# Multi-Use Trails in Santa Fe: Accessibility and Social Networking

An Interactive Qualifying Project submitted to the faculty of
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in partial fulfillment of the requirements for the Degree of Bachelor of Science


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# I. Abstract

This Interactive Qualifying Project worked to assess the multi-use trails within Santa Fe and facilitate the accessibility and use of these trails. The team evaluated and assessed five trails within the city's trail system. Four interactive maps were developed to display various collected data and observations. These maps depict bollard inventory, bikeways and trails, a segmented analysis of the trails and amenities. The maps were developed to assist the city and trail users in knowing the current trail conditions, while promoting trail use by displaying the user-friendly amenities. A website was created as an access source for all the assets developed during this project. Ownership of this website was given to the Metropolitan Planning Organization for advertising and updating. Concurrently, we developed a mockup of a Smartphone application that has the potential to help both Santa Fe citizens and tourists navigate the city's multi-use trail system.

## II. Acknowledgements

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## Executive Summary

The trail system of Santa Fe offers a means to access multiple sites of the city through non-motorized methods of transportation. Non-motorized transportation is eco-friendly and economically beneficial. This system, composed of formal and informal trails, reaches from the outskirts of the county and provides a trail network across the city of Santa Fe.

The multi-use trail system is limited in tools that allow for easy accessibility and social networking, which led to the development of the team's mission. The mission of this project was to facilitate the accessibility and use of the multi-use trails in Santa Fe, while promoting social interaction among trail users. To do this, three objectives were developed: to assess currently existing multi-use trails, to promote accessibility and use of multi-use trails, and to facilitate social interaction on multi-use trails.

Four multi-use trails were chosen to be assessed: the Acequia Trail, Rail Trail, River Trail, and Arroyo De Los Chamisos Trail. The trails of Calle Lorca Southbridge Park were also assessed as non-multi-use trails. The team created an assessment form was created to record features of the segments of each trail, concentrating on maintenance, surface condition and available amenities. Additionally, the team utilized Smartphone applications and technologies to collect GPS coordinates and map the segments of the selected trails. With the collected results, the team designed interactive maps.

Four interactive Google maps were constructed to help display relevant information for both the community and city officials. The first created map displayed all information collected from the assessment forms on the correlating segments to fulfill the first objective (Figure 1).

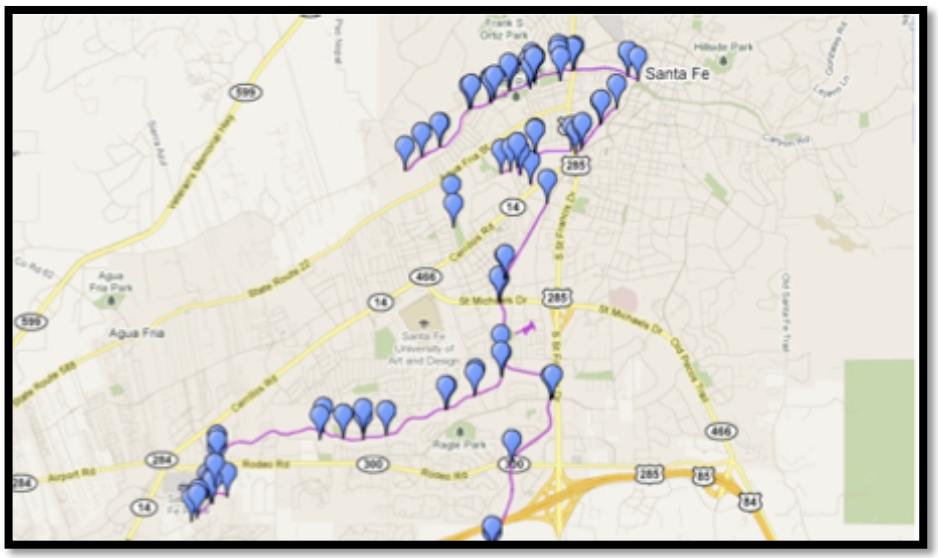



Figure 1: Segmented Map

The second map had three layers of collected amenities data: bike parking, benches, and bike shops. The team designed this map to follow the original design of the Metropolitan Planning Organization's Bikeways and Trails Map, shown in Figure 2. The third map displayed collected bollard inventory among the trails assessed with measurements and photo documentation of each location. A further analysis was completed to identify the locations in which bollards are not up to current required standards. The last map created was a sign location proposal map. Criteria for sign placements were determined, and then the team mapped ten locations that needed signage. To help with the designing aspect of the signage, students from the University of Art and Design collaborated with the team. Trailheads, rack cards, and logos for specified trails were designed.

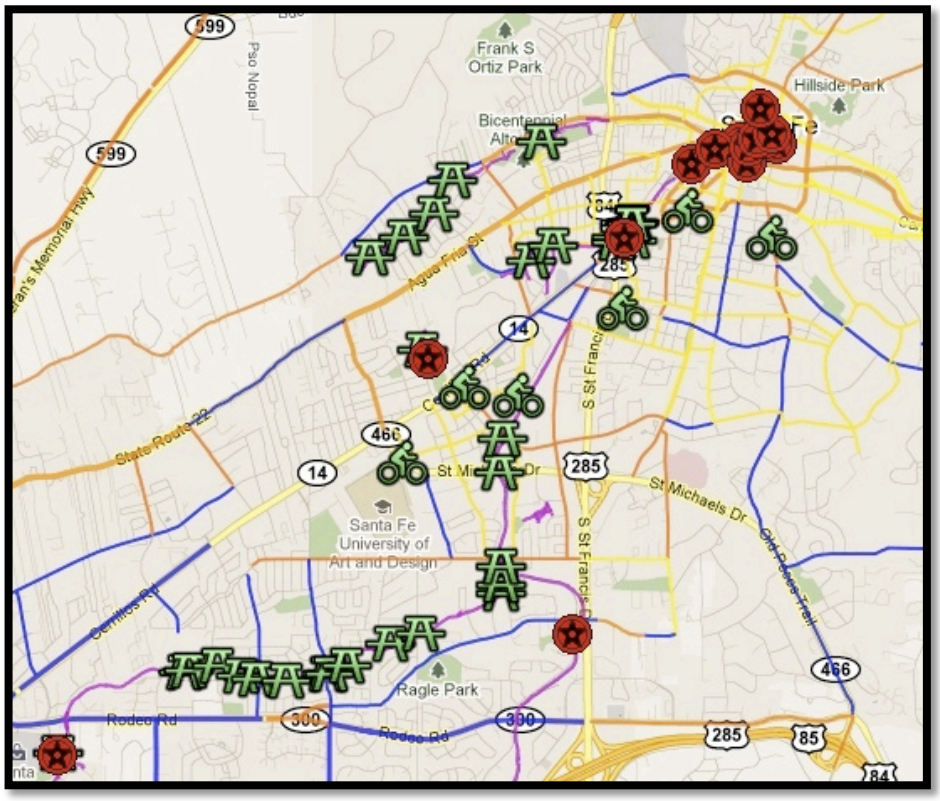



**Figure 2: Amenities Map**

For the completion of the third objective, the team researched technologically based platforms able to serve as navigational and social networking tools. It was decided that a Smartphone application would serve as a tool to meet the requirements of the objective. Because of time constraints, the team developed a visual representation of the system that would allow for this part of the project to later be adopted, completed and distributed. The team brainstormed the application, developing screen layouts to depict the functions of the application in Adobe Photoshop. The team then wrote the description and

explanation of the functions for the application. It was determined that the application mock-up would be named “Go Santa Fe” (Figure 3).


Figure 3: Go Santa Fe Smartphone Mockup

Everything created as a result of fulfilling the objectives was embedded onto a website, titled “Go Santa Fe NM.” The Metropolitan Planning Organization has complete ownership of this site and will have the ability to update and maintain the finished products. From this project the team was successfully able to create four interactive maps and a Smartphone application mock-up design to promote multi-use trail accessibility and social networking.

# 1. Introduction

In communities across the world, there is a growing need to provide people with opportunities to use non-motorized methods of transportation and recreational multi-use trails for walking and biking. Benefits of walking and biking include an eco-friendly mode of transportation, a chance to connect with nature, a way of increasing personal health and a method of socialization within the community. These purposes are aided by informational and legible maps of multi-use trails that have become more available through the advancement of technology. With the creation of Smartphones, society has gained easier access to systems that allow for social networking and way-finding means with the potential to facilitate the accessibility of these trails. Utilization of these tools is beneficial in promoting a healthier and eco-friendly lifestyle, along with a society that is more aware of recreational resources.

The environment of Santa Fe lends itself to non-motorized means of transport and recreational activity. In 2008, Santa Fe was named the best walking city in New Mexico[1] and one of the top overall walking cities in the United States by Prevention Magazine and the American Podiatric Medical Association.[2] These titles are attributed to the available resources for non-motorized methods of transportation, one of which includes Santa Fe's Prescription Trails Program, designed to combat medical issues by prescribing patients to walk along designated trails. The city of Santa Fe currently advertises 12 paved multi-use trail systems and maintains 21 developed parks with paved and unpaved trails.[3] Organizations within the city have been focusing on improving biking amenities. In 2004, the city approved $30 million dollars in bonds for the trails and parks systems.[4] The money is being distributed through the 2009 Parks Master Plan.[5]

The city of Santa Fe has developed several features to promote multi-use trails. One notable feature is an Internet mapping site containing Geographical Information System (GIS) maps of the city.[6] The maps are a collection of city records, including boundaries, trails, parks, transportation, and city

[1] Herling, J. (2009). "Best (and worst) walking cities in america ranked by prevention & APMA." Accessed 02/13/2011
*http://www2.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/03-04-2008/0004766972&EDATE*
[2] American Podiatric Medical Association. (2009). "2008 best walking cities; 500 overall U.S. city rankings." Accessed 02/13/2011
*http://www.apma.org/walking*
[3] The City of Santa Fe. (2011). "Official website." Accessed 02/11/2011
*http://www.santafenm.gov/index.aspx?NID=548*
[4] VOTE YES! Santa Fe Parks and Trails. (2008). Accessed 02/15/2011
*http://www.conservationcampaign.org/yessantafeparks/*
[5] The City of Santa Fe. "2009 parks master plan." Accessed 04/05/2011
*http://www.santafenm.gov/index.aspx?NID=1337*
[6] Geocortex. (2011). "City of santa fe internet mapping site." Accessed 02/12/2011
*http://www.santafenm.gov/index.aspx?NID=1079*

zoning. Each layer of the map offers a visualization of the specified system. Furthermore, the Santa Fe Metropolitan Planning Organization has proposed the Bicycle Master Plan to "coordinate investments in trails and roads, establish common guidelines for design, construction and maintenance, and develop shared strategies on education, enforcement and encouragement of bicycling as a transportation choice in the Santa Fe area".[7] This organization also distributes a map, titled the Bikeways and Trails Map, to create a safer bicycling environment. [8]

Many multi-use trails exist throughout the city; however there is a lack of available tools to make these trails accessible. One such tool would be appropriate and accurate signage. Current trailhead locations are sparse or nonexistent. Finally, trails lack amenities that would be beneficial to the users' experiences. The city's GIS layers that are available to the public only allow visualization but lack interactivity. This lack of provided resources and information about the multi-use trails within the city has created a need to identify means of promoting trail usage and increasing the accessibility of the multi-use trails within the city of Santa Fe.

The purpose of this project is to facilitate the accessibility and use of multi-use trails in Santa Fe while promoting social interaction among trail users. Three objectives were developed to achieve this mission: to assess existing multi-use trails, to promote accessibly and use of multi-use trails and to facilitate social interaction on multi-use trails. A trail evaluation form helped determine the conditions of currently existing trails. Interactive maps were constructed to enhance knowledge and use of trails within the city. Furthermore the development of a Smartphone application mock-up detailed a system that encompasses wayfinding and social networking tools using services throughout the city of Santa Fe.

[7] Santa Fe Metropolitan Planning Organization. (2007). "Bicycle master plan." Accessed 04/28/2011 *http://santafempo.org/bicycle-master-plan/*

[8] Santa Fe Metropolitan Planning Organization. (2000). "Bikeway & trails map." Accessed 04/28/2011 *http://santafempo.org/wp-content/uploads/2009/07/Bikeways-Map.pdf*

# 2. Background

Located on the hills of the Sangre de Cristo Mountain Range, the city of Santa Fe, New Mexico is a beautiful city filled with rich culture. With a population of 70,000 primarily Hispanic, White-Anglo and Native American people, it is a unique location of the United States. It is the "second oldest city as well as the highest and oldest state capital in the U.S".[9] The status of the area lends itself towards many innovations, project and research opportunities.

The aesthetically appealing atmosphere of Santa Fe cannot be fully appreciated through the windows of a vehicle. With numerous parks, scenery, and shopping areas, Santa Fe is the ideal place to use walking as a means of recreation and transportation.[10] Santa Fe offers multi-use bicycle, pedestrian, and equestrian trails that are increasingly popular for both recreation and commuting purposes.[11] In addition, this city is easy to navigate using non-motorized means of transportation; it contains miles of winding streets filled with charming adobe shops, historic buildings and restaurants. It was dubbed by the Santa Fe Visiting Guide as one of the countries "most famous walking cities".[12]

## 2.1 Biking and Walking Opportunities in Santa Fe

In a survey done in 2003 by the Department of Transportation Bureau of Transportation Statistics, 1000 respondents were asked the reasons for which they walk: 60% used it as a means of exercise, 20% used it for personal errands, 10% use it for recreational purposes, 6% use it for commuting to work or school, and 4% are required to walk for work.[13] As the survey shows, exercise is the most frequent reason for walking. Walking has many health benefits. Another study performed by the city of Cambridge Massachusetts in 2004 showed that walking improves circulation and breathing, combats depression, bolsters the immune system, controls weight and helps prevent osteoporosis and diabetes.[14] Walking also provides transcendental personal benefits. According to walking.org, "it is the regular rhythmical action of walking that drains away tension from our muscles and leaves us with a

[9] Santa Fe, NM Convention and Visitors Bureau. (2011) "About Santa Fe." Accessed 02/20/2011 *http://santafe.org/Visiting_Santa_Fe/About_Santa_Fe/index.html*

[10] Cheek, L. (2003). In Zimmerman N. (ED.), Santa Fe (4th ed.). New York: Compass American Guides pg. 98.

[11] Cheek (2003), 99.

[12] Santa Fe, NM Convention and Visitors Bureau. (2011). "The official travel site of santa fe, nm." Accessed 02/02/2011 *http://santafe.org/Visiting_Santa_Fe/Free_Walking_Tours/index.html*

[13] Walking.org. (2011). "Why do People Walk." Accessed 04/02/2011 *http://www.walkinginfo.org/faqs/answer.cfm?id=29*

[14] Community Development Department, City of Cambridge, Massachusetts. (2004). "The health benefits of walking. Accessed 02/02/2011 *http://www2.cambridgema.gov/cdd/et/ped/ped_hlth.html*

feeling of pleasant tiredness and a calm, clear mind".[15]

Despite the many benefits of walking, the company Movoto conducted a poll of 600 people in Santa Fe that showed that only 5% chose walking or biking as a means of transportation to work (Figure 4).[16] Although neither walking nor biking are common means of commuting to work, the Santa Fe Metropolitan Planning Organization (MPO) still encourages eco-friendly means of transportation.

