A Few Fundamentals of a Circulation Element for the City of Trinidad General Plan Update

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INTRODUCTION

As a part of the Natural Resources Planning and Interpretation major at Humboldt State University, it is required to obtain and complete an internship in the field of natural resource planning. During my internship with Streamline Planning Consultants my responsibilities have included the evaluation of the current Circulation Element in the General Plan of the City of Trinidad to assess existing goals, strategies and policies. Also, the collection of data regarding major thoroughfares and transportation routes has been an integral part of this internship. The information I have collected has been analyzed, and I have provided suggestions to Streamline Planning Consultants in regards to the City of Trinidad General Plan Update. This document is in conjunction with the work Bob Brown, owner and manager of Streamline Planning Consultants and Trever Parker, the Senior Environmental Planner at Streamline Planning Consultants, are doing.

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EXECUTIVE SUMMARY

California defines the purpose of a General Plan as "a comprehensive, long term general plan to guide its future" in producing long-term goals and policies that guide land use decisions (Governor's Office of Planning and Research). The Circulation Element should be an infrastructure plan that addresses the defined components and correlates with other General Plan Elements; it also identifies current and projected general locations and extents of major thoroughfares, transportation routes, terminals and other public facilities (Governor's Office of Planning and Research).

The information provided in this evaluation comprises a few components in a circulation element, and provides assistance to those drafting the City of Trinidad's General Plan Update. Policies such as the California Government Codes which defines what a circulation element must have are identified. Also, other plans which are to be taken into consideration by Trinidad when updating their General Plan include the 2008 Humboldt County Transportation Plan and the Humboldt County Coordinated Public Transit-Human Services Transportation Plan of 2008, which are both efforts to enhance transportation coordination and infrastructure.

The County of Humboldt collected information regarding Daily Vehicle Volumes on roads within the City of Trinidad and adjacent County roads. The vehicle volumes provide information regarding direction of traffic, volume of traffic, peak hours and average daily traffic (ADT). Although the data does not provide a whole year worth of information, traffic scenarios, trends, and conditions can be speculated. From the collected data, Patrick's Point Drive has the highest vehicle volume out of the all the streets on which data was collected. Throughout Trinidad, peak hours vary for each of the assessed roads, though morning and evening peaks are present.

The Global Warming Solutions Act of 2006 sets an emissions target of achieving 1990 emission levels by 2020. A general estimate of 1,355.25 metric tons in 2000 was produced by vehicles alone within Trinidad. The estimate is based on a method devised by the Environmental Protection Agency (EPA). Although a total inventory of all sectors within Trinidad producing CO2 emissions is still needed, Trinidad may already be achieving this 1990 emissions target. Due to the decrease in population and lack of commercial and industrial infrastructure, vehicle emissions probably account for more than half of Trinidad's total greenhouse gas emissions. Besides estimating the past year's emission totals from transportation, it is important to estimate the project growth of transportation infrastructure and vehicle trips. Estimating future emissions is essential for the City of Trinidad to develop policies that would reduce emissions and better meet 2020 emission targets.

PURPOSE AND NEED

The State of California General Plan Guidelines defines transportation as the circulation of people, goods, waste, energy, water, sewage and communications (Governor's Office of Planning and Research). The Circulation Element should be an infrastructure plan which addresses the defined components and correlates with other General Plan Elements such as the Land Use Element, Housing Element, Noise Element, Open-Space Element and Safety Element.

The Transportation Element must identify current and projected general locations and extents of major thoroughfares, transportation routes, terminals and other public facilities (Governor's Office of Planning and Research). An overarching goal should be developed along with policies backed by objectives, principles, and plan proposals. These shall be consistent with the goal for the purpose of planning infrastructure that supports the circulation of people, goods, waste, energy, water, sewage and communications (Governor's Office of Planning and Research).

The purpose of this informative document is to prepare those formulating the General Plan Update for the City of Trinidad with existing conditions, guiding policies and principles, and information relating to the Circulation Element. Some existing conditions are explained, and the necessary fundamentals required in a General Plan Circulation Element are outlined. The policies and principles that guide the City of Trinidad in all aspects of the General Plan, and transportation requirements are also outlined. A few key roads with data collected by the County of Humboldt have been analyzed. Lastly, an estimate of greenhouse gas emissions from vehicles has been produced to help understand Trinidad's effect on Global Climate Change.

EXISTING CONDITIONS

Overview

The location of Trinidad and the surrounding roadway system is comparable to that of many rural communities. In 2007, there were approximately 312 citizens in Trinidad, and they are dependent upon a single highway (U.S. Highway 101) for access to public services, employment and other commercial areas (HCAOG) outside the City. Trinidad does not have a large downtown or business district, which results in little traffic congestion. According to the 2000 census, 66.5% of those commuting to work drive alone, and only 1.2% use public transit as way to travel to work (U.S. Census Bureau).

Access to services is dependent upon the roads that allow the movement of people. Significant roads (arterials) that are important to the overall circulation in Trinidad include Edwards Street, Main Street, Patrick's Point Drive, Scenic Drive, Stagecoach Road, Trinity Street and Westhaven Drive (Humboldt County RTP). Highway 101 (freeway) is the major transportation corridor within the Trinidad planning area and carries a relatively small amount of traffic in this area. In 2003, the average daily trip count for Highway 101 was 11,500 and Arthur Bauer & Associates and VRPA Technologies project this number to increase to 14,300 average daily trips in 2025. This increase will have no effect on the Level of Service which is currently at Level A, "free flow conditions", but could have an effect on collector streets and local streets. With an increase of daily trips on Hwy 101, it could be expected that more trips will be made to Trinidad.

