

Angeles National Forest Transit Corridor Analysis



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14. ABSTRACT This report provides analysis of three corridors connecting the Gold Line in the Los Angeles metropolitan area to high use recreation sites on the Angeles National Forest. The high use recreation sites pose congestion and safety issues, as visitors park illegally along access roads when the parking lots are full. The Forest and local stakeholders are also committed to enhancing access to the recreation sites for underserved communities in the region with limited transit access to open space. The analysis identifies opportunities for providing access to these sites from the Gold Line with a shuttle service to alleviate congestion and improve access from carless communities.					
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Introduction

Angeles National Forest, which covers the majority of San Gabriel Mountains National Monument,¹ is an important environmental resource for Southern California. The mountains provide an array of outdoor recreational activities within a 90-minute drive of 15 million people in the Los Angeles region.² Yet access to this public land is threatened by increasing traffic congestion at numerous sites and limited to those with access to personal vehicles, since the Monument is not linked to transit systems. This results in a barrier for underserved communities and carless households to experience the forest.

Angeles National Forest initiated a Transportation Work Group (TWG) aimed at (1) increasing access to the Forest through alternative transportation, particularly for low-income, underserved, and carless households and (2) reducing congestion and improving safety at recreation site parking lots. The TWG has focused on connecting popular recreation sites to the newly extended Gold Line light rail by establishing a pilot shuttle service to achieve both goals; it enables visitors to access the Forest solely by transit and reduces the number of personal vehicles causing congestion at the sites.

In the fall of 2016, Angeles National Forest conducted a pilot shuttle service for four weekends between the Arcadia Gold Line Station and Chantry Flat, a high-use recreation site. The pilot was successful, attracting over 800 riders, but the service could not become permanent due to lack of funding. Then, in February 2017, the TWG met with community stakeholders, including a collaborative group led by the Wilderness Society, to discuss next steps from the pilot as well as anticipated challenges and opportunities around connecting the National Monument to transit.

The Angeles National Forest contacted staff at the Forest Service Washington Office (WO), who arranged for the U.S. Department of Transportation Volpe Center (Volpe) to conduct an assessment of three relevant corridors leading to important recreation sites on the Forest. The Volpe team (henceforth referred to as the report team) conducted a site visit in May 2017 to meet with the Forest and stakeholders and learn about the key issues and opportunities. This report provides this team's recommendations resulting from the corridor assessment. It is organized in the following sections:

- **Overview of Current Conditions:** Discusses the location, context, and overarching transportation challenges and opportunities relevant to the analysis
- **Case Examples:** Provides examples from other Forests of shuttle services and methods to control how personal vehicles access
- **Corridor Analyses:** Details the transportation issues and concepts for shuttle service for three corridors that provide access to the Angeles National Forest from the Gold Line and analyzes demand for shuttle services and includes preliminary operations plans and cost estimates
- **Business Model Options:** Reviews the different business model options that the Forest and its partners may pursue for provision of transit
- **Final Recommendations and Next Steps:** Summarizes the overall conclusions and recommended next steps, based on the analysis in this report

¹ The national monument covers 342,177 acres of the Angeles National Forest and 4,002 acres of the San Bernardino National Forest. The Monument was designated in 2014.

² <https://www.fs.fed.us/visit/san-gabriel-mountains-national-monument>

Overview of Current Conditions

Location and Context

The San Gabriel Mountains National Monument was dedicated in 2014 and contains almost 350,000 acres of land in the Angeles National Forest and approximately 4,000 acres in the neighboring San Bernardino National Forest.

The Greater Los Angeles metropolitan region had an estimated 18 million people in 2016. LA County alone has a population of just over 10 million according to most recent estimates. These mountains are a recreational resource for this major metropolitan area. They account for 70 percent of LA County’s open space, are a major source of local drinking water, and provide crucial habitats in the forest, lakes, and streams of the mountains.