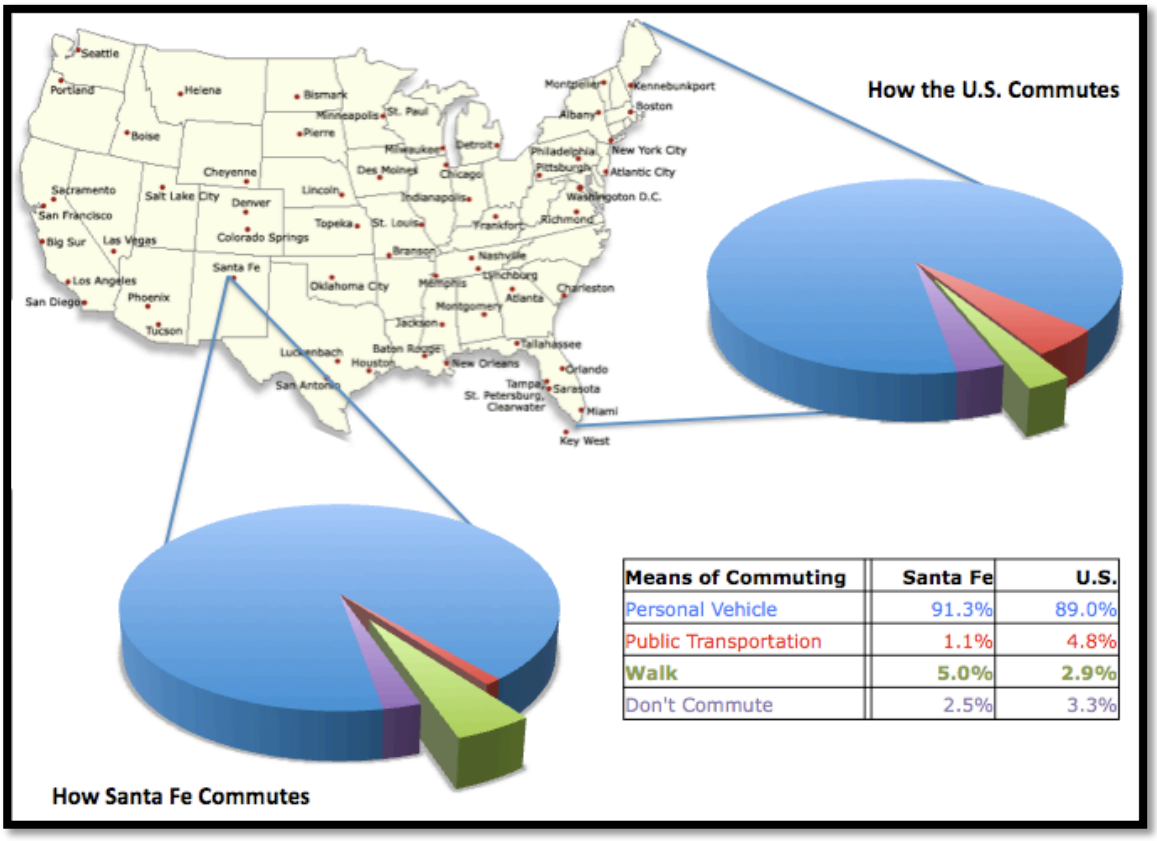



Figure 4: Commuting to Work

Regular biking can decrease the risk of heart disease, which is one of the top causes of death in the United States.[17] Biking also helps lower blood pressure and cholesterol.[18] The low impact-activity of biking provides a healthy workout and an environmentally sound means of transportation.

The city of Santa Fe consists of a vast trail network. Four of the largest multi-use trails are the Rail Trail, River Trail, Acequia Trail, and Arroyo de Los Chamisos Trail. The Rail Trail is a paved multi-use

[15] Walking.org. (2011). "Walking to reduce stress." Accessed 2/22/2011
*http://www.walking.org/walking-for-fitness/stress/reduce-stress/*

[16] Movoto. (2004). "Neighborhood search by address: santa fe." Accessed 02/01/2011
*http://www.movoto.com/neighborhood/tn/santa-fe/38482.htm*

[17] Adult Bicycling. (2009). "Fitness Benefits of Biking." Accessed 04/16/2011
*http://www.adultbicycling.com/component/content/article/9-bicycling-basics/16-fitness-benefits-of-biking.html*

[18] Adult Bicycling. (2009).

trail that extends from "Zia Road to I-25, from Siringo Road to Alta Vista, and from Alarid to the Railyard Rail Station".[19] Several extensions of the Rail Trail were completed this past year. The River Trail is a multi-use paved trail from St. Francis Drive to Don Jose Street that was extended by the city in 2009-2010. The city proposes to extend the River Trail to Frenchy's Field by the end of 2011. The Acequia Trail extends from Ashbough Park and meets the Rail Trail at Cerrillos. The design of this trail is still in progress. The Arroyo de Los Chamisos Trail meets the Rail Trail at Siringo and extends slightly past the Santa Fe Place. Other multi-use trails are found in various parks and subdivisions in the city.[20]

## 2.2 Organizations Promoting Trail Usage in Santa Fe

There are three organizations that work to promote trail usage in Santa Fe. These organizations include the Metropolitan Planning Organization, the Bicycle and Trails Advisory Committee and the Trails Alliance of Santa Fe.

### 2.2.1 The Metropolitan Planning Organization

The Metropolitan Planning Organization's (MPO) mission is to "promote interconnected transportation options" in the city of Santa Fe (Figure 5).[21] In the 2010 Transportation Plan, they propose updates for pedestrian and biking trailway systems. They plan to expand bikeway trails to encourage walking and biking as a means of transportation and suggest enhancements to the pedestrian system infrastructure. The MPO argues, "For a wide variety of bicyclists and other non-motorized users, a system of multi-use trails on alignments distinct from the road network can create enhanced opportunities both for transportation as well as recreation purposes".[22] These proposed multi-use trails must meet the engineering requirements of 10 feet in width and the American with Disabilities Act (ADA) surface requirements.

Figure 5: Santa Fe Metropolitan Planning Organization

The work of the MPO has also led to the creation of the Bikeways and Trails Safety Map in 2008 (Figure 6). This map promotes safe guidance to cyclist and pedestrians looking for multi-use trails away from the metropolitan roads of Santa Fe. The map displays paved, unpaved, and defined trails in the

[19] Santa Fe Metropolitan Planning Organization. (2007). "Bicycle master plan."
[20] Santa Fe Metropolitan Planning Organization. (2007). "Bicycle master plan."
[21] Santa Fe Metropolitan Planning Organization. (2007). "Home." Accessed 04/28/2011 *http://santafempo.org/*
[22] Santa Fe Metropolitan Planning Organization. (2007). "Home."

Greater Santa Fe Area and promotes the benefits of biking, exemplifying it as an ideal alternative form of transportation.

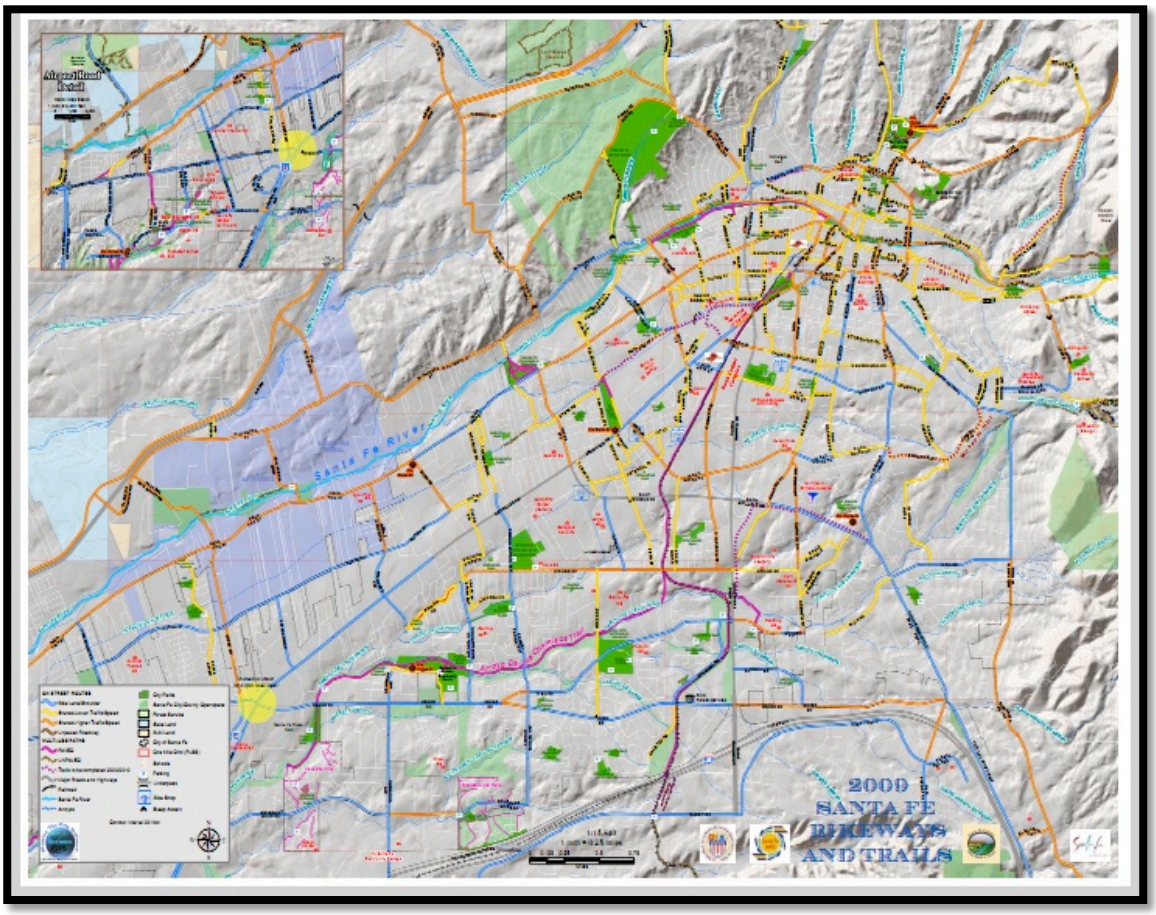



Figure 6: 2009 Santa Fe Bikeways and Trails Map

The Technical Coordinating Committee (TCC) serves in an advisory capacity to the Transportation Policy Board.[23] The main functions of the TCC are to ensure coordination among various agencies and to provide policy and project recommendations for the MPO Transportation Policy Board. Some other functions of the TCC are listed below:

1. Review and recommend amendments/updates to many agencies and programs
2. Carry out directives from the MPO Transportation Policy Board
3. Provide guidance and annual reports on the adequacy of the urban transportation processed
4. Review the MPO Boundary and make recommendations and revisions[24]

[23] Santa Fe Metropolitan Planning Organization. (2007). "Technical coordinating committee." Accessed 04/28/2011 *http://santafempo.org/committees/tcc/*

[24] Santa Fe Metropolitan Planning Organization. (2007). "Technical coordinating committee."

### 2.2.2 The Bicycle and Trails Advisory Committee

In September 2003, the Bicycle and Trail Advisory Committee (BTAC) was formed by the City Council Resolution 2003-87. It was created to fulfill the need to "evaluate the City's 1993 Bicycle Master Plan and the trail portion of the Parks, Open Space and Trails Recreation Master Plan and advise city staff on measures needed to expedite the plans' implementation".[25] Part of their duties to the City of Santa Fe are to help prioritize the different organizations projects with the Capital Improvements Program (CIP) funding, review construction plans, review allocation of funds for improvements and seek funding through CIP, state or federal funds.[26] The committee meets once a month and, at the beginning of each meeting, addresses the issues presented from the community. The BTAC is not just involved in city projects but also the community interests and will allocate funding if they see fit to those personal interests.

### 2.2.3 The Trails Alliance of Santa Fe

The Trails Alliance of Santa Fe is a volunteer organization that strives to plan, build and maintain the non-motorized trails in Santa Fe. Their goals include establishing sustainable paths, promoting the education and etiquette of path usage, informing the community about available trails, supporting land management agencies, and sharing information about the benefits of the trails to the community.[27] This organization's website shares information about other groups with similar causes, allowing for interaction and networking between local groups in the area. The website allows people to report their volunteer work hours and provides a resource for people to report trail maintenance needs, giving the alliance a way to locate the site in need. The Trails Alliance calendar provides information about events in which the organization is involved, such as planned volunteer work. Finally, the Trails Alliance is in contact with the Bicycles and Trails Advisory Committee to promote events and inform the community about trail issues.

## 2.3 Programs and Plans Promoting Trail Usage in Santa Fe

There have been new creative ways to encourage walking, such as the implemented Prescription Trail Program in Santa Fe. This program is designed to increase walking on suggested handicap accessible routes in Santa Fe to promote healthy lifestyles. Patients receive walking prescriptions from their health-care provider's bases on their current physical condition.

The city of Santa Fe offers a Prescription Trails walking guide that lists city parks and open trails

[25] The City of Santa Fe. "BTAC committee mission, membership and current agendas." Accessed 04/25/2011 *http://www.santafenm.gov/index.aspx?NID=1828*

[26] The City of Santa Fe. "BTAC committee mission, membership and current agendas."

[27] Trails Alliance of Santa Fe. (2011). "Trails alliance of santa fe." Accessed 05/02/2011 *http://trailsallianceofsantafe.org/*

by zip code. This guide makes it easier for residents to find options for walking in different areas of the city.[28] Each trail is identified according to its level of difficulty. Most are loops that go around a park. A trail that is Grade 1 is fully accessible to all users. These trails are usually flat, paved trailways that are located in or around a park, which are suitable for wheelchairs. A Grade 2 trail is mostly accessible and is usually paved. Furthermore, a Grade 3 trail is slightly challenging. These trails are paved or unpaved with variations in grade.[29] An example of a trail description and map from the Prescription Trails walking guide is shown in Figure 7.