Although residents have easy access to the beach and trails, maintaining roads and sidewalks is an important issue as it facilitates visitor access to Trinidad and increases pedestrian safety. This should all be done while maintaining the rural character of the community. There is a Pavement Management System Plan (2000) which addresses such issues and can be a guide and a tool for planners when deciding on which actions to take in regards to street management.

The Draft Trinidad General Plan Update Circulation Element outlines the parking situation in Trinidad and a few concerns are addressed with recommendations. The amount of parking for undeveloped lots is sufficient but some small developed parcels lack sufficient parking; the situation is exacerbated on alleys where there is no on-street parking. It is suggested in the Draft that signage be used to resolve the problem. Also, limiting parking to two hour intervals is also suggested. Parking becomes more of an issue during peak recreation periods. Trail users, beach users and fishermen use parking facilities in addition to normal daily users.

When the original Trinidad General Plan was created in 1979, there was no public transit system. The City of Trinidad has participated in the funding and provision of bus stops for the Humboldt Transit System (Draft Trinidad General Plan). With a small population and limited ridership, the Humboldt County Regional Transportation Plan suggests that more frequent stops to Trinidad are needed. Currently, there are five northbound and southbound stops per day, separated by an interval of at least 2 hours (Redwood Transit System). This interval is insufficient according to the Humboldt County Regional Transportation Plan. It may be expected that increased scheduled bus stops occur in Trinidad. Other transit options such as Blue Lake Rancheria Transit System may also be extended to incorporate some scheduled stops in Trinidad.

In regards to pedestrian and bicycle facilities, there are many trails and streets which both hikers and bicyclists use. There is a Trinidad Trails Plan which describes existing trails and the

conditions. The City has also been identifying the trails using uniform signage. For safety reasons it is important to keep bicycle routes and trails maintained.

Currently there is a park and ride facility at Highway 101 and Main Street. The 2004 HCAOG Regional Bicycle Transportation Plan Update proposes many more facilities such as bicycle parking areas at City Hall, the School and Library, along with other locations. At the time of the Regional Bicycle Transportation Plan Update, there were no bikeways in Trinidad. The plan proposes a total of 6 class III bikeways in Trinidad. The City of Trinidad has 23 Circulation policies regarding pedestrian and bicycle facilities. These policies are the guiding principles which land use and transportation decisions are to be based upon.

REQUIRED CIRCULATION ISSUES

Guiding Policies and Principles

The required circulation elements which are to be discussed in a General Plan are explained in the California Statute. The California General Plan Guidelines specifies the four elements which are required by statute. The Guidelines also provide more topics which may be considered by the City or County. Below are the sections in the California Government Code that specify what shall be in a General Plan in regards to the Circulation element.

> California Codes
> Government Code
> Section 65300-65303.4
>
> 65302. The general plan shall consist of a statement of development policies and shall include a diagram or diagrams and text setting forth objectives, principles, standards, and plan proposals. The plan shall include the following elements:
>
> (b) A circulation element consisting of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, any military airports and ports, and other local public utilities and facilities, all correlated with the land use element of the plan.

California Government Code § 65302(b) requires a circulation element to include “the general location and extent of existing and proposed major thoroughfare… and other local public utilities and facilities, all correlated with the land use element of the Plan.”

> 65103. (f) Promote the coordination of local plans and programs with the plans and programs of other public agencies.

This code requires that cities developing any plan such as a General Plan must appropriately design their plan in accordance with plans. In the case of Trinidad's General Plan Update, and the Circulation Element, it is important to rationally consider other Transportation plans from the County of Humboldt, other nearby cities and State Transportation plans.

Other Plans for Consideration

The 2008 Humboldt County Transportation Plan provides an assessment of the transportation modes County wide, and seeks to address current transportation needs within the County. The plan also identifies ways in which transportation improvements could be implemented. Not only does the RTP promote consistency between State, County and local plans, but acts as a forum for participation and cooperation between individuals within each jurisdiction (Humboldt County RTP).

The Humboldt County Coordinated Public Transit-Human Services Transportation Plan of 2008 identifies projects which can be funded through the Federal Transit Administration. The projects are "intended to improve the mobility of individuals" and "focuses on identifying needs" in regards to public transportation so that elderly, disabled, and low-income populations have their transportation needs met.

The Humboldt County General Plan was released in November 2008 as a Planning Commission Hearing Draft. The Circulation Element of this General Plan generally outlines goals and policies dealing with circulation, land use, road infrastructure, public transportation, bicycle and pedestrian travel and more. Specifically, the County General Plan states, "Synchronizing the County's efforts with local cities…is a high priority of this plan" (Humboldt County General Plan, Planning Commission Hearing Draft). The goals and policies which are to be devised in Trinidad's General Plan Update, should be consistent with Humboldt County's General Plan.

ANALYSIS OF A FEW KEY ROADS

The County of Humboldt collected information regarding Daily Vehicle Volumes on roads within the City of Trinidad and on County roads. The time in which the data was collected spans from April 30, 2009 to May 11, 2009. The vehicle volumes provide information regarding direction traffic, volume of traffic, peak hours and average daily traffic (ADT). Although the

data does not provide a whole year worth of information, traffic scenarios, trends, and conditions can be speculated.

