit service. It will be shown that ART achieves – on an annual basis – a reduction in Greenhouse Gas Emissions (GHG) on the order of 7,325 metric tons. That's greater than 16 million pounds of carbon dioxide air pollution that *doesn't* enter the atmosphere. This reduction is based on 9.5 million riders who use the ART network to access major resorts and venues in The Anaheim Resort® area in lieu of using automobiles. As discussed below, ART eliminates, or reduces vehicle miles traveled, on the order of 3.7 million automobile trips annually. That equates to over 10,000 automobiles *each day* that aren't contributing to traffic congestion in-and-around Anaheim's numerous high demand locations and employment centers. Those automobile trips – the one's that don't occur – avoid the air pollution emissions equivalent of greater than 26 million automobile miles, or approximately 72,000 automobile miles that are not driven in Anaheim each and every day. Given that 100% of the ART fleet operates exclusively on alternative fuel, including zero-emission electric, the use of ART displaces over 807,000 gallons of gasoline fuel each year.

Technical Approach – The methodologies used to quantify the GHG benefits of ART are those approved by the California Air Resources Board (ARB) for the assessment of public transit systems. The technical approach used in this analysis is comprised of the following tasks:

- Characterize the ART alternative fuel public transit service and bus fleet, including tabulation of the annual miles operated for each vehicle in the ART revenue fleet;
- Compute the emissions generated for each vehicle in the ART revenue fleet using the most current ARB methodologies and emissions factors;
- Analyze the most and complete ART ridership demographic data to establish the automobile usage that is avoided and/or reduced vehicle miles traveled by the availability of the ART transit system. This includes a quantification of automobile trips avoided as well as the miles associated with each avoided trip;
- Using the most current ARB model, EMFAC 2014, calculate the automobile air pollutant emissions that are avoided by using ART.

The difference in automobile GHG emissions that would have occurred if not for the availability of ART, minus the emissions generated by the ART alternative fuel transit fleet, yield the net GHG emissions reduced.

Characterization of the ART Revenue Vehicle Fleet – Operations data for the current fiscal year was analyzed to determine the GHG footprint of the ATN fleet. The ART revenue fleet is comprised of 82 vehicles. Of these, 27 are cut-away vehicles, three are mid-size transit-style buses, and 52 are full-size urban transit buses. 100% of the ART fleet operates on low-carbon alternative fuel, including compressed natural gas (CNG), liquefied natural gas (LNG), liquefied petroleum gas, (LPG, i.e., propane), and zero emission battery electric. The illustration below shows the composition of the ART revenue transit fleet.

Composition of the ART Transit Vehicle Fleet

Fuel Type	Number of Vehicles
Compressed Natural Gas	21
Liquified Natural Gas	43
Liquified Propane Gas	9
Zero Emission Pure Electric	4
Total Fleet	**77**

The ART transit fleet accrues on the order of 1.65 million miles annually. To calculate the GHG emissions generated by the ART fleet, the emissions contribution by each individual bus was assessed and then summed to determine ART's total transit service GHG footprint.

The emission rates corresponding to each bus engine in the ART fleet was determined by querying the ARB Executive Order database of engine emissions certifications. Total annual GHG emissions per transit vehicle are calculated based on the annual miles each bus travels. Overall, the ART revenue fleet emitted approximately 2,103 metric tons, or approximately 4.6 million pounds of GHG emissions in the most recently completed fiscal year.

Quantification of Automobile Emissions Avoided by Using ART Transit – To determine the GHGs that would have been emitted had ART riders used their personal or rental automobiles in lieu of ART transit service, ART conducted a comprehensive survey of rider demographics and travel behavior. This survey was used to derive the estimated number of automobile trips avoided, vehicle miles traveled reduced and substituted with ART transportation services.

ART is unique amongst public transit agencies in Southern California, especially when viewed in the context of two key metrics – overall ridership trends and transit dependency. In Southern California, traditional public transit bus ridership is declining. This decline can be attributed to several factors; however, most relevant is the improvement in the overall economy since the Great Recession of 2008.

In contrast, ART ridership has experienced a steady increase in demand during the same economic recovery period. Interestingly, ART enjoys an inverse relationship to a growing economy as compared to traditional public transit. As the economy improves, more families have the ability to visit the destinations ART serves - resorts, theme parks, major sports venues, etc. And because parking is often limited or increasingly expensive at these attractions, the direct, cost conscience service offered by ART is increasingly the preferred transportation solution for visitors and residents alike. Even though transit ridership shows a decreasing trend, nationwide, Anaheim's local economy continues to experience growth, thus expanding its job market, which in turn is the sources for the increase in ART ridership.