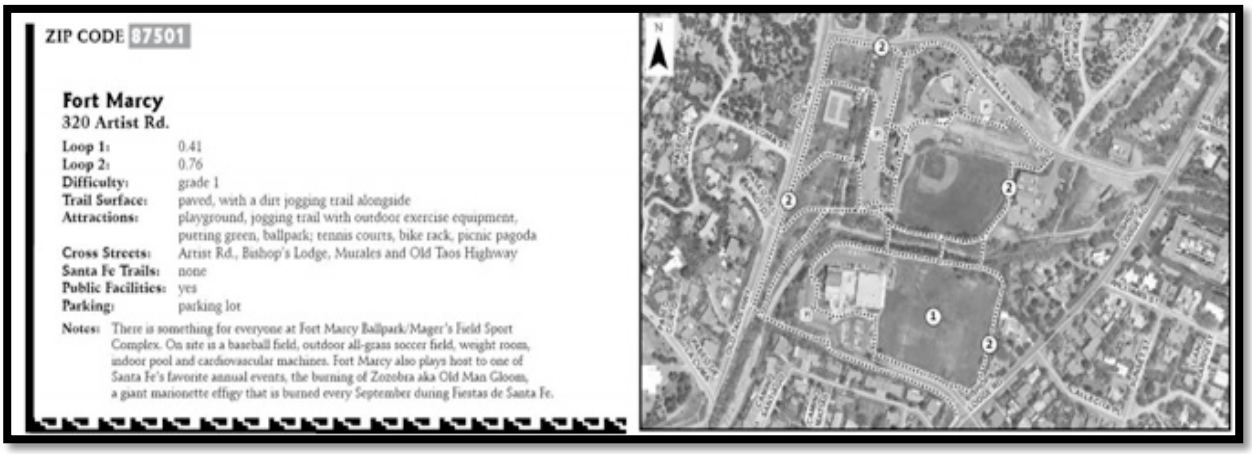



**Figure 7: Fort Marcy Prescription Trail**

The MPO is working with the New Mexico Department of Health to further develop the Prescription Trails Program in the Santa Fe area and with other public health groups promoting active transportation. The MPO proposes expanding the program to identify improvements to the pedestrian system to "allow people to make walking part of their daily transportation mode."[30]

Santa Fe voters passed a bill in 2008 that authorized $30 million dollars in bonds to the city's parks and trails. This campaign, "VOTE YES! Santa Fe Parks and Trails," proposed to use the money to improve the parks and trails and increase the availability of outdoor recreation by expanding and revitalizing the existing structures.[31] To do this, the bill proposed expanding and improving the parks and trails in each of the city's districts (Figure 8), connecting and expanding the walking, biking and running trails and improving the parks. The benefits proposed by the bill include improved trails, updated water irrigation, and updated playgrounds, ball fields and parks for users of all ages.[32] This $30 million

[28] New Mexico Department of Health. (2010). "Facts about the prescription trails program." Accessed 02/13/2011 *http://www.diabetesnm.org/programs/documents/Rx%20Trails/Fact%20Sheet%20SF.pdf*
[29] Prescription Trails New Mexico. (2011). Accessed 02/04/2011 *http://prescriptiontrails.org/index/index.shtm*
[30] Santa Fe Metropolitan Planning Organization. (2007). "Bicycle master plan."
[31] VOTE YES! Santa Fe Parks and Trails. (2008). Accessed 02/01/2011
[32] VOTE YES! Santa Fe Parks and Trails. (2008). Accessed 02/01/2011

bond passed in 2009 included substantial support ($7 million[33]) for construction of trails.[34] This is being distributed through the 2009 Parks Master Plan.[35]

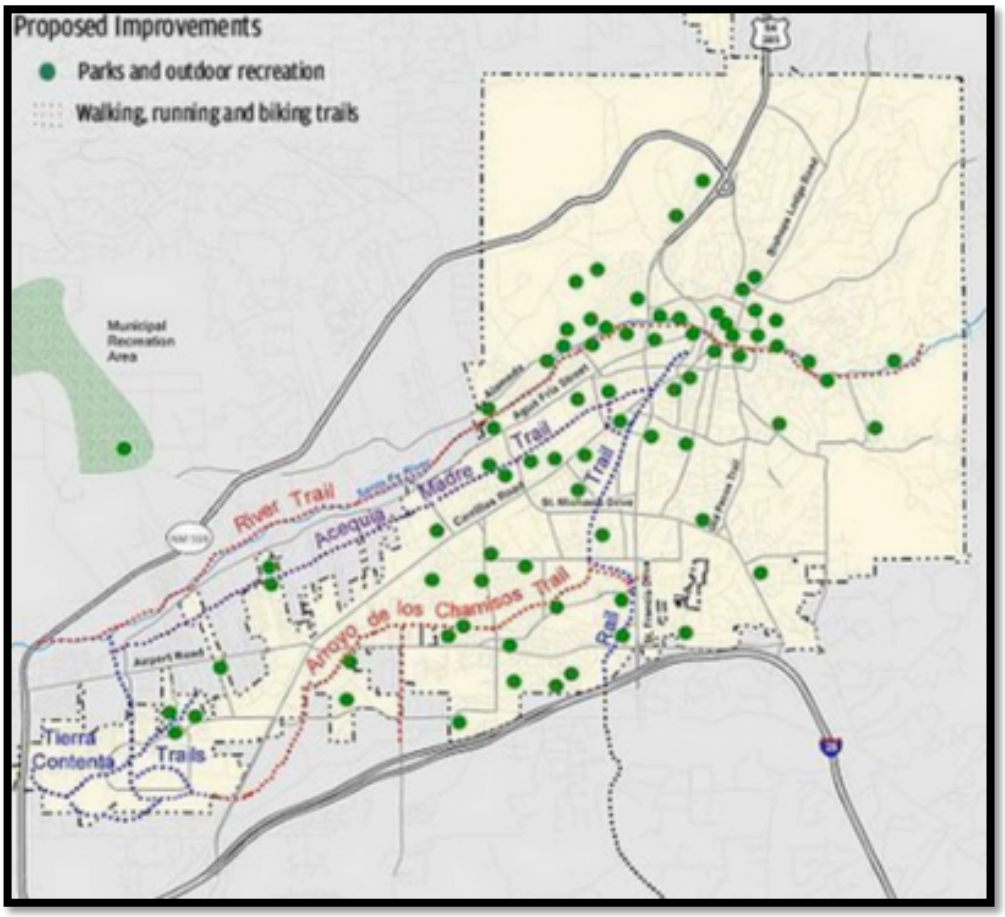



Figure 8: VOTE YES! Proposed Trail Improvements

## 2.4 Social Networking Tools

Social networks are resources for people to communicate and interact with one another, in addition to sharing information about day-to-day life. Facebook is the world's largest and most frequently used social network.[36] According to the Facebook Press Room, there are over 500 million active users of this website worldwide.[37] It allows the user to "friend" people, create groups of common interests, plan events, and access a plethora of other applications.

Social networking is also surging due to the increase of Smartphone users. Social networking

[33] Wilson, Keith. Interview. 03/22/2011
[34] VOTE YES! Santa Fe Parks and Trails. (2008).
[35] The City of Santa Fe. "2009 parks master plan."
[36] Facebook. (2011). *"Press Room Statistics."* Accessed 02/12/2011 *http://www.facebook.com/press/info.php?statistics.*
[37] Facebook. (2011).

usage on smartphones has skyrocketed by 187% to over 18 million users in July 2009.[38] The increase allowed social networking sites to account for 32% of all Smartphone activity during the year. Facebook was the most popular social network, followed by Myspace and Twitter. The three sites consisted of 26 percent, 13 percent and 7 percent of Smartphone users respectively.[39]

TNS found that, on average, users spend 3.1 hours a week on social networking through mobile devices and 2.2 hours on email. "The increased need for instant gratification as well as the ability to offer multiple messaging formats, including the instant message or update function gives evidence for the growing popularity of social networking on mobile devices," the report said.[40] TNS predicts consumers to spend even more time social networking on smartphones, moving over from computers. According to the study, social networking is emerging as an enduring form of communication in an increasingly mobile culture.

[38] ADWEEK. (2009)."Smartphone social networking surges." Accessed 05/02/2011
*http://www.adweek.com/news/technology/smartphone-social-networking-surges-100440*
[39] ADWEEK. (2009).
[40] MOBILEDIA. (2010). "Smartphones push growth of social networks." Accessed 05/02/2011
*http://www.mobiledia.com/news/75272.html*

# 3. Methodology

The purpose of this project is to facilitate the accessibility and use of the multi-use trails in Santa Fe while promoting social interaction among trail users. To complete this mission, three objectives were developed. The objectives are

- To assess existing multi-use trails
- To promote accessibility and use of multi-use trails
- To facilitate social interaction on multi-use trails

For this project, the team first defined a trail. It was concluded that for the purposes of this work a trail excludes roads for motorized vehicles, sidewalks and hiking trails. A trail is a means to get from point A to point B that can be walked, run or biked on and has a definite direction. These trails include formal (Figure 9a) and informal trails (Figure 9b) that are publicly owned and maintained. Formal trails include paved multi-use trails; informal trails include unpaved trails that are unrecognized by the city of Santa Fe as means of transportation.


Figure 9: (a) Formal Trail, (b) Informal Trail

## 3.1 Assessing Currently Existing Trails

The team focused on five trails: Acequia Trail, Arroyo De Los Chamisos Trail, Calle Lorca Southbridge Park Trails, Rail Trail and River Trail. The Acequia Trail, Arroyo De Los Chamisos Trail, Rail Trail and River Trail are formal trails, while the Calle Lorca Park Trails are informal. These formal trails were chosen because they were the main multi-use trail arteries in the City of Santa Fe. They are also

featured on the MPO's Master Biking Plan and will receive funds from the 2009 Parks Master Plan (Appendix A). The Calle Lorca Southbridge Park trails were chosen for this project because of their potential connection to the Rail Trail and multiple connections to different neighborhoods.

As a result from utilizing the GPS capabilities of Google My Tracks, the following tracks were recorded and exported as previously mentioned. The five trails that were exported are color coded for easy identification and designated as follows (Figure 10a):

- Magenta represents the River Trail
- Green represents the Acequia Trail
- Blue represents the Rail Trail
- Red represents the Arroyo De Los Chamisos Trail
- Orange represents the Calle Lorca Park Trails.

The map on the right (Figure 10b) represents the mapped trails with respect to the citywide trail system with red representing the assessed trails and blue representing the entire trail system.

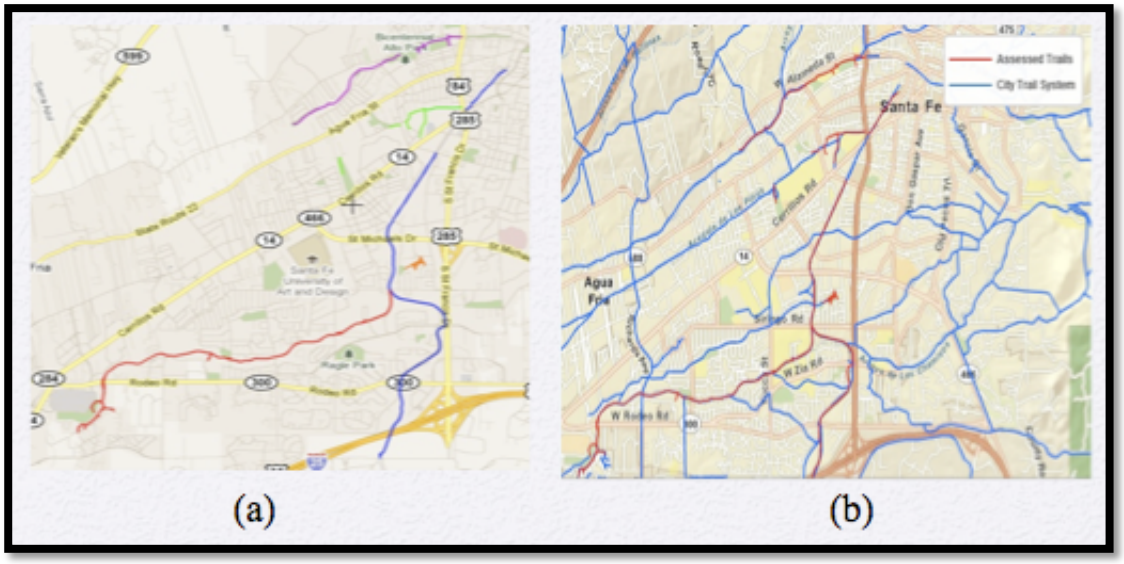



**Figure 10: (a) Color Coded Trail Map, (b) Trail System**

To assess these currently existing trails, the team researched the various available trail-monitoring methods. The census-based approach employs sectional evaluations where a trail is divided into sections with assessments made for each segment.[41] The team used the census-based approach, applying this method to both formal and informal trails. Trail assessments were divided among various segments of a particular trail. A segment was defined as an intersection with a road or another trail. For

[41] Marion, Jeffrey L., Leung Y., Nepal, S. K. (2006). "Monitoring trail conditions: New methodological considerations." No. 23. Accessed 02/11/2011 *http://www.georgewright.org/232marion.pdf*

example, the evaluation of Trail A in Figure 11 includes three separate assessments according to segments. Each trail segment was assigned an individual code. Assessments were completed using a developed trail assessment form (Appendix B).

Each trail segment was assigned an identification code. The segment identification consisted of two parts: the initials of the trail and a numerical portion based on the location of the segment. The segments were numbered from downtown Santa Fe outbound. The side segments off the main trails were labeled using a lettering system from downtown Santa Fe outbound. The Rail Trail runs across the city so the segments were numbered from West to East. The West to East labeling was chosen because the western portions of the Rail Trail are formal and the trail is expanding to the East. A map showing the segments and their identification is located in Results section 4.1.2.

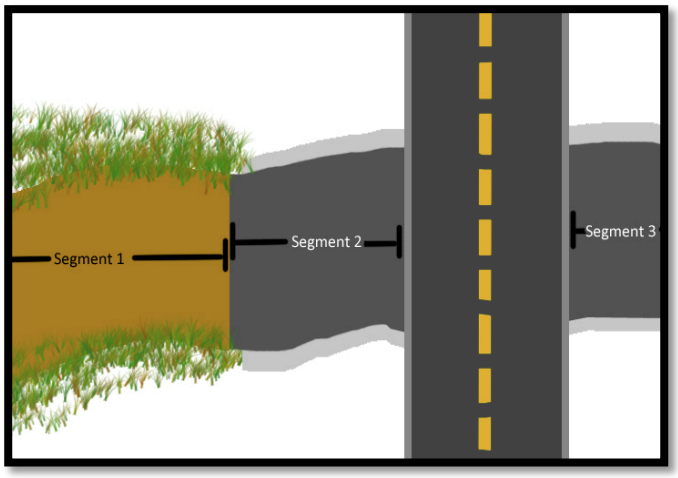



Figure 11: Segment Schematic

The trail assessment form has several sections: trail surface, potential barriers/obstacles, amenities, and existing and potential trailhead locations. The trail surface options were paved, sand, gravel, compact soil or concrete. The potential barriers/obstacles noted surface erosion, difficult trail access, overgrown/maintenance and bollards. A bollard is a short post used to divert motor vehicles from a non-motorized trail. The amenities recorded on the assessment form included benches/picnic tables, bike parking, dog-waste stations, trashcans and water fountains. The data from each assessment form was placed into an electronic chart. Each chart was attached to its corresponding segment on an interactive map. When a segment is selected on the interactive map, the trail assessment chart appears.

Technological tools were also utilized in fulfilling this objective. Digital photography played an important role in visualizing current trails. At the end of every trail segment, the team took pictures of various aspects such as currently existing trail signs. Pictures were also taken during assessments. Google My Tracks is an application that lets users see their location and progress on a map, monitor real-time statistics, view an elevation profile by time or distance and create waypoints. The team started the locator at the beginning of each trail segments, and stopped at the end of the segment, creating a track. Google My Tracks allowed the team to upload their tracks onto Google Maps, thus creating a layer

of trails. The team was effectively able to visualize the surveyed trails using these online tools.

GPS Location for iPhone was used for assessing the exact location of benches and bike parking. When an amenity was found, the team would record the exact latitude and longitude points of the location and later export these from Excel to Google Maps. The Excel sheet of the data can be found in Appendix C.

The same GPS Location technology was used for locating bollards. This data was recorded in an Excel file to be loaded on Google Maps. For each bollard, measurements were taken of the distance between bollards (Figure 12a) or the distance from the bollard to the edge of the trail (Figure 12b). Once all points were loaded onto Google Maps, the map became interactive when photos for each bollard were added to the coinciding point marker. Additionally the measurements of the bollard spacing were recorded. This map is designed for the Metropolitan Planning Organization and the City of Santa Fe to keep track of their current locations and to make sure they are up to code with spacing requirements. This map can be viewed in the Results portion of this report.