Patrick's Point Drive Analysis

For the most part, all "am" peak hours for each post mile and each day include the 10:00 and 11:00 hour. All "pm" peak hours vary but are mostly consistent by day. The higher ADT at post mile 0.0 indicates many vehicles begin on Patrick's Point at Ocean Avenue. The ADT lowers at the 2.57 post mile and then rises slightly at the 5.64 post mile. This could be due to vehicles turning off on streets such as Ocean Avenue, Anderson Lane, Midway Cir, Mosier Ct, Stagecoach Rd, or Westgate Drive which would lessen the amount of traffic at the 2.57 post mile. Reasons for why the 5.64 post mile has a higher ADT then the 2.57 post mile is that the 5.64 post mile is the main entrance from Highway 101 to Patrick's Point State Park, and some other homes south on Patrick's Point Dr. This part of the road may be used by residents exiting off Highway 101 and going south to homes, rather than taking the Main St. exit off of Highway 101 in Trinidad. The South bound has a higher average ADT for the study period on the post mile 5.64 and may be a result of recreationists visiting Patrick's Point State Park.

People traveling to and from their homes in Trinidad can either use the Seawood Drive exit off Highway 101 or the Main St. exit in Trinidad of Highway 101. It is safe to say that the most common entrance and exit is that of Main Street from Highway 101. It seems that even though the Seawood Drive entrance and exit provides access to homes, it is not used as excessively.

Figure 1.

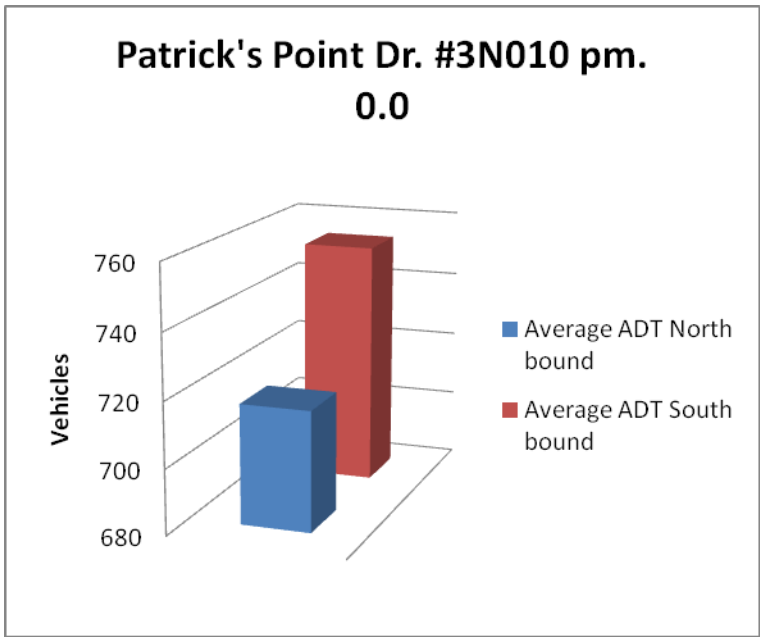

Figure 1. shows the difference in north and south bound travel at the post mile marker 0.0 for Patrick's Point Dr. It shows that there is on average more vehicles traveling south than north.

Figure 2.

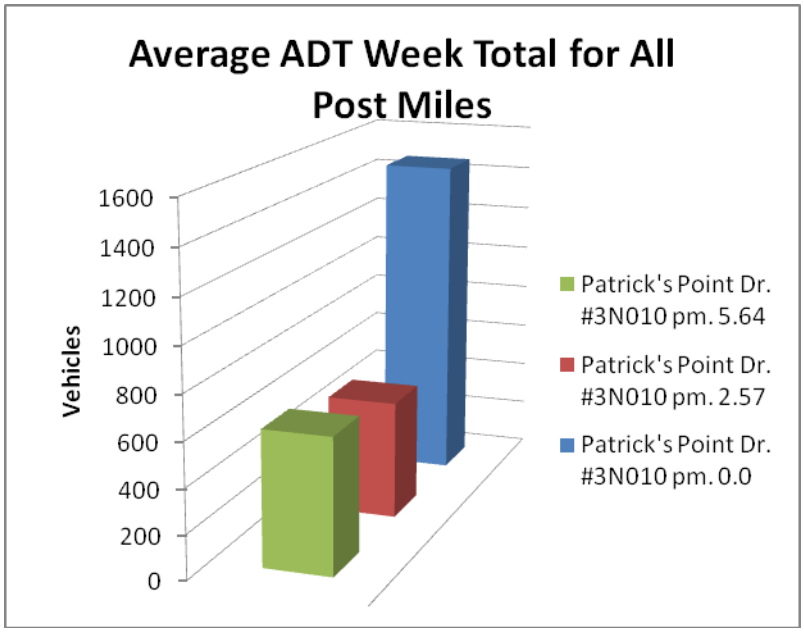

Figure 2. shows the average ADT between the three different post miles on Patrick's Point Dr. for the study period. The post mile 0.0 is by far the most used portion of Patrick's Point Dr. The 5.64 post mile is the next most used.

Anderson Lane Analysis

For Anderson Ln. the "am" peak hour varies throughout the study period. On the other hand, the common "pm" peak hour is roughly 15:00 to 15:59.