A second unique characteristic of ART compared to traditional public transit bus service is that ART riders have a very low rate of *transit dependency*. Transit dependent riders do not own or have limited access to private automobiles; as such, their mobility is dependent on the availability of public transportation. For transit dependent individuals, public transportation provides an essential mobility benefit; however, it should be understood that mobility and air quality are at times conflicted – there can be no air quality benefit assigned to transit trips that do not eliminate the use of a higher polluting transportation mode. Whereas traditional public transit in southern California has an adult ridership transit dependency on the order of 40% or greater - meaning that 4 out of ten riders do not have regular access to a car – ART's adult transit dependency is on the order of 3% - 9%. ART riders typically either own a car or, if visitors, can afford to rent a car while vacationing in the Anaheim Resort. Although they have access to an automobile, for convenience a growing number of Anaheim residents and visitors are choosing ART to get them to and from their destinations.

How many automobile trips does ART eliminate and/or reduces vehicle miles traveled? According to the ART demographic study, approximately 65% of 9.5 million annual ART riders are adults. Approximately 94% have access to a car – either as an Anaheim resident or visitor to the destination with the means to access a rental car, but due to the design characteristics of ART service, with focus on passenger needs, frequency, convenience and affordability, ART patrons choose to use ART instead of their personal automobile.

The ART ridership demographic analysis further breaks down ridership into "parties", i.e., individual riders, families with children, or groups of adult riders. The availability of ART transportation services eliminates and/or reduces vehicle miles traveled from over **3.7 million** automobile trips from Anaheim roadways each year. These trips account for over **26 million** annual automobile miles *not driven* in the City of Anaheim.

ART's impact on reducing Anaheim's carbon footprint is significant. The trips and automobile miles that were avoided reduced Anaheim's GHG emissions – according to ARB's EMFAC 2014 emissions model – by over 9,427 metric tons. This is partially offset by the GHG emissions generated by ART's fleet of low carbon

fuel buses; however, *the net GHG reduction that can be attributed to ART is over 7,325 metric tons, or over 16 million pounds of GHG emissions avoided annually*.

In addition to direct reductions in GHG emission, the amount of gasoline that is displaced – not burned – is over 807,000 gallons annual.

"ART provides a direct benefit in reducing Anaheim's carbon footprint, eliminating over 16 million pounds of CO_2 based GHG emissions each year".

It is important to note that ART also serves the Anaheim Regional Transportation Intermodal Center, or ARTIC. In this way, ART provides essential connectivity between other forms or public transit, including Metrolink and Amtrak rail service as well as the Orange County Transportation Authority's regional bus service. This connectivity to other forms of public transit allows riders to use whatever form is most convenient and then use ART to provide "last mile" connectivity to their Anaheim destination. This not only serves tourists but also the significant number of riders who are employed by Anaheim attractions. First mile/last mile connectivity is an essential element for public transit agencies that want to attract non-transit dependent rider. As such, ART supports the other transit agencies by making their traditional transit and rail services a more attractive mode as riders can depend on ART to get them to their ultimate destination.

Reduction in Local Traffic Congestion – In addition to the direct benefits of reduced GHG emissions and gasoline fuel consumption, ART provides other transportation-related benefits to the City of Anaheim, specifically as it pertains to traffic congestion.

Los Angeles-Long Beach-Anaheim, CA
- *Annual hours lost per commuter: 80*
- *Total annual hours of delay: 622.5 million*
- *Annual cost per commuter: $1,711*
- *Total congestion cost: $13.3 billion*

The 2015 Urban Mobility Scorecard[1], a report released jointly by the Texas A&M Transportation Institute, and Inrix, a traffic data collection company, identified the Los Angeles – Long Beach - Anaheim urban area as having the second worst traffic congestion in the nation – a close second behind the Washington DC region. Half of the 20 worst roads for traffic in the country are located here, and this three-city region has the distinction of having the nation's longest rush hour – nearly eight (8) hours on a typical day.

Imagine Anaheim's traffic congestion would be with an additional 10,000 cars each day, especially considering that 10,000 vehicles - lined end-to-end - represents *a line of traffic 32 miles long.* The availability of ART service, further indicates that regional growth can be sustained through managed mobility needs. With the projected increase of visitor attendance by 20,000 and employment growth of

[1] *https://static.tti.tamu.edu/tti.tamu.edu/documents/ums/congestion-data/los-angeles.pdf*

6,000 jobs by year 2019, a unique partnership between the City of Anaheim planning efforts and long-term environmental impacts of the Specific Plan Mitigation Monitoring Program and ART system, ensure that Anaheim, as a major destination city, can continue to develop as a robust, major destination, employment center and an epicenter of tourism and hospitality industry for the State of California.