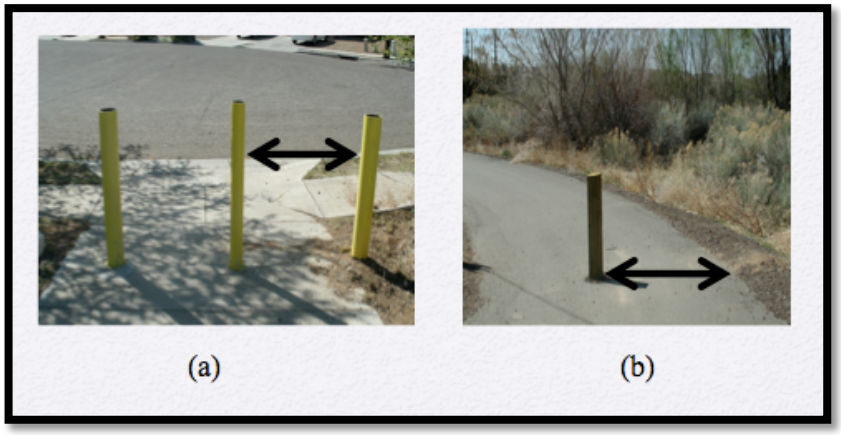



Figure 12: (a) Bollard to Bollard Spacing, (b) Bollard to Trail Edge Spacing

## 3.2 Promoting Accessibility and Use of Multi-Use Trails

In order to promote accessibility, a map detailing the five assessed trails was created. Google My Tracks consisted of an option to convert various segments of the five assessed trails into Keyhole Markup Language (KML) files. This extension was developed for use with Google platforms such as Google Earth and Google Maps. KML files specify sets of information that include placemarkers, lines, polygons, and 2- or 3-dimensional models. A KML file was created for each assessed segment and then compiled on Google Fusion Tables. This compiled information was then exported onto a custom web-based Google Map creation tool, known as Scribble Maps Pro. Due to minor inaccuracy of the GPS capabilities of Google My Tracks, several trails were re-drawn to accurately reflect positioning. The

custom created Google map was then directly exported to Google My Maps using Scribble Maps Pro.

Using existing bike route GIS layers from the city, the team also recreated an interactive version of the Santa Fe Bikeways and Trails Map that was issued by the Metropolitan Planning Organization in 2009. The GIS layers were exported onto a web-based GIS software known as GIS Cloud for visualization. The necessary layers were then exported as KML files for use with Google Earth and Google Maps. Using Scribble Maps Pro, the interactive map was colored according to the legend on the existing map. This map can be seen in the results section of the report.

The team created a bench layer and updated the city's bike parking layer by collecting various GPS coordinates of these amenities using GPS location. This interactive map was created to simplify travel, avoiding carrying a paper-issued map.

As mentioned, the map was created using Scribble Maps Pro and exported to Google Maps for web implementation. An updatable visual database is implemented if city officials were to login onto the specific Scribble Maps Pro account that the team created. Layers of the map can be turned on and off for visualizations and can be exported directly onto Google Maps and Google Earth. Scribble Maps Pro also consists of a feature that allows the user to embed the map onto an html webpage with a specific code (Figure 13).

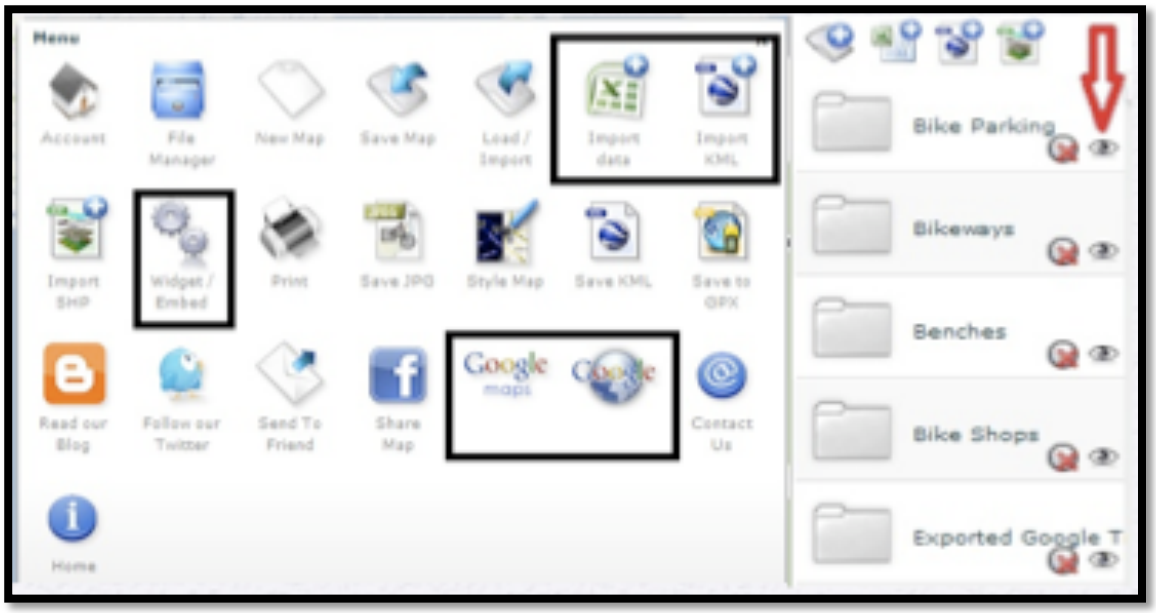



**Figure 13: Scribble Maps Features**

The city has the ability to add/remove/organize GIS layers, including benches, bike parking, and bike shops, if layers consist of the KML extension. Data on excel spreadsheets can also be imported on the Scribble Maps Pro database as long as the data is entered with latitude and longitude coordinates

and/or a specific address. Please refer to Appendix D of the report for more details on how to use Scribble Maps Pro.

After assessing the trails from Objective 1, the team had developed a plan to propose new sign locations. First, criteria were created to justify the locations for potential signage. The criteria are as follows:

- At the two endpoints of the trail if a trailhead currently does not exist
- At an intersection with no current existing signage
- At a point where there is break in the trail that continues at a different location

Following the criteria and using the map of the five assessed trails previously mentioned, 10 sign locations were proposed. This map will help the city of Santa Fe plan where future signage is needed, which will eventually help the public better access the trails. This map can be viewed in the Results section of this report. Designs for the proposed trail signs were developed in conjunction with a local university.

The team worked with a design class, titled HumanXNature, taught by Professor Maggie Macnab from the Santa Fe University of Art and Design (SFUAD) (Figure 14). With Professor Macnab, the team created a list of assets for the class to develop over the second half of the semester. The class was broken up into four groups with one team member as a facilitator, to go out and analyze a designated trail. The trails chosen for the class were the Acequia, Calle Lorca, Rail, and River Trails. The team assigned and obtained the following assets from the class:

Figure 14: Santa Fe University of Art and Design

- A logo for the smartphone app (See Section 3.3)
- A logo for the group's designated trail
- A trailhead design involving the created trail logo
- A rack card design to be placed at the signage that provides information about the trail

All SFUAD designs may be viewed in the Results section of this report.

## 3.3 Facilitating Social Interaction on Multi-Use Trails

With the increase in technological application and society's growing dependency on these innovations, social interaction on multi-use trails would be enhanced by the application of technological tools. The team proposed a Smartphone application mock-up using combining navigation and social interaction. A mock-up provides a visual prototype that displays the intended function of a technological

system, allowing the team to create a strong-working concept of the application in the allotted time. The Smartphone application design, “GO Santa Fe,” makes use of four main functions to enhance trail promotion, accessibility, safety and social interaction among users. These functions are Navigation, Travel Log, Social Map, and Profile. The design of this application was created using Adobe Photoshop. The use of Photoshop allowed the team to create a visual layout of the application screens that display the use and functionality of the application.

To create the mock-up, Droid phone pictures were downloaded and edited in Photoshop allowing the team to create the screenshots. Before beginning to invest time in Photoshop, the team brainstormed and created a drawn visual to conceptualize the needed screens to display the functions of the application. During the brainstorming process, the team designed the initial concept with the intention of allowing users to receive the most beneficial features through minimal input into the device. The team also kept in mind the technological capabilities of Smartphone’s that would lend themselves to navigation and location. The end result will be a thought-out design that a future team may later code, implement and distribute.

# 4. Results and Analysis

The results of this project are divided into three sections: assessing and accessibility of trails and social networking among trail users. Results were created for each of these sections. Interactive maps for the assessed trails, the trail segments and the bollards were created as a result of assessing the trails. The interactive sign location proposal and amenities map were created as a result of assessing the trails while the Smartphone mock-up was for social networking.

## 4.1 Trail Assessments

The team produced three results from assessing the chosen trails. These results include an assessed trails map, the segmented informational map and the bollard map.

### 4.1.1 Segmented Map

The following interactive map consists of the five trails that the team assessed along with the different segments associated with each of these five trails (Figure 15). The blue placemarkers represent the start and end points of segments. At the end of each segment, a chart with details about the specific segment is displayed onto the screen. As mentioned before, segments were numbered from downtown Santa Fe outbound, while side segments and access points were labeled with a lettering system (Figure 16).

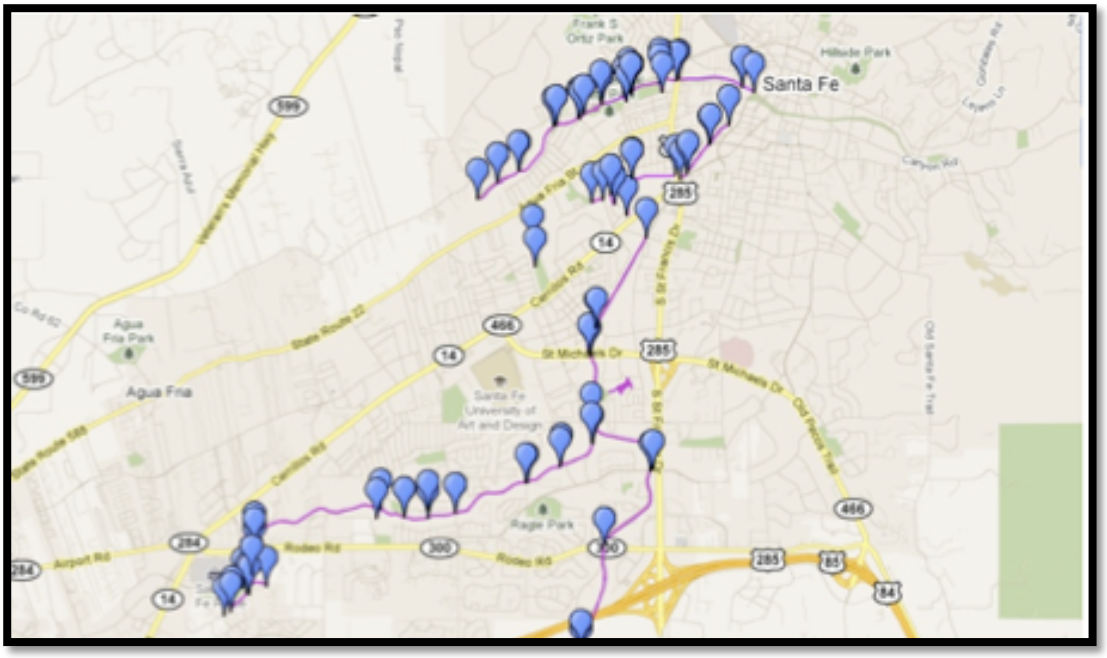



Figure 15: Segmented Map


Figure 16: Naming Segments

#### *4.1.1.1 Arroyo De Los Chamisos*

From analyzing the Arroyo De Los Chamisos charts it was prevalent that this trail was more accessible then most. The entire length was paved, with the exception of bridges, and was easily accessible. For most segments that met with a road, there was a sign labeled "Arroyo Chamisos Urban Trail." (Figure 17) At the start of the trail, at segment 1, "AR_1," there was no sign, which is the location that needed it most since it intersects the Rail Trail. In terms of amenities, there were a frequent number of benches and trash receptacles. It also had periodic dog waste stations.


Figure 17: Arroyo Chamisos Urban Trail Sign

#### *4.1.1.2 Rail Trail Analysis*

The Rail Trail consisted of several issues that were hazardous to walkers and bikers. At the intersection of St. Michaels (end of segment RA_5), the walker/biker has to cross six lanes of high-speed traffic with no current crosswalk signal. In addition, at the end of segments RA_1 and RA_6, there is another instance where crossing is a hazard. As the railroad-crossing bar comes down to let the New Mexico Rail Runner pass, crossing is still hazardous to the walker/biker since the bar obstructs trail. Also

at the end of segment RA_1, unneeded bollards are obstructing the trail. This area of excessive bollards poses a potential hazard to trail users (Figure 18).


Figure 18: (a) Intersection of St. Michaels, (b) Intersection of Siringo

#### *4.1.1.3 River Trail Analysis*

It was obvious the River Trail was designed with the necessities of the user in mind. The River Trail was the only trail that had a water fountain. The trail offered dog waste stations, trashcans, bike parking and benches on more than half of the trail route segments. However, as the trail reaches St. Francis, the present gates pose hazards for cyclists as the handlebars of bicycles may get stuck in the gating. Furthermore, a couple segments further down the trail are unpaved and currently closed. Segment 5 begins as a gravel trail that shifts under the tires of the moving bicycle. Later, the gravel ends and becomes a steep dirt trail only accessible by walking due to roots (Figure 19).

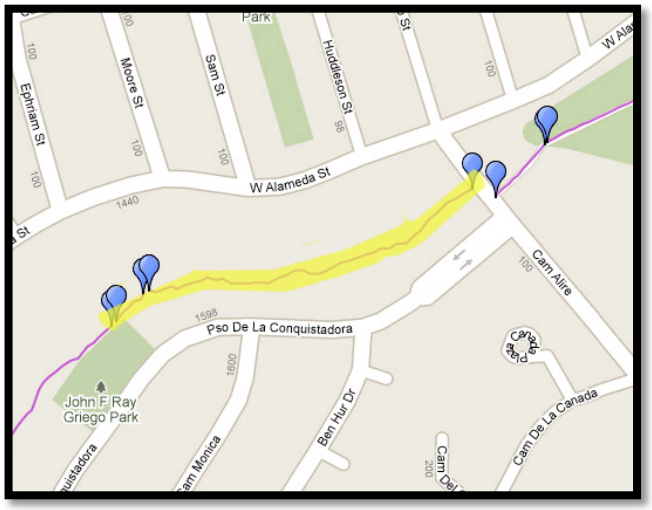



Figure 19: Gravel Section of River Trail

#### *4.1.1.4 Acequia Trail Analysis*

The Acequia Trail was newly paved. It contained one of the few biking parking options the team found on the assessed trails. Throughout the trail, there were stone pillars with plaques that said "Acequia Trail" on them. While this was aesthetically pleasing along the trail, it did not offer directional signage between the trail segments. The trail lacked signage on the 2 trail segments that are currently not connected to the main trail. One place lacking signage is between Baca Street and Potencia Street (Figure 20) and the other location lacking signage is between Montago Street and Ashbough Park (Figure 21).

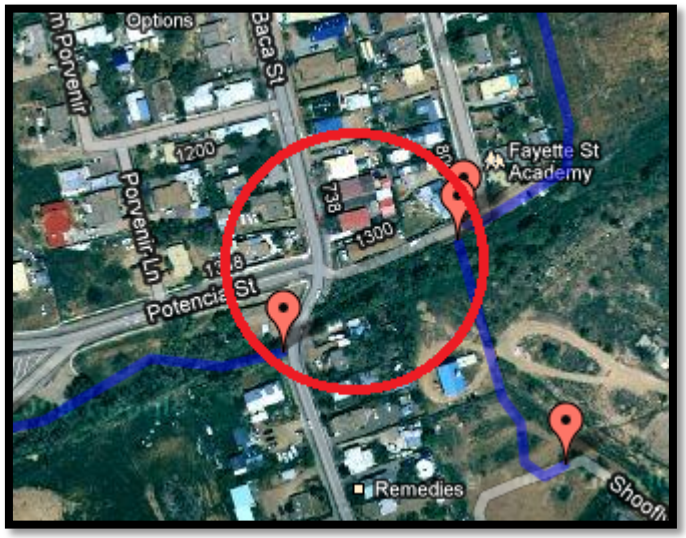



Figure 20: Bacca Street and Potencia Street


Figure 21: Montago Street and Ashbough Park

#### *4.1.1.5 Calle Lorca Trail Analysis*

The Calle Lorca Path assessment was unique because was the only trail that was not multi-use. These trails were all narrow dirt trails that are not ADA accessible. Evidence of much needed maintenance for this trail are exemplified in the overgrowth of bushes, erosion, and the condition of a rickety bridge that connects one part of the trails to the others across a ditch (Figure 22). It is important to note that this trail system provides a shortcut that connects three different neighborhoods.