Anderson Ln. is situated between Patrick's Point Dr. and Stagecoach Rd. and acts as a local street. The average ADT is 235 and may mean that Anderson Ln. is not only acting as a local street but as a collector street, allowing vehicles to move from Patrick's Point Drive to Stagecoach Rd. If this is true, it could again explain the lower average ADT of Patrick's Point Dr. #3N010 post mile 2.57 and suggest that people turn off of Patrick's Point before that post mile.

Patrick's Point Dr. has a high average ADT at post mile 0.00 and decreases to an average ADT of 530. Anderson Ln. could be collecting vehicles from Patrick's Point Dr. and filtering them to Stagecoach Rd. Also, the low average ADT at Stagecoach Rd. post mile 0.06 could be a result of

vehicles traveling from Patrick's Point Dr. to Anderson Ln. to Stagecoach Rd. and not taking the Main St. Stagecoach Rd. intersection.

Stagecoach Road Analysis

The common "am" peak hour is roughly between 10:30 to 11:29. The common "pm" peak hour is roughly between 13:45 to 14:44. Although a common time period can be estimated, the peak hours for both morning and evening vary.

The average ADT for the post mile 0.06 is a third lower than that of the average ADT for the post mile 2.41. Stagecoach Rd. runs north and south. Average ADT from the 0.06 post mile would be expected to be higher than that of the post mile 2.41 when in fact, the data shows the reverse. Again this is probably due to vehicles using Patrick's Point Dr. to Anderson Ln. to Stagecoach Rd., rather than Main St. to Stagecoach Rd.

Figure 3.

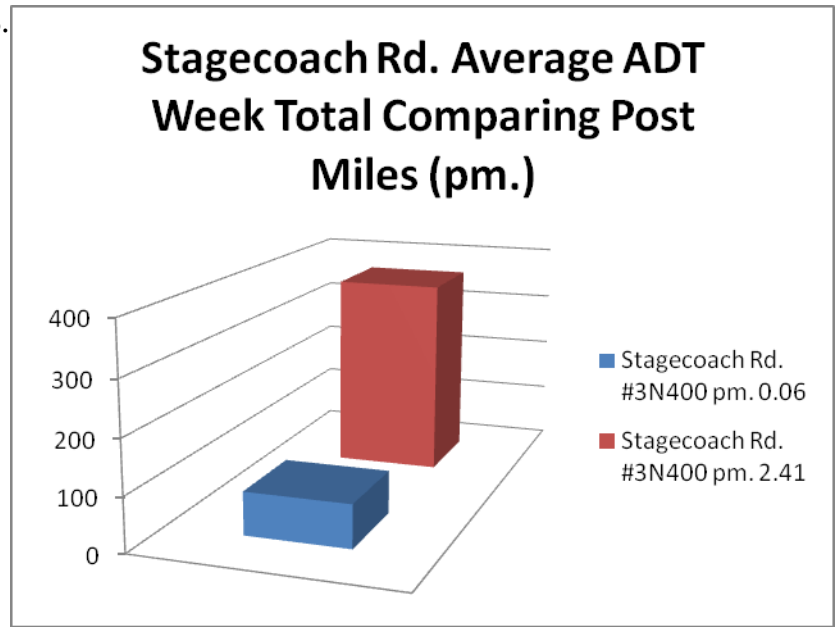

Figure 3. above shows the difference in average ADT from the different post miles on Stagecoach Rd. The 2.41 post mile has a far greater average ADT than the 0.06 post mile.

Stumptown Road Analysis

The "am" peak hour varies throughout the study period as well as the "pm" peak hour. The average ADT on Stumptown Rd. is 92. Stumptown Rd. is not within the Trinidad City Boundary but would be considered a local street, allowing access to homes. Stumptown Rd. connects to

North Westhaven Dr. or Trinidad Frontage. Trinidad Frontage connects to Westhaven Dr. near the on and off ramp of Highway 101. The average ADT on Trinidad Frontage could be a result of the vehicles traveling to and from Stumptown Rd.

The average ADT of Stumptown Rd. is half of the average ADT of Trinidad Frontage. More homes and streets are located north of Stumptown Rd. off of North Westhaven Dr. or Trinidad Frontage. Trinidad Frontage is the main and only road that allows access to Westhaven Dr. and Highway 101.

Trinidad Frontage Analysis

The average “am” peak hour for Trinidad Frontage is around 11:00 to 11:59. The average ADT for the study period is 180 vehicles. This closely correlates with the Westhaven Dr. data set, where there is a difference in averages between the Westhaven Dr. post mile 0.04 and 0.30 of 200 vehicles. Trinidad Frontage shows that the vehicles may be exiting off of Westhaven Dr. onto Trinidad Frontage.

The peak volumes are around 20 vehicles. Again, when looking at the Westhaven Dr. data set, there is a difference of about 30 vehicles between the Westhaven Dr. post mile 0.04 and 0.30. Although the numbers are not exactly aligned, the probable cause of the difference is due to vehicles traveling on Trinidad Frontage from Westhaven Dr.