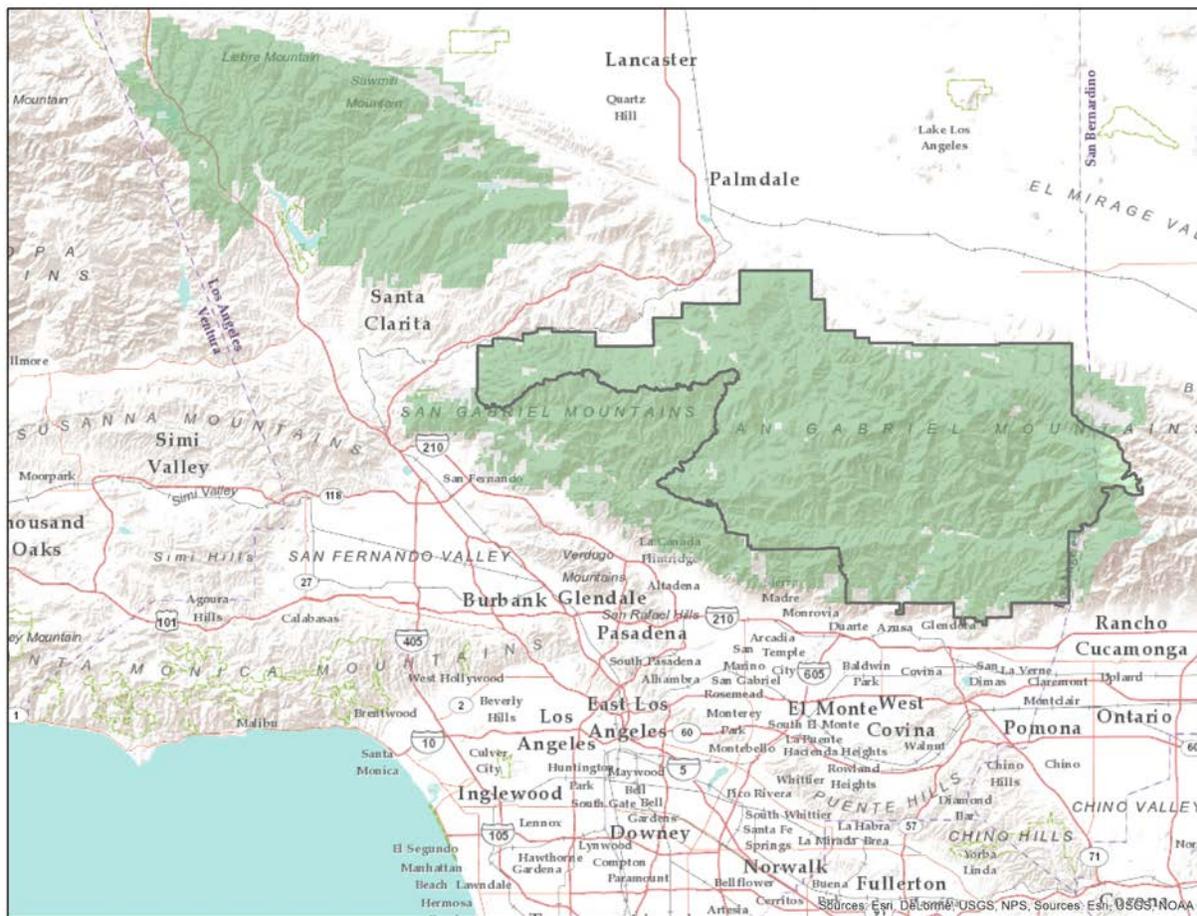


Figure 1. Angeles National Forest map with San Gabriel Mountains National Monument outlined in grey.