Figure 22: Bridge on Calle Lorca Trail

### 4.1.2 Bollard Inventory

The map containing the bollard data is shown in Figure 23. The placemarkers represent every GPS location where bollards were found on the trails that were assessed. The map shown is a representation of the actual interactive map in which the placemarkers can be selected. Once selected a screen appears which displays a picture of the bollards and the spacing either between them or from the bollard to the side of the trail. This is shown in Figure 24.

The City of Santa Fe requires that the spacing from bollard to bollard or bollard to the edge of the trail must be a minimum of 5 feet. Additionally ADA requires that there be a minimum of 3 ft of spacing for bollards. When the team was completing fieldwork and taking bollard measurements, it was discovered that some of the city's bollards along the trails did not fit these regulations. The red placemarkers represent the bollards that do not fit correct ADA spacing requirements whereas the yellow placemarkers represent the bollards that do not fit correct city requirements. The green placemarkers represent the correctly spaced bollards along the assessed paths. Only 15 out of the 62 assessed bollard locations (24%) fulfilled bollard spacing requirements. This map was created for the MPO to be able visualize the exact location of wrongly spaced bollards within the city.

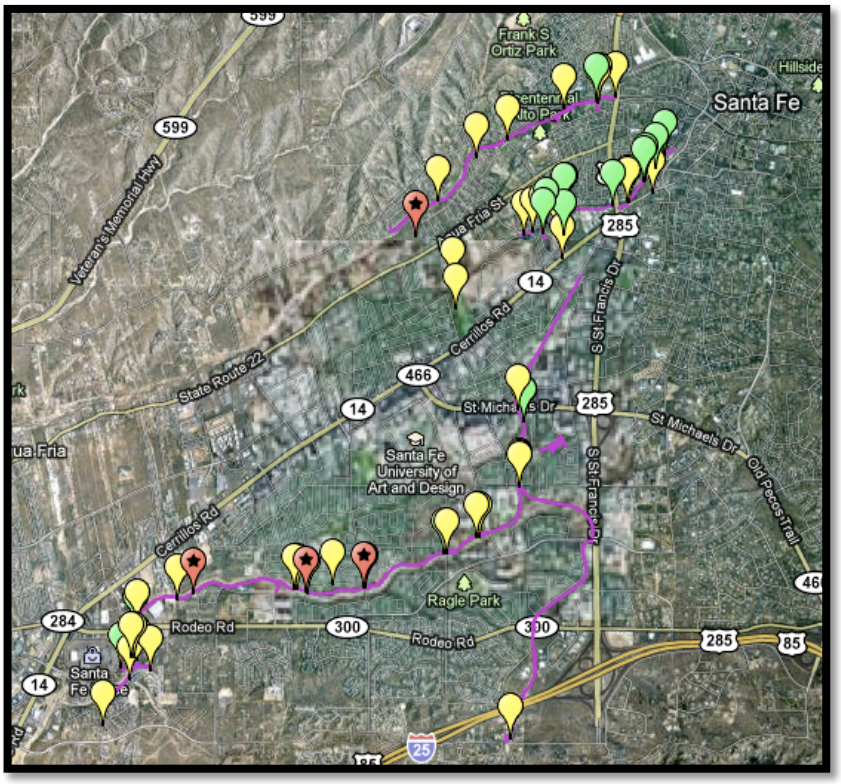



Figure 23: Collected Bollard Data


Figure 24: Interactive Bollard Map

## 4.2 Trail Accessibility

To facilitate accessibility, the team created interactive maps for sign location proposals and trail amenities, such as benches, bike parking and bike shops.

### 4.2.1 Sign Location Proposals

When the team was assessing the five trails, it was noted that some trail endpoints lacked signage and some intersections can be misinterpreted. A solution for this was a trailhead proposal map as shown in Figure 25. Following the criteria mentioned in Methodology 3.2.1, 10 sign placemarkers were added to the Assessed Trail Map at all the locations of interest. Photos and justifications can be viewed once the sign icon is selected on the interactive map as shown in Figure 26. This map is a proposal for the city of Santa Fe to visualize the areas of interest in which signage is needed. The following are proposed sites that would benefit from trailheads because these are the end points of the multi-use trails. Signs here would promote awareness of the location of trails.

- Rail Trail Downtown
- In the Calle Lorca Park
- Arroyo de los Chamisos near Santa Fe Place At these locations, the trail breaks.

The team proposed signage at these locations to notify people that the given trail continues. The reasons for the breaks in the trails are due to construction or gaps.

- River Trails before the gravel surface
- River Trail after gravel surface
- Rail Trail at the intersection of St Francis and Cerrillos
- Rail Trail at Alta Vista
- Acequia Trail at Montano
- Acequia Trail at Ashbaugh Park

A sign to be built in the following location was proposed to eliminate confusion among users. At the following location, two trails interest. The proposed sign would allow trail users easier navigability of these trails.

- Rail Trails/Arroyo de Los Chamisos Trail at Siringo

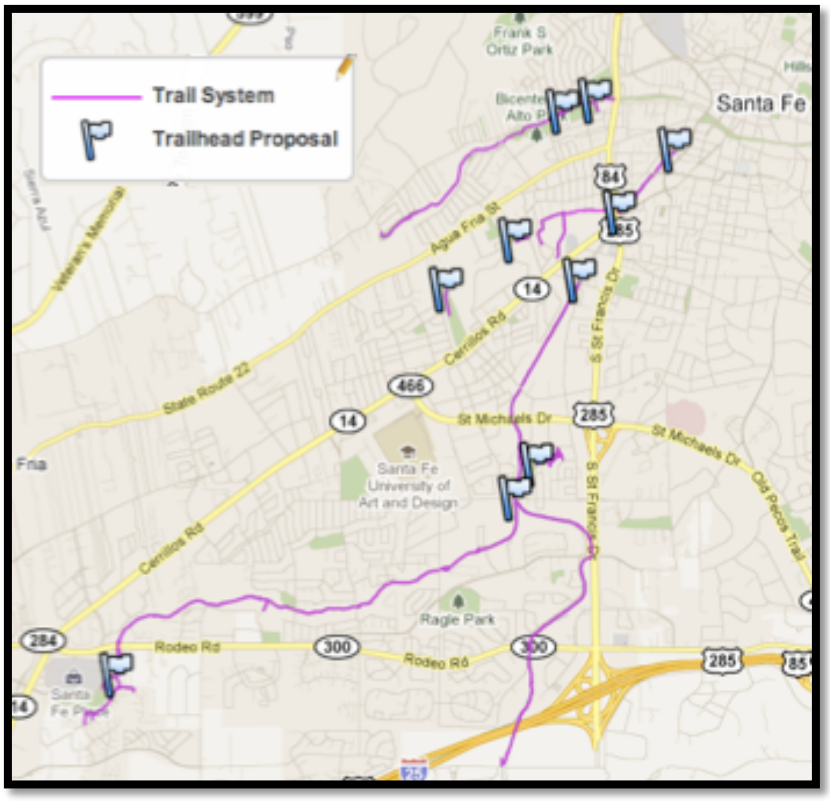



Figure 25: Sign Location Proposal Map

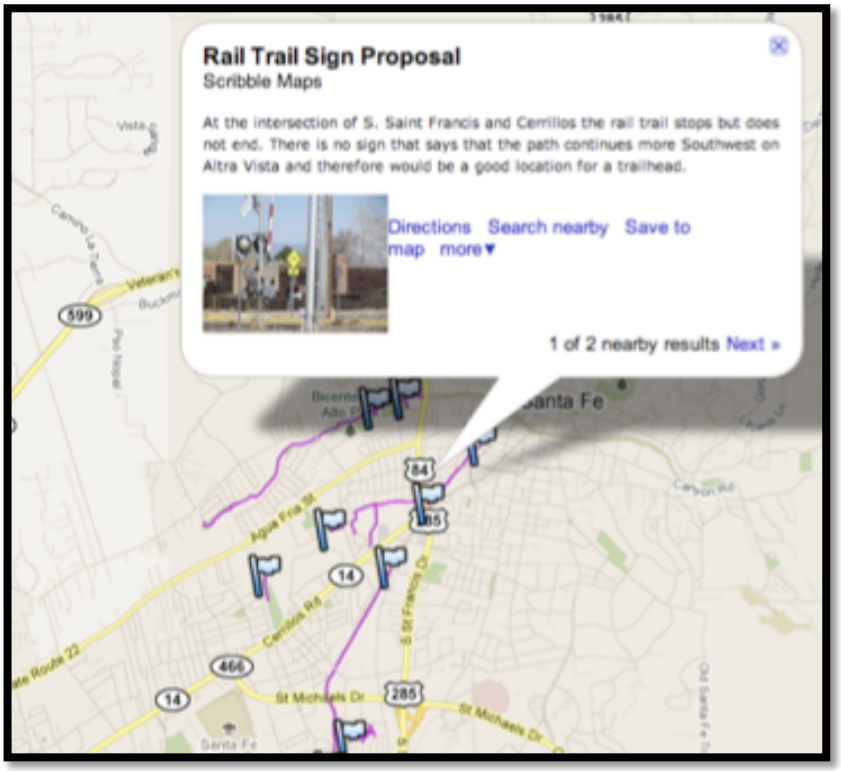



Figure 26: Interactive Sign Location Proposal Map

These proposals inspired trailhead designs from the Santa Fe University of Art and Design. Additionally students were asked to create rack-card and logo designs for each trail they assessed. The following Figures 27 to 30 are the trailhead designs, Figures 31 to 34 are the rack-card designs, and Figure 35 are the logo designs.


Figure 27: Calle Lorca Southbridge Park Trailhead Design


Figure 28: River Trailhead Design


Figure 29: Rail Trailhead Design

Figure 30: Acequia Trailhead Design

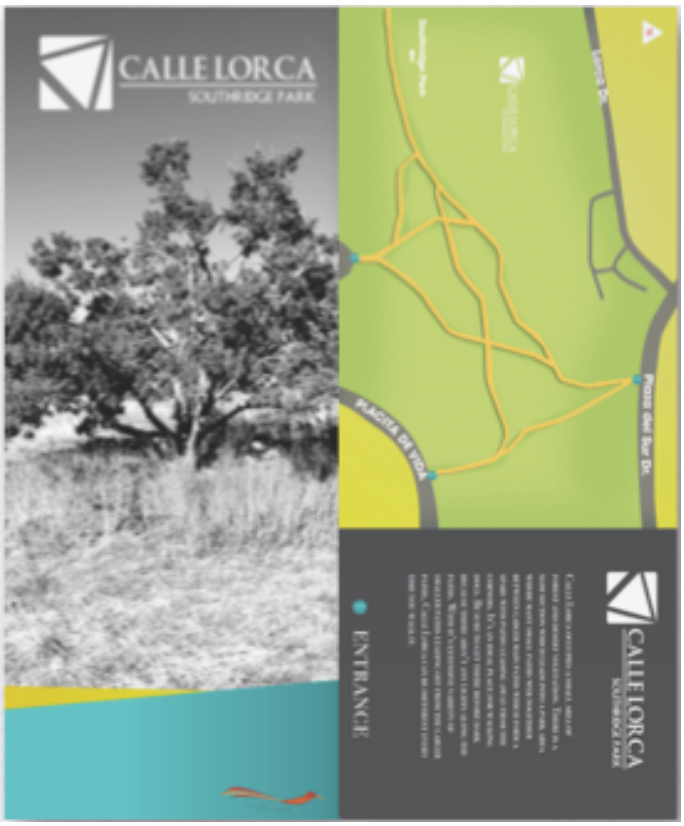



Figure 31: Calle Lorca Rack Card Design

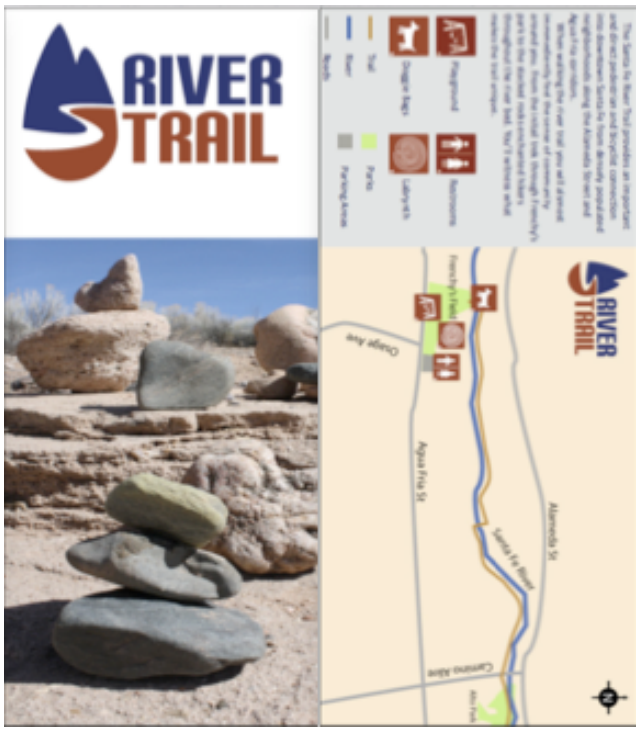



Figure 32: River Trail Rack Card Design


Figure 33: Rail Trail Rack Card Design


Figure 34: Acequia Trail Rack Card Design


Figure 35: Logo Designs

### 4.2.2 Amenities Inventory

An interactive map of the cities bikeways was created following the Santa Fe Bikeways and Trails Map designed by the MPO. Segments of the bikeways GIS layer were colored as follows:

- Blue representing a bike lane/shoulder
- Yellow representing a shared bike lane with lower traffic speed
- Orange representing a shared bike lane with higher traffic speed
- Magenta representing the trails that the team assessed

In addition to the recreated MPO Bikeways and Trails Map, a new layer for benches was created and the cities current bike parking and bike shops layers were updated. Benches are represented by green picnic bench placemarkers, while bike parking and bike shops are represented by red circles and green bicycle placemarkers respectively (Figure 36). When these placemarkers are selected, information regarding the specific point is displayed onto the screen. Figure 37 is an example of the displayed information for one of the bike shop placemarkers.