Westhaven Drive Analysis

For the “am” peak hours, the post mile 0.04 and post mile 0.30 have an overlapping interval from 9:00 to 9:44. The am peak hour for post mile 1.36 is from 10:15 to 11:14. The “pm” peak hours do overlap for all three post miles from the times of 16:45 to 17:29 for a 45 minute interval. The post mile 0.04 has data that shows direction of vehicles. The east bound direction flow of vehicles is far greater than the west bound direction of flow on Westhaven Dr. at post mile 0.04. The 0.04 post mile ADT is slightly higher than that of the 0.30 post mile. This could be a result of vehicles turning off of Westhaven Dr. at either Trinidad Frontage Rd. or Rock Quarry Rd. The ADT at post mile 1.36 is greatly reduced from that of the previous two post miles. This may be because many of the vehicles are turning off onto other roads or driveways as state before. The average ADT for the study period is 139, which is only 15% of the average ADT of the 0.30 post mile.

ESTIMATING GREENHOUSE GAS EMISSIONS FROM TRANSPORTATION

The Environmental Protection Agency (EPA) has developed four fact sheets consisting of aspects which help calculate emissions from vehicles. The EPA fact sheets are to "facilitate consistency of assumptions and practices in the calculation of emissions of greenhouse gases from transportation and mobile sources." The information provided by the EPA is to help those estimating emissions and the benefits of mobile sources air pollution control programs. There is also a "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories" produced by the California Air Resources Board (CARB), California Climate Action Registry and other agencies to provide assistance and methodologies to local governments quantifying CO2 emissions (California Air Resources Board). For the purpose of this estimate, the EPA fact sheet will be used as it provides a simple method in which to measure CO2 emissions from vehicles.

Step One

Fact sheet three of the four provided by the EPA defines six key steps to estimating greenhouse gas emissions which are associated with a single passenger vehicle. Step one is to determine the amount of CO2 produced from one gallon of gasoline. The EPA uses values derived by the Code of Federal Regulations 40 CFR 600.113-78 to estimate the amount of greenhouse gasses, and estimates the emissions to be 8.8 kg of CO2 per gallon of gasoline (EPA).

Step Two

Estimating the fuel economy of passenger cars and light trucks in miles per gallon is key step number two (EPA). The EPA provides two methods for measuring the fuel economy; first, MOBILE6.2 is a computer modeling software developed by the EPA, and second, the Federal Highway Administration's (FHWA), "Highway Statistics 2001", which are the vehicle miles traveled divided by fuel use. Both are used by the EPA in different scenarios, but recommends using only one set when estimating emissions. For this purpose of estimating local emissions in a relatively small area, the MOBILE6.2 model will be used. In 2003, MOBILE6.2 calculates that passenger cars have a weighted average of 23.9 miles per gallon (MPG), while light trucks have a weighted average of 17.4 mpg (EPA). Overall, MOBILE6.2 calculates the average fuel economy for passenger cars and light trucks to be 20.3 mpg.

Step Three

Step three is estimating the number of miles driven per year. EPA estimates the number on a nationwide basis. It is not necessary to estimate the nation's average of miles driven per day,

only the number of miles driven by those within Trinidad and the surrounding areas. In the 2000 U.S. Census, the estimated average travel time to work for Trinidad was 22.8 minutes (U.S. Census Bureau). Since the actual amount of miles driven by a person per day is not available, estimating the average miles driven by one vehicle will be derived from two factors. First, the average travel time can give a range of miles which could be traveled. Second, by measuring the distance to the closest cities where vehicles may be traveling and taking the average, average miles travelled can be estimated

Highway speeds are 65 miles per hour (MPH), so it can be cautiously assumed that one minute equals one mile. Therefore, 22.8 minutes of time travel equals about twenty two miles of travel. There are four cities in which people are likely travelling to for work. First, McKinleyville is about 11 miles from Trinidad. The City of Arcata is approximately 15 miles from Trinidad. The City of Blue Lake is about 20 miles from Trinidad and the distance to the City of Eureka is roughly 23 miles. The average of these probable distances is 17.5 miles. To roughly gauge the amount of miles traveled, the average of the minute estimate and the distance estimate will be used. Therefore, the final estimate of miles traveled to work per vehicle is 19.75. This number is then doubled to get the daily total of miles driven by each vehicle. Therefore, an estimated average of 39.5 miles per day is driven by one person in Trinidad. This number is then multiplied by 365 days to get a year's estimate of 14,417.5 miles driven.

This number is only a rough estimate as there is no information on the exact number of miles driven per day by one individual. That said, the estimate may be close. The average number of miles driven per year nationwide is estimated to be 12,000 miles for all passenger vehicles (EPA). Based on the estimate above, Trinidad's number of miles per day is slightly above this national average by a little more than 2,000 miles. This may be a result of the rural area and lack of significant traffic reducing travel time. The national average travel time is 55 minutes and average travel miles is 29 (AAA). Urban areas such as Los Angeles and New York drastically alter the average travel time as they are outliers with high travel times (U.S. Census Bureau**)**. Although the estimate may be inaccurate, it is relatively close.

Step Four

Other than CO2**,** gasses such as N4O, CH4, and HFCs are greenhouse gasses released in emissions. Step four is to determine the emissions of N2O, CH4, and HFCs released from vehicles. It is assumed that these non CO2 gasses make up only 5% of the total emissions released from a vehicle, while CO2 itself makes up 95% of the emissions (EPA). EPA multiplies the CO2 estimate from step one by 100/95 to incorporate the contribution of N2O, CH4, and HFCs emissions. For the purpose of this estimate, the same calculation will be done.