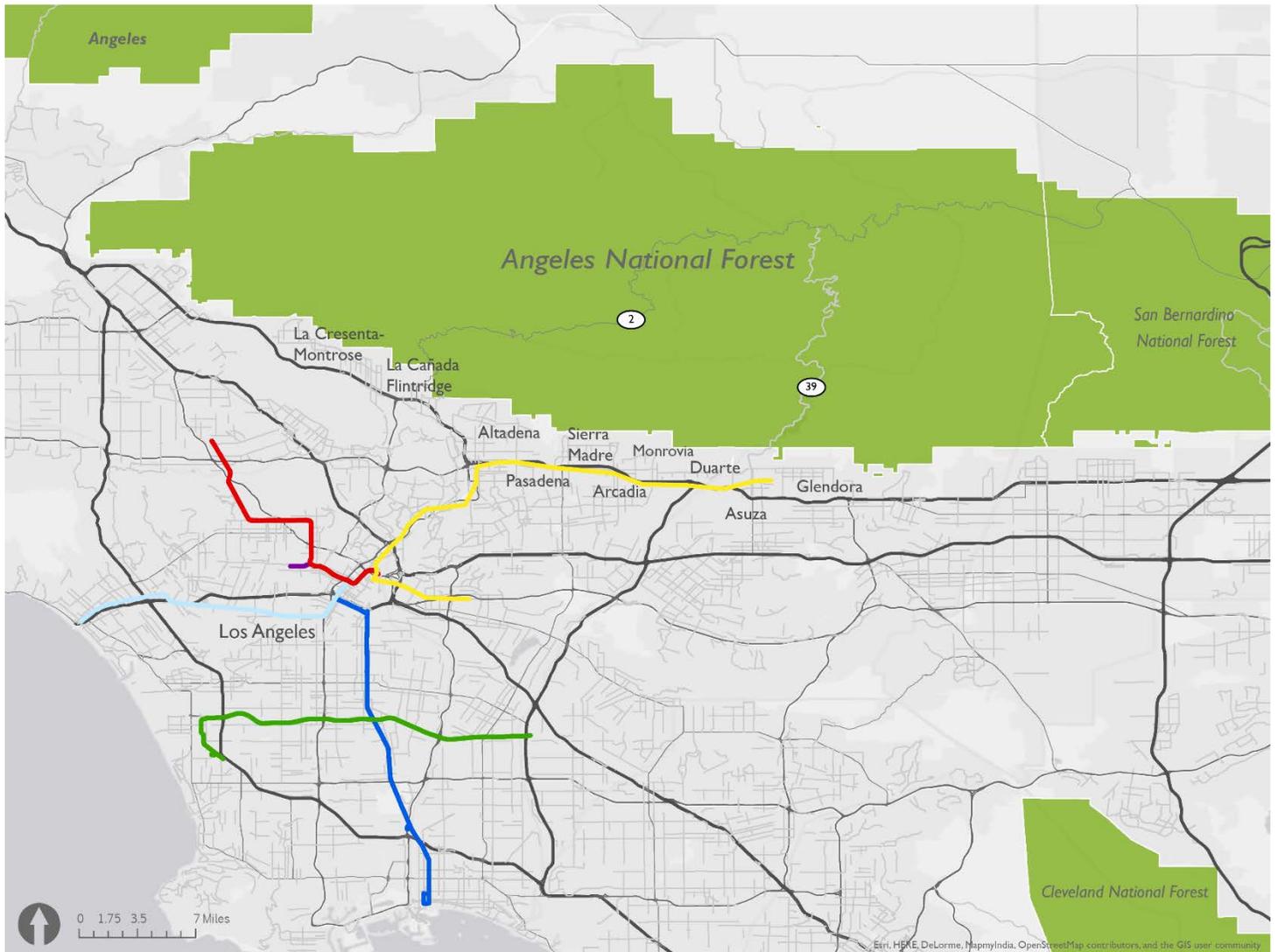


Figure 2. Angeles National Forest is adjacent to the Los Angeles metropolitan area and foothill communities. LA County Metropolitan Transportation Authority (LA Metro) Rapid Transit lines are shown on this map, including the Gold Line (yellow).

Access to Angeles National Forest

Because the San Gabriel Mountains are immediately adjacent to the nation’s second largest metropolitan area, they provide an extraordinary opportunity for recreation. Los Angeles is not widely known for its access to mountain recreation, but these mountains sit adjacent the edge of the metropolitan area. They are more accessible than mountains in other cities known for outdoor activities, like Denver, Colorado. The region has an opportunity to promote access to the outdoors and enhance the relationships between its communities and the surrounding natural resources. Angeles National Forest features a number of important recreational sites in the San Gabriel Mountains.

Currently, access to the San Gabriel Mountains and Angeles National Forest from the Los Angeles basin and San Gabriel Valley is available by a handful of roads from the adjacent foothill communities. These communities are, from west to east:

- Los Angeles (Eastern San Fernando Valley communities)
- La Crescenta-Montrose
- La Cañada Flintridge
- Altadena
- Pasadena
- Sierra Madre
- Arcadia
- Monrovia
- Duarte
- Azusa
- Glendora

These municipalities, along with LA County and Caltrans, California’s State Department of Transportation, manage parts of the transportation network providing access to and running through the Angeles National Forest. The municipalities own and maintain residential roads in the foothill communities. LA County owns and maintains numerous other roads located in unincorporated land as well as select roads within the Forest. Caltrans is responsible for State highways that run through the Forest. Additionally, Angeles National Forest owns and maintains some roads within the Forest.