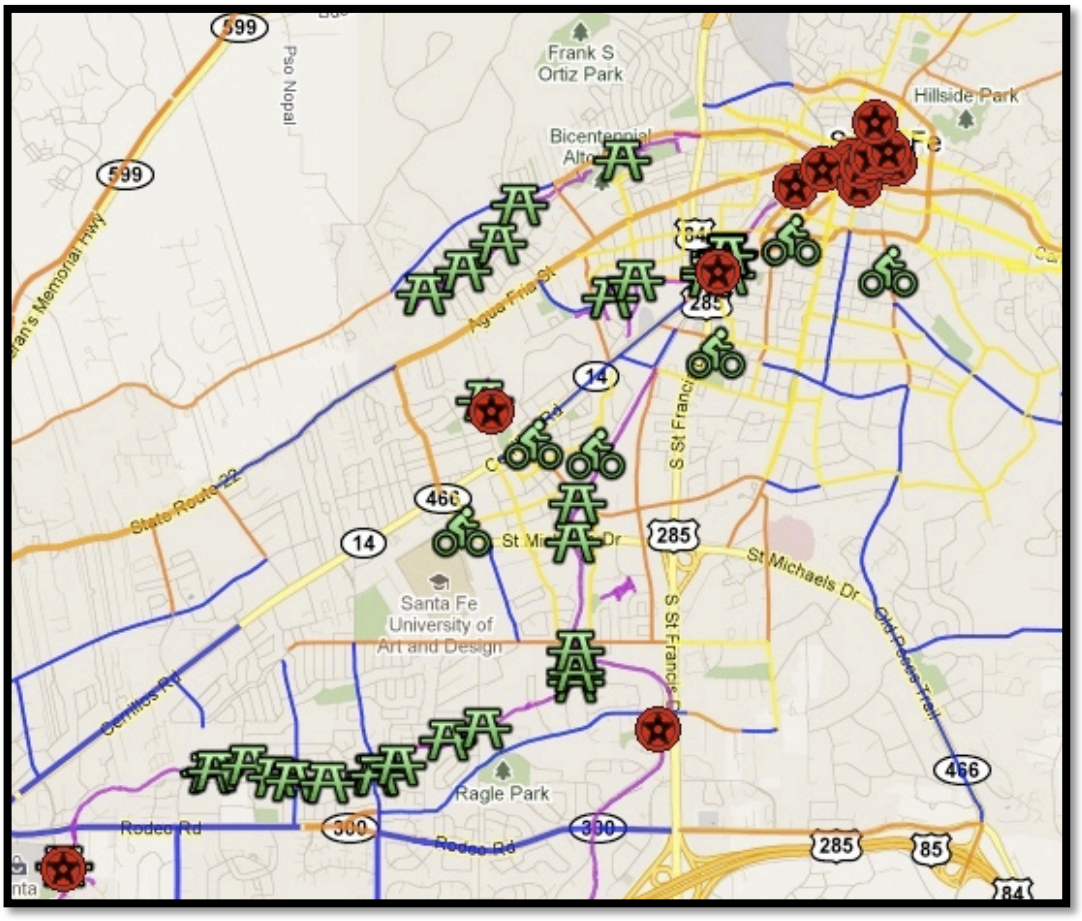



Figure 36: Amenities Map

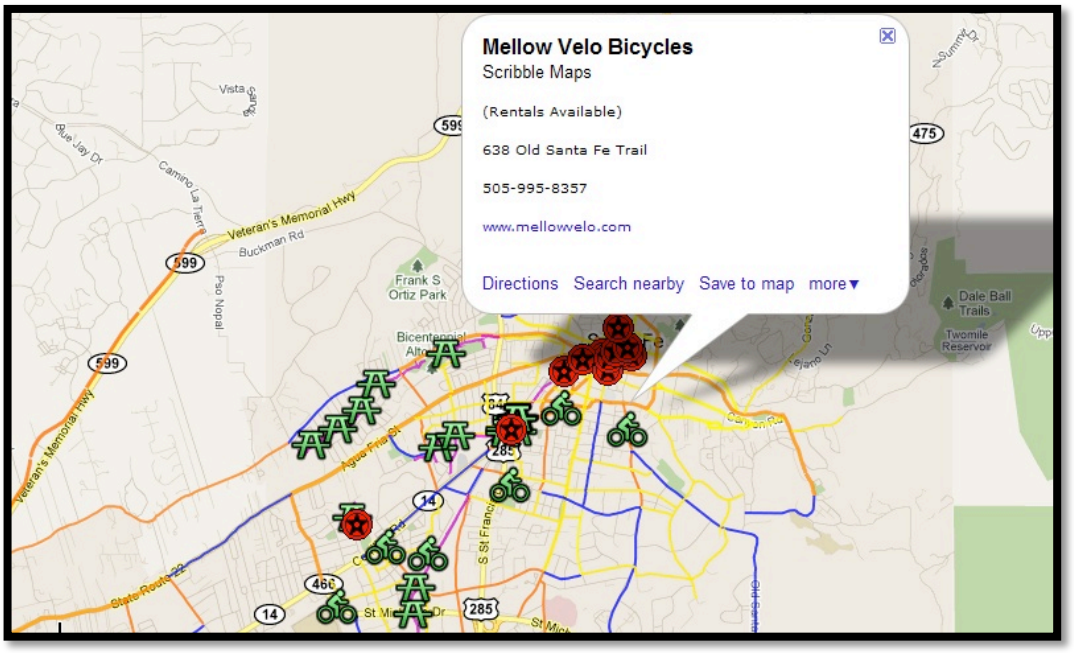



Figure 37: Amenities Map with Interactive Bike Shops

## 4.3 Social Networking

The main logo for the Smartphone application mockup was created by Fernando D. Garcia-Vergo from the University of Art and Design (Figure 38). We amended the original color scheme from blue to green for rhetorical purposes. Green is a color associated with 'Go' as seen in traffic lights. The utilization of the color green was used throughout the app. The application functions and screen layouts may be seen below. For the additional and filler screens, please refer to Appendix E.


Figure 38: GO Santa Fe

The Navigation tool provides a GPS, customizable with a calorimeter and travel distance keeper feature. The measurements of the calorimeter are calculated from the user's weight and activity type. The travel distance keeper records the calories the user has burned while documenting the length and trail of his or her journey. The data from these features are recorded in the Travel Log function, allowing the user to view his or her daily progress. To make accessing the trails easier, a layer for bus stops and a compass is included in the navigational system that the user may add to the GPS screen. Other layers of this function allow the user to view and locate points of interest on the map. The Navigation function also allows the user to search for locations and provides directions to reach the selected site. Once the

user reaches said destination, the app will prompt the user to “check in,” then the location will be saved into the travel log. Should the place be new or undocumented, the user may update the site catalogue by taking a picture and providing a name of the place.

This Navigation function (Figure 39) will also contain features to make trail usage safer. An emergency phone call button will be included that requires the user to slide a button across the screen to avoid accidental activation. This will connect the user directly to the police to report unsafe circumstances. Another feature promoting safety will have users take an active role in maintaining the trails. Should the user encounter a trail obstruction, he or she may use the “Report” function on the phone. This function will ask for trail obstruction details such as flooding, fallen trees or rocks, or vandalism, and then ask the user to take a picture of the problem. Finally, using the phone’s location, the GPS function will submit the coordinates along with the rest of the report to the Parks and Recreation Department in Santa Fe.

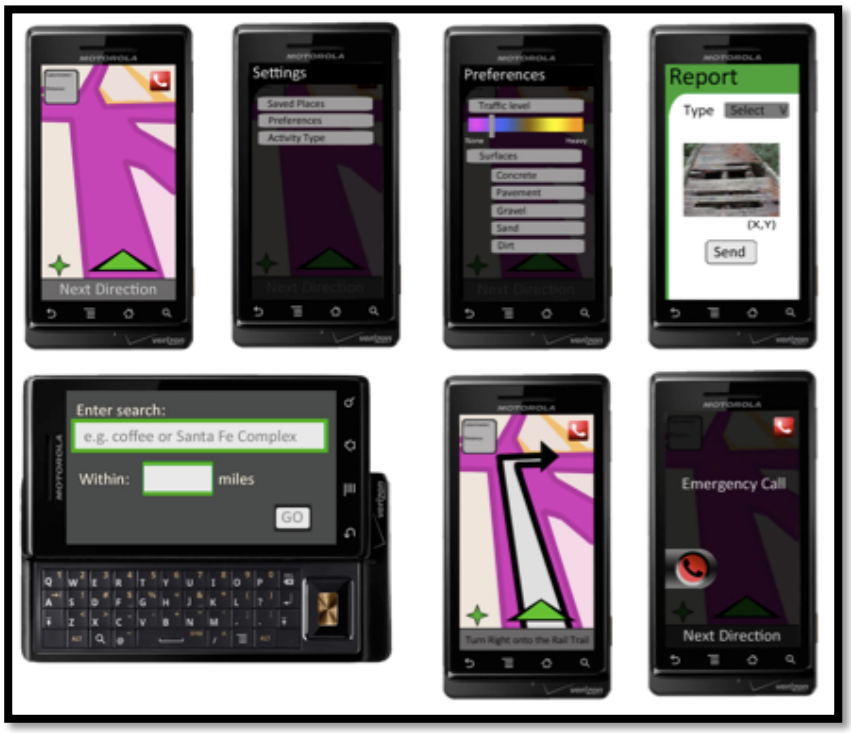



Figure 39: Navigation Function

The Social Map function (Figure 40) allows users to connect and interact on trails. The key feature of this function is the map displaying the location of trail users. This map allows the users to click on the icons of other users on the map to chat and view others’ profiles. Should any user feel threatened, he or she may block the harassing user, report the chat conversation, and save the chat as evidence. The user may decide to go offline to avoid contact from and displaying other users. A layer

including a user's saved interests and places of interest will be included to allow the user to locate their distance from his or her current location. The app will be able to switch from the Social Map to the Navigation function to provide directions for the user.


Figure 40: Social Map Function

The Travel Log (Figure 41) allows users to view their tracks, distance traveled, calories burned and places visited. The feature provides the user with distance traveled and calories burned per day and the overall total. The Travel Log has two tabs: one for the current day and one for the monthly calendar. In the month tab, the user is able to scroll through each month. Each day the application was used is highlighted. The user is able to click on the highlighted days and view the tracks, distance traveled, calories burned and pictures of places he or she has "checked in."

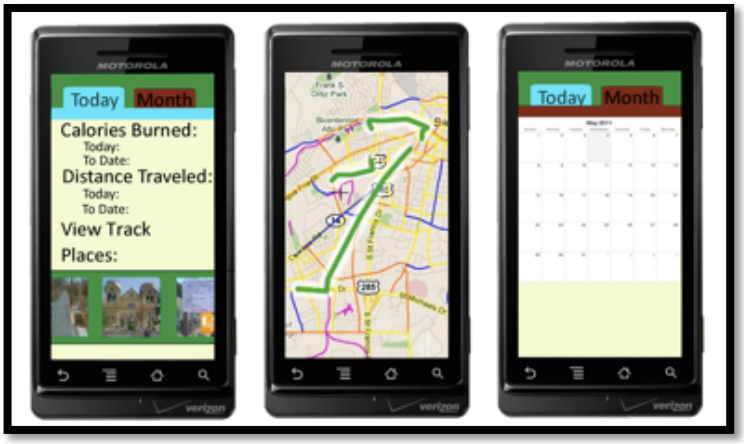



Figure 41: Travel Log Function

Using the Profile function (Figure 42), the user is able to set-up a profile by choosing a screen-name, dot color and password. Users may access the profiles of other users on the Social Map. They may also have their profile saved on the device to avoid having to constantly sign in to use the app. This

feature displays the outdoor interests of users and places they have “checked in.” The Profile also functions as a database of user records so users may sign in from other devices.


**Figure 42: Profile Function**

# 5. Conclusion and Recommendations for Future Work

The team was able to successfully create four interactive maps for both public and city use. All the data that was collected from the Trail Assessment Forms were compiled into tables and added to a Segmented Map. Each table was assigned to its respective segment and can be viewed when selected. A Bollard Location Map that presented the locations of all bollards and assessed the spacing requirements was also created. Specific ADA and city of Santa Fe spacing requirements were noted and are shown. An Amenities Map, which focused on bench, bike parking, and bike shop layers, was completed to allow the MPO, City of Santa Fe, and the communities have better accessibility of trails. Similarly the Sign Proposal Map allows the same parties to see where signs are needed to access along the same trails.

A Smartphone application mock-up was created to fulfill the third objective of facilitating social interaction on multi-use trails. The schematic of the design proposes navigational, social, and traveling options for the user. Though not a coded product, the mockup displays a potential networking tool that provides a design that through implementation would be a valuable to trail user.

For the created information to be easily accessed, the team created a website called “Go Santa Fe NM” using Google Sites. This website contains the interactive maps, the Smartphone mock-up and a trail maintenance report. The trail maintenance report allows users to report needed trail maintenance by submitting a description of the maintenance and the location. This information is time stamped and entered into an excel document for easy viewing for the user. This site is the location, which all created products and designs are stored for the city and was left in the hands of the Metropolitan Planning Organization.

## 5.1 Smartphone Coding

Due to time constrains, the team chose to focus on creating a thorough design of a Smartphone application, demonstrated through a visual representative mock-up. The team’s creation provides the foundation of a product that may later be built. We recommend following our blue print of the application to code the application and prepare it for distribution. The team recommends freely distributing the application to the public, allowing more people to have access to this tool. This would allow for easier access and navigation of the trails by the population.

## 5.2. GPS Mapping

The first recommendation in relation to GPS mapping would be to check application accuracy and restrictions before the start date of fieldwork. This will avoid later complications with needing to switch applications and having alternate and multiple forms of data.

The team also faced issues with Google My Tracks distorting map renders. The team had to resort to editing the maps on Google Maps and Scribble Maps to produce a more accurate representation of the trail. Measure the pros and cons of the chosen technology and become familiar with it. The team suggests exploring other means of GPS tracking other than Google My Tracks.

Additionally the team recommends to do all methods for measuring and mapping a trail altogether. Try not split up fieldwork for the same trail across multiple days which make data compilation complicated. Map all trails in the same direction. If the recorded directions aren't uniform, it becomes more difficult to cross-reference data between forms, maps, and GPS tracking information.

For tracking the amenities, we suggest investigating the following smartphone applications:

- Butone (http://www.citizapps.com/products/butone), a gadget that allows for documenting the coordinates of a designated item. The user may label his or her different "Butones" for the different amenities and easily keep record on an online database for each. The user would then be able to transfer the coordinates onto an Excel spreadsheet and then upload them to his or her mapping program.
- Mavericks: (http://www.androlib.com/android.application.com-codesector-maverick-lite-qDiC.aspx), a Smartphone application that allows the user to mark and label points on a map. It also allows the user to track his or her journey. We recommend the full version (purchase required) because the trial only allows for marking 10 points. This application also allows the user to specify the file in which to keep record of the points. It then allows the user to export the KML files of the mapped points to the computer.

## 5.3 Assessments

In the process of assessing the trails, the team developed several recommendations for future work. The team recommends inspecting the trails before tracking them. This will develop a pre-defined route and segments and a method for naming the segments prior to mapping. It will also eliminate unexpected access trails and define a consistent method for assessing and mapping.

Though this wasn't relevant to the team's project, the team received a suggestion to investigate certain access points to the trail network in Santa Fe that have been barricaded or blocked. Some of these points are barricaded, while other are appear to be gated off, but allow users to enter and exit. It would be beneficial to the city and the community to identify and map these barriers and obstacles. The city could take action to allow public access through these points and a map of the gates that can be opened would inform the public about the various 'hidden' access points.

## 5.4 City Contributions

The team recommends that the city takes into consideration the incorrectly spaced bollards and the signs proposals on the respectful interactive maps. The incorrectly spaced bollards should be considered for removal or replacement. This will follow the bollard regulations of 3 feet and allow for safer trail usage. The addition of these signs will allow for better trail accessibility.