Step Five

If using the FHWA method of estimating fuel economy for passenger vehicles and light trucks separately, step five describes how to determine the relative percentage of greenhouse gas emissions for an average passenger vehicle. As stated before, and for the purpose of this estimation, MOBILE6.2 data and estimates of fuel economy already includes a weighted average for all passenger vehicles including light trucks.

Step Six

The last step in calculating annual greenhouse gas emissions from a typical vehicle involves a calculation EPA has created using the previous estimates from steps one through five. Since the equation is made to incorporate national numbers, it has been slightly modified to fit the purposes of this local estimate. The equation is:

$$\textit{Metric tons of } CO_2e \textit{ for the average passenger vehicle} =$$

$$\left(\frac{\textit{Vehicle Miles Traveled}}{\textit{Passenger vehicle MPG average}}\right) x\, CO_2e \textit{ per gallon } x \frac{\frac{100}{95}}{1000}$$

*e = emissions

Plugging in the derived estimates from the previous steps gives the equation:

$$\textit{Metric tons of } CO_2e \textit{ for the average passenger vehicle} = \left(\frac{14,417.3}{20.8}\right) x\, 8.8\, x \frac{\left(\frac{100}{95}\right)}{1000}$$

The answer in metric tons is equal to 6.58 metric tons of C02 emissions for the average passenger vehicle in Trinidad. The nation's average calculated by EPA using the MOBILE6.2 is 5.48 metric tons of C02 per passenger vehicle. The higher CO2 emissions value for an average passenger vehicle in Trinidad may be due to the longer distances traveled to and from work. Remember that the number of miles driven per vehicle was estimated via correlations between travel time and probable travel distances. Although the per vehicle emission value in Trinidad may be slightly higher than the national average, there are far fewer vehicles within Trinidad due to the low population when compared to other cities.

To better estimate the emissions from a single passenger vehicle within Trinidad, a range of annual miles travelled values could be used to figure a high and low total emission per passenger vehicle. This may be more appropriate since the exact number of miles driven is unknown.

For example, if we assume that Trinidad's average miles driven per day are lower than the national average, we may say that there are only 10,500 miles vehicle miles traveled. Plugging this into the equation above gives metric tons of CO2 emissions per average vehicle value of 4.79 metric tons.

In addition to figuring out the emissions from the average passenger vehicle, the next step to estimating the total CO2 emissions in Trinidad from vehicles is to find out how many vehicles may be used during the year. The 2000 Census shows that 66.5% of Trinidad's population drives to work alone (U.S. Census Bureau). This percentage of the total Trinidad population of 311 equals to about 206 people, of who drive alone. Multiplying the number of people who drive alone in Trinidad by the estimated annual average emissions per vehicle in Trinidad, gives the total greenhouse emissions produced from Trinidad vehicles of 1,355.25 metric tons. This total comprises of the high emissions estimate above.

The CO2 emissions relative to other cities of the same size is hard to estimate because very few cities the same size of Trinidad have taken an inventory of their CO2 emissions. In 2002, the City of Arcata prepared a Community Greenhouse Gas Inventory and Forecast. The inventory is an effort by the City of Arcata as part of the International Council on Local Environmental Initiatives (ICLEI) Cities for Climate Protection (CCP), and creates a baseline of CO2 emissions, sets emissions targets, develops actions to meet targets, and monitors greenhouse gasses to confirm progress and results (Community Greenhouse Gas Inventory and Forecast). Although Arcata has a higher population than the Trinidad, it is in approximately the same location and can provide information regarding CO2 trends in the region.

Arcata's inventory consists of all sectors including waste, residential, commercial, Transportation, and more. The results are those of the year 2000 and as a whole, Arcata produced 234,703 of CO2 emissions. The CO2 emissions from transportation alone in Arcata were 111,239 tons of CO2 emissions. This amount is more than 80 times the estimated 1,355.25 tons of CO2 emissions amount generated by vehicles in Trinidad. The City of Arcata has a population of about 17,294 which is roughly 55% higher than that of Trinidad's (U.S. Census Bureau).

For Arcata, the transportation sector accounts for 44.7% of their total CO2 emissions (Community Greenhouse Gas Inventory and Forecast). The commercial sector accounts for 25.5% of their total CO2 emissions. Due to that lack of a prominent commercial and industrial sector in Trinidad, the transportation sector in Trinidad may be accounting for more than half of the total CO2 emissions in Trinidad.

The CO_2 emissions estimate for Trinidad above only incorporates vehicles, and estimating Trinidad's total emissions from all sectors is essential to understanding what the City of Trinidad's impact on Global Climate Change is. The Global Warming Solutions Act of 2006 sets the emissions target of achieving 1990 emission levels by 2020. Trinidad may already be achieving this target due to the decrease in population. In 1990, the population was 362 (U.S. Census Bureau). Again, it is necessary to take the inventory of CO_2 emission from all sectors to assess the total CO_2 emissions contributed by Trinidad. The "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories" will assist in quantifying and reporting greenhouse gas emissions (California Air Resources Board).