Two major State routes and several small roads provide these communities and greater Los Angeles with direct access to Angeles National Forest and the Monument. The Angeles Crest Highway (California State Route 2) from La Cañada Flintridge, and San Gabriel Canyon Road (California State Route 39) from Azusa are the two largest access points, located on either side of the Monument. One major county road from Sierra Madre also provides access to Chantry Flat, a popular picnicking, camping, and hiking destination discussed in detail in the corridor analysis.

These are all public roads accessible to private vehicles, chartered buses that can navigate the terrain, and athletic bicyclists. Most visitors access the forest using their personal vehicles. The majority of the roads do not have sidewalks for pedestrians. There is currently no scheduled public transit service to the Angeles National Forest. The City of Duarte began a free Saturday shuttle service between the Gold Line and Fish Canyon in the spring of 2016, but has not run it since the site closed due to fire in June 2016.³ Duarte plans to run the service again when the site reopens. Aside from this service, access to the mountains is limited to those that live in close proximity to local access points or to those with access to a personal vehicle.

Opportunities for Improved Access to Angeles National Forest

Three recent developments provide an opportunity to explore ways to connect the Forest to transit, easing congestion and expanding access for underserved communities.

First, LA Metro opened the **extension to the Gold Line light rail in 2016**, which runs parallel to the Forest through the foothill communities. The extension offers the Forest, its partners, and the local municipalities the opportunity to link recreational sites in the Forest to rapid transit. The Gold Line runs from its current terminus in Azusa to downtown Los Angeles where it connects with the wider Metro Rail system. East of (and including) Sierra Madre Villa Station, all Gold Line stations include parking structures with varying numbers of spaces.

³ The service operated between 7:00am and 6:00pm with a 30-minute frequency using a Duarte Parks and Recreation Department vehicle. See additional information at:
<http://www.accessduarte.com/news/displaynews.htm?NewsID=201&TargetID=1>

In addition to Metro Rail, each Gold Line station is served by connecting LA Metro, Foothill Transit, and local municipal buses. Of the foothill communities, Pasadena and Sierra Madre have scheduled local municipal bus service and the other communities offer demand-responsive service like dial-a-ride programs. Pasadena is the only foothill community that currently offers any scheduled municipal weekend service. LA Metro offers daily bus service on regional routes and to unincorporated areas like Altadena. Foothill Transit, a joint powers authority of San Gabriel Valley communities, offers additional daily transit service. The report team worked closely with the City of Pasadena to identify feasible transit extensions for Pasadena Transit service. Those proposals are included in the corridor analyses.

Second, LA County produced the **Countywide Comprehensive Parks and Recreation Needs Assessment** in 2016, which inventoried open space and recreation opportunities throughout the county to determine the distribution of need for future investments. The results of the assessment indicate a high geographic disparity within the county. Residents near the hills and mountains and along the coast enjoy some of the most spectacular natural amenities available to urban residents anywhere in the country. Unfortunately, the development of the densely-populated neighborhoods of the region's valleys often did not include the preservation of open space for parks. Many of these neighborhoods have high concentrations of low-income residents who are less likely to have easy access to personal vehicles and thus do not have convenient options to access open space and recreation in the greater metropolitan area. Partially in response to these findings, LA Metro initiated work on a **Transit to Open Space and Parks Plan** for increasing access to parks and open space by public transportation. It plans to complete this study in 2018. This study presents an opportunity for collaboration with efforts related directly to the Angeles National Forest and San Gabriel Mountains National Monument.

Finally, as discussed in the introduction, Angeles National Forest community stakeholders collaborated with Forest Service staff to create a task force with the goal of improving access to the Forest and San Gabriel Mountains National Monument for transportation-disadvantaged individuals. This task force was instrumental in setting up the Chantry Flat shuttle pilot project and continues to share information and resources to find a more permanent solution. The Forest and its partners have the following goals:

- Enhance access for carless individuals with limited access to public space
- Reduce congestion at popular sites
- Improve safety
- Reduce resource impacts from personal vehicles
- Provide a high quality experience for all visitors
- Develop strong partnerships

This last goal is key: any permanent solution to providing transit access to Angeles National Forest will likely need to rely primarily on local partnerships and funding sources in the absence of a permanent congressional appropriation. Improving visitor experience is an important goal for the Angeles National Forest, but its primary mission is to protect and manage forest resources. The Forest's annual transportation budget (most recently around \$550,000) has been trending downward for the last ten years and is expected to decrease further. The primary transportation responsibility of the Forest is to maintain the existing Forest roads and essential access. These commitments are likely to tie up available funding in the near future. However, the Forest is committed to working closely with partners and providing as many resources as it is able to further the aforementioned goals.