## 5.5 Multi-Use Trail Regulations

Trail biking rules are beneficial to cyclists to help feasibility and safety on trails. The city of Santa Fe currently does not have an official set of guidelines in which to follow for multi-use trails. Though there are city yielding rules, these are just to clarify right-of-way on multi-use trails. To fix this problem the team analyzed what other rules currently exist elsewhere in the United States. The following list is a set of regulations for multi-use trail users outlined in the Colorado Cycling Rules.[42] The team felt these are clear, well thought-out guidelines that fit the same criteria Santa Fe needs. Therefore, the team recommends these rules for the city:

1. Please be sure to obey any local regulations when using a multi-use trail.
2. Please use common sense and courtesy on the trail
3. Always ride, walk, and skate on the right side of the trail
4. Obey traffic control signs and markings on trail
5. Pass on the left, when the trail is clear of traffic
6. Give audible warning before overtaking other trail users:
    - Ring your bike bell
    - Loudly and clearly call out "Passing"
7. Listen up! Headphones prevent you from hearing warnings
8. Use hand signals to indicate turns and stops
9. Do not stop on the trail, blocking other users
10. Ride single file so that other users may pass safely
11. Look for traffic before entering trail
12. Watch for the unexpected, especially with kids or dogs
13. Slow down when the trail is crowded and travel at speeds that are safe and appropriate to trail conditions"[43]

[42] Bicycle Colorado.(2009). "Colorado cycling rules." Accessed 05/04/2011 *http://bicyclecolo.org/articles/colorado-cycling-rules-pg27.htm*

[43] Bicycle Colorado. (2009).

## 6. Bibliography


ADWEEK. (2009).“Smartphone social networking surges.” Accessed 05/02/2011 *http://www.adweek.com/news/technology/smartphone-social-networking-surges-100440*

Adult Bicycling. (2009). “Fitness Benefits of Biking.” Accessed 04/16/2011 *http://www.adultbicycling.com/component/content/article/9-bicycling-basics/16-fitness-benefits-of-biking.html*

American Podiatric Medical Association. (2009). “2008 best walking cities; 500 overall U.S. city rankings.” Accessed 02/13/2011 *http://www.apma.org/walking*

Bicycle Colorado.(2009). “Colorado cycling rules.” Accessed 05/04/2011 *http://bicyclecolo.org/articles/colorado-cycling-rules-pg27.htm*

Cheek, L. (2003). In Zimmerman N. (ED.), Santa Fe (4th ed.). New York: Compass American Guides.

Community Development Department, City of Cambridge, Massachusetts. (2004). “The health benefits of walking. Accessed 02/02/2011 *http://www2.cambridgema.gov/cdd/et/ped/ped_hlth.html*

The City of Santa Fe. (2006) “2009 parks master plan.” Accessed 04/05/2011 *http://www.santafenm.gov/index.aspx?NID=1337*

---. “BTAC committee mission, membership and current agendas.” Accessed 04/25/2011 *http://www.santafenm.gov/index.aspx?NID=1828*

---. “Official website.” Accessed 02/11/2011 *http://www.santafenm.gov/index.aspx?NID=548*

Facebook. (2011). *“Press Room Statistics.”* Accessed 02/12/2011 *http://www.facebook.com/press/info.php?statistics*

Geocortex. (2011). “City of santa fe internet mapping site.” Accessed 02/12/2011 *http://www.santafenm.gov/index.aspx?NID=1079*

Herling, J. (2009). “Best (and worst) walking cities in america ranked by prevention & APMA.” Accessed 02/13/2011 *http://www2.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/03-04-2008/0004766972&EDATE*

Marion, Jeffrey L., Leung Y., Nepal, S. K. (2006). "Monitoring trail conditions: New methodological considerations." No. 23. Accessed 02/11/2011 *http://www.georgewright.org/232marion.pdf*

MOBILEDIA. (2010). "Smartphones push growth of social networks." Accessed 05/02/2011 *http://www.mobiledia.com/news/75272.html*

Movoto. (2004). "Neighborhood search by address: santa fe." Accessed 02/01/2011 *http://www.movoto.com/neighborhood/tn/santa-fe/38482.htm*

New Mexico Department of Health. (2010). "Facts about the prescription trails program." Accessed 02/13/2011 *http://www.diabetesnm.org/programs/documents/Rx%20Trails/Fact%20Sheet%20SF.pdf*

Prescription Trails New Mexico. (2011). Accessed 02/04/2011 *http://prescriptiontrails.org/index/index.shtm*

Santa Fe Metropolitan Planning Organization. (2007). "Bicycle master plan." Accessed 04/28/2011 *http://santafempo.org/bicycle-master-plan/*

---. "Bikeway & trails map." Accessed 04/28/2011 *http://santafempo.org/wp-content/uploads/2009/07/Bikeways-Map.pdf*

---. "Home." Accessed 04/28/2011 *http://santafempo.org/*

---. "Technical coordinating committee." Accessed 04/28/2011 *http://santafempo.org/committees/tcc/*

Santa Fe, NM Convention and Visitors Bureau. (2011) "About Santa Fe." Accessed 02/20/2011 *http://santafe.org/Visiting_Santa_Fe/About_Santa_Fe/index.html*

---. "The official travel site of santa fe, nm." Accessed 02/02/2011 *http://santafe.org/Visiting_Santa_Fe/Free_Walking_Tours/index.html*

Trails Alliance of Santa Fe. (2011). "Trails alliance of santa fe." Accessed 05/02/2011 *http://trailsallianceofsantafe.org/*

VOTE YES! Santa Fe Parks and Trails. (2008). Accessed 02/15/2011 *http://www.conservationcampaign.org/yessantafeparks/*

Walking.org. (2011). "Walking to reduce stress." Accessed 2/22/2011 *http://www.walking.org/walking-for-fitness/stress/reduce-stress/*

---. "Why do People Walk." Accessed 04/02/2011

*http://www.walkinginfo.org/faqs/answer.cfm?id=29*

Wilson, Keith. Interview. 03/22/2011

## Appendix A- 2009 Parks Master Plan

## PARKS MASTER PLAN REVISION
## DRAFT 4 - 10/31/07

| Parks Advisory Committee Recommentation | |
|---|---|
| District | Amount: |
| 1 | 2,218,579 |
| 2 | 2,117,375 |
| 3 | 2,038,675 |
| 4 | 2,601,325 |
| **Sub Total** | **8,975,954** |
| **Regional Parks** | |
| SF River Parkway | 2,297,500 |
| Archuleta Property | 30,500 |
| Franklin E. Miles | 2,151,273 |
| GCCC | 921,250 |
| MRC | 1,150,000 |
| Ragle | 2,305,762 |
| Salvador Perez | 325,687 |
| **Sub Total** | **9,181,972** |
| **Parks Districts & Regional Grand Total** | **18,157,926** |

| Current BTAC Projects | Capital Improvement Costs |
|---|---|
| Rail Trail - All Segments withing City Limits - (District 1, 2 3 & 4) | 3,768,000 |
| Acequia Trail (District 3) | 2,388,250 |
| Community College Trail (SF County & District 4 | 1,740,000 |
| Arroyo Chamiso East - St. Francis To Museum Hill (District 2) | 2,341,320 |
| Arroyo Chamiso East - Underground Crossing @ St. Francis | 1,166,680 |
| Arroyo Chamiso West - Rodeo to Nava Ade & Wagon Rd. (District 4) | 1,224,365 |
| River Trail - Camino Alire to Frenchy's Field (Districts 1 & 3) | 3,232,000 |
| **Sub Total** | **15,860,615** |
| Note: This factor is already inclued in estimates **Design & Contingencies @ 25%** | 0 |
| **Total:** | 15,860,615 |
| **Available Funds:** | 6,714,869 |
| **Unfunded Total:** | **9,145,746** |

**Total:**
**27,303,672.00**

**Northwest Qaudrant Open Space/Trails Request**
**2,965,328.00**

**Grand Total:**
**30,269,000.00**

PWC May 27, 2008

# 2008 Parks Implementation Plan DRAFT

| District # 1 | | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adam Gabriel Armijo | $ 40,000 | 1,000 | 39,051 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 40,000 |
| Alto/Bicentennial Outdoor Pool | $ 15,875 | 7,500 | | | 8,375 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15,875 |
| Cathedral Park | $ 38,500 | | 20,000 | 3,500 | 3,300 | 11,700 | | | | | | | | | | | | | | | | | | | | | | | | | | | 38,500 |
| Cross of the Martyrs | $ 43,750 | | | | | | | | | | | | 43,750 | | | | | | | | | | | | | | | | | | | | 43,750 |
| Ft. Marcy Complex | $ 500,000 | 100,000 | 60,000 | 125,000 | 215,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 500,000 |
| Frank S. Ortiz (Dog Park) | $ 72,625 | | | | | | | | | | | | 8,972 | 36,387 | 27,262 | | | | | | | | | | | | | | | | | | 72,625 |
| Frank S. Ortiz Park | $ 78,608 | | | | | | | | | | 66,248 | 12,360 | | | | | | | | | | | | | | | | | | | | | 78,608 |
| John F. Griego | $ 25,075 | 500 | 500 | 5,000 | 2,500 | 14,575 | | | | | | | | | | | | | | | | | | | | | | | | | | | 25,075 |
| Mager's Field | $ 382,625 | 15,000 | 252,500 | 252,500 | 222,625 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 902,625 |
| Melendez Park | $ 11,000 | | 11,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 11,000 |
| Monica Rephel Park | $ 2,000 | | | | | | | | | | | | 2,000 | | | | | | | | | | | | | | | | | | | | 2,000 |
| Peralta Park | $ 6,250 | | | | | | | | | | | | 6,250 | | | | | | | | | | | | | | | | | | | | 6,250 |
| Plaza Park | $ 600,000 | 5,000 | 10,000 | 15,000 | 5,000 | 270,000 | 255,000 | 40,000 | | | | | | | | | | | | | | | | | | | | | | | | | 600,000 |
| Prince Park | $ 67,650 | | | | | | | | | | | | 50,000 | | | | | 27,650 | 10,000 | | | | | | | | | | | | | | 67,650 |
| Sunnyslope Meadows | $ 20,500 | | | | | | | | | | | | | | | | 20,500 | | | | | | | | | | | | | | | | 20,500 |
| Thomas Mazzone Park | $ 24,000 | | | | | 24,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | 24,000 |
| Torreon | $ 92,125 | | | | | | | | | | | | | | | | | | 18,750 | 18,750 | | | | 24,700 | 29,925 | | | | | | | | 92,125 |
| **Sub-Total** | **$ 2,218,579** | 129,000 | 373,051 | 381,000 | 456,800 | 320,275 | 255,000 | 60,000 | 0 | 0 | 66,248 | 12,360 | 90,972 | 36,387 | 27,262 | 0 | 20,500 | 27,650 | 28,750 | 18,750 | 0 | 0 | 0 | 24,700 | 29,925 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **2,218,579** |

**Mager's Field - Includes an additional $120,000.00 from allocation fro Ft. Marcy Complex Walking Path.**

| District # 2 | | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amelia E. White | $ 100,000 | | 1,000 | 1,000 | 1,500 | 22,050 | 16,200 | 58,250 | | | | | | | | | | | | | | | | | | | | | | | | | 100,000 |
| Atalaya Park | $ 36,250 | | | | | | | | | | | | | 12,625 | 23,625 | | | | | | | | | | | | | | | | | | 36,250 |
| Calle Lorca | $ 187,500 | | | | | | | | | | | | 16,000 | 16,000 | 16,000 | 44,750 | 31,000 | 20,000 | 43,750 | | | | | | | | | | | | | | 187,500 |
| Cornell | $ 60,875 | | | | | | | | | | | | | | 14,700 | 17,000 | 3,000 | 16,175 | 10,000 | | | | | | | | | | | | | | 60,875 |
| De Vargas (E & W) | $ 512,000 | | 250,803 | 5,000 | 48,000 | 75,000 | 75,000 | 50,000 | 8,200 | | | | | | | | | | | | | | | | | | | | | | | | 512,003 |
| Don Diego/Estrada Park | $ 6,250 | | | 6,250 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6,250 |
| Galisteo Tennis Courts | $ 131,250 | | | | | | | | | | | | | | | | 40,000 | 91,250 | | | | | | | | | | | | | | | 131,250 |
| Orlando Fernandez Park | $ 17,875 | | | | 14,500 | 3,375 | | | | | | | | | | | | | | | | | | | | | | | | | | | 17,875 |
| Patrick Smith Park | $ 210,000 | | 5,000 | 5,000 | 3,000 | 47,000 | 40,000 | 65,000 | 20,000 | | | | | | | | | | | | | | | | | | | | | | | | 210,000 |
| Power Plant | $ 700,000 | | 5,000 | 5,000 | 10,000 | 30,000 | 17,000 | 50,000 | 80,000 | 70,000 | 142,500 | 162,500 | 85,000 | 30,000 | 5,000 | | | | | | | | | | | | | | | | | | 700,000 |
| Salvador Perez Pool | $ 85,000 | | | | | | | | | | | | | | 8,000 | 10,000 | 27,000 | 15,000 | 25,000 | | | | | | | | | | | | | | 85,000 |
| Young Park | $ 70,375 | | | | | | | | | | | | | | | | | | | | | | | | | 50,050 | 57,057 | | | 3,300 | | | | 70,375 |
| **Sub-Total** | **$ 2,117,375** | 0 | 259,800 | 22,250 | 76,000 | 177,425 | 177,200 | 221,250 | 108,200 | 70,000 | 142,500 | 162,500 | 101,000 | 66,625 | 67,325 | 71,750 | 101,000 | 142,425 | 78,750 | 0 | 0 | 0 | 0 | 0 | 0 | 50,050 | 57,057 | 0 | 0 | 3,300 | 0 | 0 | 0 | **2,117,375** |

| District # 3 | | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ashbaugh | $ 452,000 | | | | | | | | 5,000 | 5,000 | 12,000 | 105,000 | 110,000 | 114,000 | 105,000 | | | | | | | | | | | | | | | | | | 452,000 |
| Cielo Vista Park | $ 300,000 | | | | | | | | | | | | | | | | | | | | | | | | | 11,000 | 11,000 | 64,000 | 125,000 | 91,000 | | | 300,000 |
| Tapiaucitas Park | $ 5,500 | | | | | | 5,500 | | | | | | | | | | | | | | | | | | | | | | | | | | 5,500 |
| Pinnacle Park | $ 661,250 | | | 10,000 | 10,000 | 10,000 | 290,000 | 265,000 | 76,250 | | | | | | | | | | | | | | | | | | | | | | | | 661,250 |
| Gregorio Lopez Park | $ 97,750 | | | 4,000 | 30,000 | 55,000 | 28,650 | | | | | | | | | | | | | | | | | | | | | | | | | | 97,750 |
| Larragoite Park | $ 290,000 | | | 5,000 | 5,000 | 10,000 | 52,500 | 77,500 | 100,000 | | | | | | | | | | | | | | | | | | | | | | | | 290,000 |
| Las Acequias Park | $ 130,000 | | | | | | | | | | | | | | 5,985 | | 25,000 | 73,346 | 46,271 | | | | | | | | | | | | | | 130,000 |
| Los Milagros | $ 63,800 | | | | | | | | | | | | | | | | 30,950 | 32,850 | | | | | | | | | | | | | | | 63,800 |
| Mladovita Park | $ 32,000 | | | | 8,000 | 8,000 | 16,000 | | | | | | | | | | | | | | | | | | | | | | | | | | 32,000 |
| Rancho del Sol Park | $ 24,375 | | 5,000 | 500 | 18,475 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 24,375 |
| **Sub-Total** | **$ 2,038,675** | 0 | 24,000 | 45,900 | 81,575 | 379,150 | 364,000 | 176,250 | 5,000 | 5,000 | 12,000 | 105,000 | 110,000 | 119,385 | 105,000 | 58,950 | 105,196 | 46,271 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11,000 | 11,000 | 64,000 | 125,000 | 91,000 | 0 | 0 | 0 | **2,038,675** |