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APPENDICES

	Thursday May 7,2009			Friday May 8, 2009			Saturday May 9, 2009			Sunday May 10, 2009			Monday May 11, 2009		
Patrick's Point Dr. #3N010 pm. 0.0	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**
ADT	779	774	1523	892	877	1769	873	892	1765	781	860	1641	258	366	624
AM Peak Time	10:00 - 10:59	10:45 - 11:44	10:45 - 11:44	9:15 - 10:14	9:00 - 9:59	9:15 - 10:14	11:00 - 11:59	10:30 - 11:29	11:00 - 11:59	11:00 - 11:59	10:00 - 10:59	10:00 - 10:59	10:30 - 11:29	8:30 - 9:29	10:15 - 11:14
AM Peak Volume	57	65	119	59	62	118	65	72	128	58	74	117	53	74	123
PM Peak Time	16:00 - 16:59	13:15 - 14:14	15:45 - 16:44	15:15 - 16:14	15:15 - 16:14	15:15 - 16:14	14:00 - 14:59	15:45 - 16:44	14:00 - 14:59	16:15 - 17:14	13:15 - 14:14	13:15 - 14:14	12:00 - 12:59	12:00 - 12:59	12:00 - 12:59
PM Peak Volume	81	79	156	90	80	170	93	90	169	76	80	148	47	50	97

Thursday through Monday Averages		
Average ADT North bound	**Average ADT South bound**	**Average ADT Week Total**
716.6	753.8	1464.4
Average AM Peak Volume	**Average AM Peak Volume**	**Average AM Peak Volume**
58.4	69.4	121
Average PM Peak Volume	**Average PM Peak Volume**	**Average PM Peak Volume**
77.4	75.8	148

	Thursday May 7,2009			Friday May 8, 2009			Saturday May 9, 2009			Sunday May 10, 2009			Monday May 11, 2009		
Patrick's Point Dr. #3N010 pm. 2.57	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**
ADT			484			604			650			672			242
AM Peak Time			10:15 - 11:14			9:15 - 10:14			10:30 - 11:29			11:00 - 11:59			10:15 - 11:14

Thursday through Monday Averages
Average ADT Week Total
530.4
Average AM Peak Volume

AM Peak Volume			46			56			44			59			51	51.2
PM Peak Time			16:00 - 16:59			12:00 - 12:59			15:30 - 16:29			13:15 - 14:14			12:00 - 12:59	**Average PM Peak Volume**
PM Peak Volume			58			61			76			71			41	61.4

	Thursday May 7,2009			**Friday May 8, 2009**			**Saturday May 9, 2009**			**Sunday May 10, 2009**			**Monday May 11, 2009**			**Thursday through Monday Averages**
Patrick's Point Dr. #3N010 pm. 5.64	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**North Bound**	**South Bound**	**Total**	**Average ADT Week Total**
ADT			527			730			793			745			248	608.6
AM Peak Time			10:30 - 11:29			9:45 - 10:44			11:00 - 11:59			11:00 - 11:59			9:45 - 10:44	**Average AM Peak Volume**
AM Peak Volume			53			56			77			87			54	65.4
PM Peak Time			15:15 - 16:14			12:00 - 12:59			14:15 - 15:14			12:30 - 13:29			12:00 - 12:59	**Average PM Peak Volume**
PM Peak Volume			65			81			91			86			29	70.4

	Thursday April 30, 2009*			**Friday May 1, 2009**			**Saturday May 2, 2009**			**Sunday May 3, 2009**			**Monday May 4, 2009 ***			**Thursday through Monda Averages**		
Westhaven Dr. #C4N030 pm. 0.04	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**Average ADT**	**Average ADT**	**Aver AD**

ADT	51	1236	1287	18	1449	1769	10	1321	1331	69	1519	1588	8	282	290
AM Peak Time	10:45 - 11:44	8:45 - 9:44	8:45 - 9:44	10:00 - 10:59	7:45 - 8:44	7:45 - 8:44	6:45 - 7:44	11:00 - 11:59	11:00 - 11:59	9:30 - 10:29	9:45 - 10:44	9:45 - 10:44	7:30 - 8:29	7:30 - 8:29	7:30 - 8:29
AM Peak Volume	10	122	124	3	111	118	2	148	149	3	128	131	3	103	106
PM Peak Time	13:00 - 13:59	16:45 - 17:44	16:45 - 17:44	15:15 - 16:14	17:45 - 18:44	17:45 - 18:44	16:15 - 17:14	13:00 - 13:59	13:00 - 13:59	13:00 - 13:59	14:15 - 15:14	14:15 - 15:14	12:00 - 12:59	00:00 - 00:59	12:00 - 12:59
PM Peak Volume	12	140	141	4	150	170	4	110	110	24	179	189	1	0	1

* = Times are limited to between 00:00 to 12:59

West bound	East bound	We Tot
31.2	1161.4	125
Average AM Peak Volume	**Average AM Peak Volume**	**Aver AM Pea Volu**
4.2	122.4	125
Average PM Peak Volume	**Average PM Peak Volume**	**Aver PM Pea Volu**
9	115.8	122

	Thursday April 30, 2009*			**Friday May 1, 2009**			**Saturday May 2, 2009**			**Sunday May 3, 2009**			**Monday May 4, 2009***		
Westhaven Dr. #C4N030 pm. 0.30	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**
ADT			1077			1218			994			984			244
AM Peak Time			9:00 - 9:59			7:45 - 8:44			10:45 - 11:44			10:30 - 11:29			7:30
AM Peak Volume			98			102			89			79			86
PM Peak Time			16:30 - 17:29			17:00 - 17:59			13:15 - 14:14			12:00 - 12:59			00:00 - 00:59
PM Peak Volume			151			117			90			106			0

Thursday through Monda Averages
Aver AD We Tot
903
Aver AM Pea Volu
90.
Aver PM Pea Volu
92.