Case Examples of Shuttle Services and Controlled Access

Numerous National Parks and National Forests currently make transit services available to visitors to ease congestion, improve visitor experience, and manage (increase or decrease) the rate of visitation to public lands. While every service operates under unique circumstances, some address challenges similar to those of the Angeles National Forest.

This section describes one planned and two existing shuttle services that provide relatable examples for the Angeles National Forest regarding parking congestion, accessibility from local city centers, and high rates of visitation. The key takeaways to consider when developing plans for The Angeles National Forest include:

- **Collaboration:** Two of the examples involve a partnership with a local transit agency. The third service, which is planned but not yet implemented, may use a local transit agency or an outfitter and guide (commercial service provider).
- **Service Structure and Route:** All of the examples describe a shuttle service rather than a regular bus service. The purpose of a shuttle service is to transport riders to one destination from one or a handful of pick-up points. The purpose of a bus route is to provide access to multiple destinations along a corridor or through a region.
- **Ticket Structure and Price:** Visitors purchase roundtrip tickets for all the services. This differs from how riders usually pay for in-city transit service. The price of these tickets (\$5 - \$15) covers operation and is higher than the typical price for metropolitan transit trips (ranges from less than \$1 to \$2.75 in larger metropolitan areas).
- **Controlled Access:** All of the services are paired with restrictions on personal vehicle access to the destinations. The examples provide different approaches to controlling personal vehicle access, from prohibiting access at all times to permitting access until the destination's parking lot is full.
- **Parking:** In all the examples, the shuttle originates at a location with parking for riders/visitors.

Maroon Bells Scenic Area, Colorado



Figure 3. Maroon Bells Service Operated by RFTA.

Located in Aspen, Colorado in the White River National Forest, the Maroon Bells Scenic Area is home to beautiful views, day hikes, and backpacking. Like the relevant sites in the Angeles National Forest, this site experiences congestion and lacks adequate parking, and it is located 25 minutes from the nearest feasible shuttle pick up location. However, it differs from the Angeles National Forest in that most visitors generally plan their visit well in advance, as they are arriving from out of town, whereas the Angeles National Forest is adjacent to a major metropolitan area and sees more spur-of-the-moment visits. In 1978, White River National Forest entered into a partnership with Roaring Fork Transportation Authority (RFTA), the local public transit provider, to provide shuttle service

to the scenic area, since the parking lot at Maroon Bells could not accommodate the demand during the busy summer months.

RFTA has been providing shuttle service ever since between Aspen Highlands, a commercial/resort center on the outskirts of Aspen, and the Maroon Bells Scenic Area (25 minutes each way). The service operates a mid-sized bus daily every 20 minutes from mid-June to early October between 8:00am and 5:00pm. All visitors are required to take this shuttle when it is operating, meaning that no vehicles are permitted to drive to Maroon Bells during operating hours. A “Welcome Station” located about a mile up the road from the shuttle boarding location at Aspen Highlands has a gate that prevents visitors from driving to the site during the shuttle’s hours of operation. However, visitors are free to drive to the area before and after operating hours and during off-peak seasons.

The roundtrip shuttle tickets cost \$8 for adults, \$6 for those under 16 or over 65 years of age, and are free for those under six. The service is funded entirely from ticket revenues. Visitors can park at the Aspen Highlands parking lot for \$5 per vehicle on weekdays or \$10 on weekends. This parking lot sometimes reaches capacity during peak hours, illustrating the importance of considering parking needs at shuttle pick-up locations. The Forest Service piloted an alternative shuttle service in September 2017. During the pilot, free parking was made available at a nearby lot on Fridays, Saturdays, and Sundays in September, which connected to the Aspen Highlands via a free shuttle every 30 minutes. Visitors can also take public transportation to reach Aspen Highlands via the free Castle Maroon bus from Rubey Park Transit Center in downtown Aspen, which runs every 20 minutes. Ridership reached 174,202 in 2015 and 199,768 in 2016.