# 2008 Parks Implementation Plan DRAFT

| District # 4 | | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | Jan-11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gardelero Park | $ 131,625 | | | | | | | | | | | | | | | | | 15,000 | 17,360 | 19,345 | 79,345 | | | | | | | | | | | | 131,625 |
| Genoveva Chavez Park | $ 201,250 | 10,000 | 3,000 | 2,000 | 3,000 | 63,000 | 67,000 | 54,250 | | | | | | | | | | | | | | | | | | | | | | | | | 201,250 |
| Herb Martinez Park | $ 246,810 | | | | | | | | | | | | | | | | | | 3,000 | 3,000 | 2,000 | 5,000 | 55,000 | 82,905 | 97,226 | | | | | | | | | 246,810 |
| Martin Luther King | $ 92,000 | | | | 92,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 92,000 |
| Las Estancias Park | $ 50,000 | | 25,000 | 12,500 | 12,500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 50,000 |
| Mary Brandt Park | $ 34,800 | | | | | | | | | | | | | | | 4,000 | 9,320 | 4,630 | 8,480 | 8,360 | | | | | | | | | | | | | 34,800 |
| Monica Lucero Park | $ 76,800 | | | | | | | | | | | | | | | | | | | | | | 32,986 | 36,707 | 1,320 | | | | | | | | 7,707 | 76,800 |
| Nava Ada | $ 587,500 | | | | 14,000 | | | 186,000 | | 5,000 | 10,000 | 5,000 | 77,500 | | 90,000 | 90,000 | 65,500 | 48,500 | | | | | | | | | | | | | | | | 587,500 |
| Pueblos Del Sol Trails | $ 1,100,000 | | | 800,000 | 300,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1,100,000 |
| Villa Caballero Park | $ 33,250 | | | | | 17,650 | 11,650 | | | | | | 4,000 | | | | | | | | | | | | | | | | | | | | | 33,250 |
| Villa Linda Park | $ 107,490 | | | | | | | | | | | | 33,364 | 23,764 | 37,466 | 23,998 | | | | | | | | | | | | | | | | | 107,490 |
| Sub-Total | $ 2,601,325 | 10,000 | 27,000 | 814,500 | 361,500 | 80,650 | 78,650 | 240,250 | 0 | 5,000 | 10,000 | 5,000 | 103,764 | 23,764 | 127,466 | 117,998 | 74,820 | 68,130 | 29,220 | 29,722 | 81,343 | 5,000 | 55,000 | 115,568 | 132,015 | 1,320 | 0 | 0 | 0 | 0 | 0 | 0 | 7,707 | 2,601,325 |

| Regional Parks | | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Archuleta Property | 30,500.00 | | | | | | | | | | | | | | | | | | | | | | | | | | 30,500 | | | | | | 30,500 |
| Santa Fe River Parkway | $ 2,297,500 | | | | | | | | | | | | | | | | 20,000 | 15,000 | 30,000 | 40,000 | 255,000 | 245,000 | 305,500 | 275,000 | 255,000 | 250,000 | 215,000 | 150,000 | 155,000 | 10,000 | 15,000 | | | 2,297,500 |
| Franklin F. Miles Park | $ 2,151,275 | | | 15,000 | 45,000 | 305,000 | 405,000 | 540,000 | 420,000 | 285,254 | 81,019 | | | | | | | | | | | | | | | | | | | | | | | 2,151,275 |
| GCCC Pooley | $ 921,250 | | 44,000 | 362,750 | 130,000 | 265,000 | 130,000 | 100,000 | | | | | | | | | | | | | | | | | | | | | | | | | | 921,250 |
| MRC | $ 1,150,000 | | | | | | | | | | | | 20,000 | 25,000 | 15,000 | 15,000 | 10,000 | 420,000 | 415,000 | 230,000 | | | | | | | | | | | | | | 1,150,000 |
| Eagle Park | $ 2,305,762 | | | 5,000 | 30,000 | 35,000 | 50,000 | 25,000 | 15,000 | 5,000 | 302,168 | 206,000 | 245,750 | 385,492 | 555,889 | 267,152 | 262,971 | 35,000 | 15,000 | 5,000 | | | | | | | | | | | | | | 2,305,762 |
| Salvador Perez Park | $ 525,687 | | | | | | | | | | | | | | | | 5,000 | 10,000 | 5,000 | 5,000 | 52,000 | 82,000 | 80,568 | 85,119 | | | | | | | | | | 525,687 |
| Sub-Total | $ 9,381,972 | 0 | 44,000 | 382,250 | 180,000 | 605,000 | 645,000 | 665,000 | 435,000 | 290,254 | 383,187 | 206,000 | 265,750 | 410,492 | 570,889 | 282,152 | 297,971 | 470,000 | 465,000 | 278,000 | 307,000 | 327,000 | 455,068 | 390,119 | 255,000 | 250,000 | 245,500 | 150,000 | 155,000 | 10,000 | 15,000 | 0 | 0 | 9,381,972 |

| Northwest Quadrant Open Space/Trails | | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NWQ Open Space and Trails | $ 2,965,328 | | | | 25,000 | 103,160 | 58,160 | 30,000 | 25,000 | 15,000 | 10,000 | 20,000 | 240,000 | 210,000 | 536,000 | 235,000 | 310,000 | 160,000 | 160,000 | 310,000 | 303,784 | 110,000 | 104,224 | | | | | | | | | | 2,965,328 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sub-Total | $ 2,965,328 | | | | 25,000 | 103,160 | 58,160 | 30,000 | 25,000 | 15,000 | 10,000 | 20,000 | 240,000 | 210,000 | 536,000 | 235,000 | 310,000 | 160,000 | 160,000 | 310,000 | 303,784 | 110,000 | 104,224 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,965,328 |

| Currents BTAC Projects | | May-08 | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Jun-09 | Jul-09 | Aug-09 | Sep-09 | Oct-09 | Nov-09 | Dec-09 | Jan-10 | Feb-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Aug-10 | Sep-10 | Oct-10 | Nov-10 | Dec-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rail Trail | $ 3,768,000 | | | | | 376,800 | 376,800 | 376,800 | 376,800 | 376,800 | 376,800 | 376,800 | 376,800 | 376,800 | 376,800 | | | | | | | | | | | | | | | | | | | 3,768,000 |
| Acequia Trail Phase I | $ 1,469,125 | 125,000 | 20,000 | 20,000 | 20,000 | 20,000 | 10,000 | 10,000 | 155,516 | 155,516 | 155,516 | 155,516 | 155,516 | 155,516 | 155,516 | 155,515 | | | | | | | | | | | | | | | | | | 1,469,125 |
| Acequia Trail Phase II | $ 919,125 | 75,000 | | | 168,825 | 168,825 | 168,825 | 168,825 | 168,825 | | | | | | | | | | | | | | | | | | | | | | | | | 919,125 |
| Community College Trail | $ 1,740,000 | | 47,000 | | | | | | | | | 211,625 | 211,625 | 211,625 | 211,625 | 211,625 | 211,625 | 211,625 | 211,625 | | | | | | | | | | | | | | | 1,740,000 |
| Arroyo Chamiso East | $ 5,508,000 | 80,500 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | | | 552,749 | 552,749 | 552,749 | 552,749 | 567,752 | 567,752 | | | | | | | | | | | | | | | | 5,508,000 |
| Arroyo Chamiso West | $ 1,224,365 | 95,216 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 178,524 | 178,524 | 178,524 | 178,524 | 178,524 | 178,529 | | | | | | | | | | | | | | | | | | | | | 1,224,365 |
| Santa Fe River Trail | $ 3,252,000 | | | | 100,000 | 100,000 | 52,000 | 300,000 | 300,000 | 300,000 | 300,000 | 300,000 | 300,000 | 300,000 | 300,000 | 300,000 | | | | | | | | | | | | | | | | | | 3,252,000 |
| Available Funds | $ (8,714,869) | 334,716 | 102,000 | 155,000 | 303,825 | 655,035 | 1,044,119 | 1,044,119 | 1,189,665 | 1,020,860 | 1,010,860 | 1,222,470 | 1,996,090 | 1,996,090 | 1,996,090 | 1,219,687 | 779,377 | 779,377 | 211,625 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,860,615 |
| Sub-Total | $ 9,145,746 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Available Funding | -6,714,869 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9,145,746 |

Bond Total: **30,269,000**

## Appendix B- Trail Assessment Form

### Trail Assessment Form

Trail Name _____ Trail Segment _____

Recorder Name_____ Date/Time _____

Use Type Walking Biking Other _____

Trail Surface

Paved ☐
Sand ☐
Gravel/loose rock ☐
Compact Soil ☐
Concrete ☐
Comments _____
_____
_____
_____

Is there a trailhead?
Yes ☐ No ☐
Comments _____
_____
_____
_____
_____
_____
_____

Potential trail signs?
Yes ☐ No ☐
Describe _____
_____
_____
_____
_____
_____
_____

ADA Access
Easy ☐
Medium ☐
Hard ☐

Potential Barriers/ Obstacles

Erosion ☐
Difficult Access ☐
Overgrowth/Maintenance ☐
Bollards ☐
Spacing _____
Other _____
_____
_____
_____

Amenities
Benches ☐
How many _____
Bike Parking ☐
Describe _____

Mileage _____

Width of Trail _____

Addition Comments _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

## Appendix C- Excel Data Sheets

**Bench Layer**

| Point Number | Latitude | Longitude |
|---|---|---|
| 1 | 35.67836 | -105.95371 |
| 2 | 35.67832 | -105.95765 |
| 3 | 35.67811 | -105.95992 |
| 4 | 35.67689 | -105.96215 |
| 5 | 35.66941 | -105.97323 |
| 6 | 35.67982 | -105.95180 |
| 7 | 35.67995 | -105.95200 |
| 8 | 35.67999 | -105.95168 |
| 9 | 35.67848 | -105.95178 |
| 10 | 35.67871 | -105.95333 |
| 11 | 35.66207 | -105.96494 |
| 12 | 35.65147 | -105.96519 |
| 13 | 35.64994 | -105.96519 |
| 14 | 35.64917 | -105.96528 |
| 15 | 35.64589 | -105.97335 |
| 16 | 35.64506 | -105.97652 |
| 17 | 35.64324 | -105.98107 |
| 18 | 35.64255 | -105.98262 |
| 19 | 35.64248 | -105.98313 |
| 20 | 35.64192 | -105.98717 |
| 21 | 35.64213 | -105.99034 |
| 22 | 35.64241 | -105.99180 |
| 23 | 35.64317 | -105.99429 |
| 24 | 35.64282 | -105.99704 |

| | | |
|---|---|---|
| 25 | 35.64261 | -105.99772 |
| 26 | 35.63592 | -106.01051 |
| 27 | 35.68676 | -105.96099 |
| 28 | 35.68348 | -105.97009 |
| 29 | 35.68069 | -105.97206 |
| 30 | 35.67881 | -105.97507 |
| 31 | 35.67713 | -105.97867 |
| 32 | 35.65921 | -105.96545 |

**Bike Parking**

| Point Number | Latitude | Longitude |
|---|---|---|
| 1 | 35.66884 | -105.97266 |
| 2 | 35.64457 | -105.95532 |
| 3 | 35.63592 | -106.01051 |
| 4 | 35.67895 | -105.95249 |

**Bollards**

| Point Number | Latitude | Longitude |
|---|---|---|
| 1 | 35.68864 | -105.95421 |
| 2 | 35.68864 | -105.95653 |
| 3 | 35.68857 | -105.95618 |
| 4 | 35.68822 | -105.95644 |
| 5 | 35.68815 | -105.95627 |
| 6 | 35.68752 | -105.96013 |
| 7 | 35.68752 | -105.96030 |
| 8 | 35.68466 | -105.96674 |

| | | |
|---|---|---|
| 9 | 35.68341 | -105.97017 |
| 10 | 35.68299 | -105.97034 |
| 11 | 35.67895 | -105.97489 |
| 12 | 35.67783 | -105.97764 |
| 13 | 35.68313 | -105.94854 |
| 14 | 35.68195 | -105.94966 |
| 15 | 35.68174 | -105.95000 |
| 16 | 35.68083 | -105.95069 |
| 17 | 35.68076 | -105.95078 |
| 18 | 35.68069 | -105.95086 |
| 19 | 35.67881 | -105.95266 |
| 20 | 35.67895 | -105.95275 |
| 21 | 35.67881 | -105.95292 |
| 22 | 35.65921 | -105.96554 |
| 23 | 35.65810 | -105.96485 |
| 24 | 35.65803 | -105.96485 |
| 25 | 35.65231 | -105.96545 |
| 26 | 35.65217 | -105.96545 |
| 27 | 35.62824 | -105.96648 |
| 28 | 35.65196 | -105.96545 |
| 29 | 35.64722 | -105.96992 |
| 30 | 35.64722 | -105.97034 |
| 31 | 35.64575 | -105.97386 |
| 32 | 35.64575 | -105.97404 |
| 33 | 35.64241 | -105.98322 |
| 34 | 35.64241 | -105.98330 |
| 35 | 35.64275 | -105.98691 |
| 36 | 35.64185 | -105.98888 |
| 37 | 35.64199 | -105.98991 |

| | | |
|---|---|---|
| 38 | 35.64241 | -105.99120 |
| 39 | 35.64234 | -105.99154 |
| 40 | 35.64185 | -106.00305 |
| 41 | 35.64143 | -106.00502 |
| 42 | 35.63906 | -106.00974 |
| 43 | 35.63864 | -106.00983 |
| 44 | 35.63578 | -106.01008 |
| 45 | 35.63564 | -106.00974 |
| 46 | 35.63166 | -106.01360 |
| 47 | 35.63403 | -106.01043 |
| 48 | 35.63473 | -106.00811 |
| 49 | 35.63599 | -106.01000 |
| 50 | 35.63599 | -106.01026 |
| 51 | 35.63501 | -106.01163 |

## Appendix D- Scribble Maps Pro Tutorial

The team used the scribble maps pro tutorial to help create some of the deliverables. The tutorial can be found at the following website:

http://crossingboundariesproject.edublogs.org/files/2010/04/Scribble_Maps_HELP.pdf

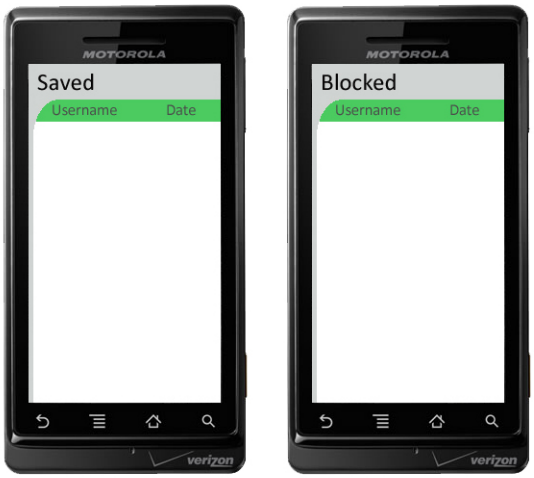
## Appendix E – Smartphone Application Mock-up Additional Info and Slides


Username:
Password:
Create Profile
Avatar Color:
Outdoor Interests:
Select
Walking
Cycling
Running
Dog Walking
DONE
Weight:
lbs.
Activity:
Select One
This information is used to measure burned calories.
It will NOT be made public.
Username
Interests:
Distance Traveled:
Places:
Edit Settings


Today
Month
Calories Burned:
Today:
To Date:
Distance Traveled:
Today:
To Date:
View Track
Places:
Place: SF Complex
Date: 05/04/2011


MOTOROLA
verizon
Username
Interests:
Distance Traveled:
Places:
Go Offline
Settings
Zoom
Saved Chats
Blocked Users
Username
Chat


MOTOROLA
verizon
Username
Username: Need a walking buddy?
Block User
Report
Save Chat
Close Chat


MOTOROLA
verizon
Saved
Username
Date
Blocked
Username
Date