* = Times are limited to between 00:00 to 12:59

	Thursday April 30, 2009*			Friday May 1, 2009			Saturday May 2, 2009			Sunday May 3, 2009			Monday May 4, 2009*			Thursday through Monda Averages
Westhaven Dr. #C4N030 pm. 1.36	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**West Bound**	**East Bound**	**Total**	**Aver AD We Tot**
ADT			330			304			23			28			10	13
AM Peak Time			10:15 - 11:14			11:00 - 11:59			8:45 - 9:44			8:15 - 9:14			9:45 - 10:44	**Aver AM Pea Volu**
AM Peak Volume			38			29			6			2			6	16.
PM Peak Time			16:45 - 17:44			12:00 - 12:59			12:45 - 13:44			14:30 - 15:29			00:00 - 00:59	**Aver PM Pea Volu**
PM Peak Volume			43			34			3			7			0	17.

* = Times are limited to between 7:00 to 23:59

* = Times are limited to between 00:00 to 10:59

Thursday April 30, 2009*	Friday May 1, 2009	Saturday May 2, 2009	Sunday May 3, 2009	Monday May 4, 2009*	Thursday through Monday Averages

Anderson Ln. #3N500 pm. 0.30			Total			Total			Total			Total			Total			Average ADT Week Total
ADT			218			318			266			279			96			235.4
AM Peak Time			00:00 - 00:59			10:15 - 11:14			10:30 - 11:29			8:45 - 9:44			8:00 - 8:59			Average AM Peak Volume
AM Peak Volume			0			27			24			15			22			17.6
PM Peak Time			15:00 - 15:59			15:00 - 15:59			14:00 - 14:59			15:00 - 15:59			00:00 - 00:59			Average PM Peak Volume
PM Peak Volume			39			43			29			34			0			29

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	Thursday April 30, 2009*			Friday May 1, 2009			Saturday May 2, 2009			Sunday May 3, 2009			Monday May 4, 2009*			Thursday through Monday Averages
Stagecoach Rd. #3N400 pm. 0.06			Total			Total			Total			Total			Total		Average ADT Week Total
ADT			92			78			103			94			32		79.8
AM Peak Time			11:00 - 11:59			11:00 - 11:59			9:45 - 10:44			9:00 - 9:59			8:45 - 9:44		Average AM Peak Volume
AM Peak Volume			9			6			12			9			9		9
PM Peak Time			13:15 - 14:14			15:00 - 15:59			13:15 - 14:14			12:45 - 13:44			00:00 - 00:59		Average PM Peak Volume
PM Peak Volume			13			10			18			12			0		10.6

	Thursday April 30, 2009			Friday May 1, 2009			Saturday May 2, 2009			Sunday May 3, 2009			Monday May 4, 2009			Thursday through Monday Averages
Stagecoach Rd. #3N400 pm. 2.41			**Total**			**Total**			**Total**			**Total**			**Total**	**Average ADT Week Total**
ADT			349			286			415			658			118	365.2
AM Peak Time			11:00 - 11:59			10:15 - 11:14			10:00 - 10:59			11:00 - 11:59			9:30 - 10:29	**Average AM Peak Volume**
AM Peak Volume			37			29			49			64			44	44.6
PM Peak Time			15:15 - 16:14			12:15 - 13:14			13:00 - 13:59			14:45 - 15:44			00:00 - 00:59	**Average PM Peak Volume**
PM Peak Volume			59			40			57			109			0	53

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	Thursday April 30, 2009*			Friday May 1, 2009			Saturday May 2, 2009			Sunday May 3, 2009			Monday May 4, 2009*			Thursday through Monday Averages
Stumptown Rd. #3N510 p.m. 0.04			**Total**			**Total**			**Total**			**Total**			**Total**	**Average ADT Week Total**
ADT			116			134			95			78			40	92.6
AM Peak Time			11:00 - 11:59			11:00 - 11:59			6:30 - 7:29			7:45 - 8:44			9:45 - 10:44	**Average AM Peak Volume**
AM Peak Volume			4			19			10			7			13	10.6
PM Peak Time			16:45 - 17:44			17:00 - 17:59			16:30 - 17:29			18:30 - 19:29			00:00 - 00:59	**Average PM Peak Volume**
PM Peak Volume			22			16			13			13			0	12.8

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	Thursday April 30, 2009*			Friday May 1, 2009			Saturday May 2, 2009			Sunday May 3, 2009			Monday May 4, 2009*			Thursday through Monday Averages
Trinidad Frontage Rd. #3N040 p.m. 0.00			**Total**			**Total**			**Total**			**Total**			**Total**	**Average ADT Week Total**
ADT			256			273			162			148			65	180.8
AM Peak Time			11:00 - 11:59			11:00 - 11:59			6:45 - 7:44			10:30 - 11:29			8:00 - 8:59	**Average AM Peak Volume**
AM Peak Volume			23			28			17			11			17	19.2
PM Peak Time			13:00 - 13:59			12:15 - 13:14			13:45 - 14:44			18:30 - 19:29			00:00 - 00:59	**Average PM Peak Volume**
PM Peak Volume			40			28			20			24			0	22.4

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