Multnomah Falls, Oregon

Multnomah Falls, located in the Columbia River Gorge National Scenic Area, is the most visited natural recreation site in the Pacific Northwest. Like the relevant sites on the Angeles National Forest, this site receives mostly day-use visitors, experiences congestion and lack of parking, and is located on the outskirts of a large metropolitan area (Portland). The destination is popular for day trips and short hikes. It does not accommodate overnight lodging or camping. The on-site parking lot often reaches capacity during peak hours, so an optional shuttle service called the Columbia Gorge Express runs during peak times to alleviate congestion.



Figure 4. Columbia Gorge Buses. Source: Oregon Department of Transportation.

The Oregon Department of Transportation operates the shuttle service between Multnomah Falls (I-84 Exit 31), Rooster Rock State Park (I-84 Exit 25), and the Gateway/NE 99th Avenue Transit Center in Portland. The service runs on Fridays through Sundays between the end of May and the end of September and on Federal holidays between 10:00am and 3:00pm. The service fleet consists of three

small buses that allow up to 20 passengers and three bikes each. The service picks up at Rooster Rock State Park more frequently (every 15 to 45 minutes) than at Gateway Transit Center (every 45 to 80 minutes). The variation in frequency at each location depends on the time of day. The trip length from Gateway to Rooster Rock is 30 minutes, from Rooster Rock to Multnomah Falls is 15 minutes, and from Gateway directly to Multnomah Falls is 30 minutes. The service is not mandatory, but visitors are encouraged to use it when the parking lot is full (which is indicated in information provided online and on digital highway signage). When the parking lot is full, three gates on the Interstate off-ramp close access to the site, only permitting the shuttle to pass.

The cost of the round-trip ticket is \$5 from Gateway Transit Center. The shuttle is free from Rooster Rock State Park, but there is a \$5 per vehicle entrance fee into the park. There is free parking at Gateway, which is served by several transit train lines and buses. In 2016, the ridership over the 18 weekends of service operation was approximately 30,000 trips to and from Multnomah Falls. On average, 94 people boarded at Gateway and 235 people boarded at Rooster Rock each day. The shuttle is especially popular on holiday weekends, with a record of 775 riders on the Sunday of the Fourth of July weekend.

Hanging Lake Recreation Area, Colorado



Figure 5. 'Creative' Illegal Parking at Hanging Lake Recreation Area

Hanging Lake is a popular hiking destination in Glenwood Canyon, Colorado, on the White River National Forest. In 2011, the Secretary of the Interior named the lake a National Natural Landmark. Like the relevant sites on the Angeles National Forest and Maroon Bells, this site experiences congestion and lacks adequate parking, and it is located 25 minutes from the nearest town (Glenwood Springs). Visitation to the recreation area has steadily increased for the past several

years, causing congestion issues along the off-ramp from the Interstate to Hanging Lake, in the parking lot, and on the trail itself. A large portion of visitors are from the Denver region, which is a 3-hour drive from Hanging Lake, and plan their trips in advance. The parking lot has no room for expansion due to geography and the increased visitation threatens the environmental health and sustainability of the trail and lake.

Since 2014, the Forest Service, the Volpe Center, the Colorado Department of Transportation, and other local stakeholders have been working together to improve transportation and manage visitation to the trail and lake. One of the proposed solutions is to implement a mandatory timed-reservation system for accessing the trail accompanied by a shuttle service. Visitors would only be able to access the site on foot, by bicycle, or using the shuttle. The online reservation system would help manage visitation to the site, preventing bunching of visitors in the middle of the day. The shuttle service would ensure a sustainable level of access to the site while eliminating parking congestion.

The details of the service are not yet finalized, as the Forest is currently undergoing a National Environmental Policy Act (NEPA) process to implement the proposed management plan that includes a limit to the volume of daily visitors and provision of a shuttle service. The Forest is not planning on operating this service itself; it will pursue an agreement with either a commercial provider (outfitter and guide) or RFTA, the local transit authority that also serves Maroon Bells. However, the general provisions of the service are outlined in the Area Management Plan for Hanging Lake.⁴ The shuttle service would run between Glenwood Springs and Hanging Lake, 25 minutes each way. It would operate during peak season, May 1 to October 31, from approximately 6:30am to 9:00pm. The current conceptual plan is to run a 35- to 40-passenger bus every twenty minutes, with a total of three buses in use at a time. If more funding is available, larger 57-passenger buses could be used at a frequency of every 30 minutes.

The round-trip shuttle tickets could cost around \$15 per visitor. This price includes a Recreation Enhancement Act (REA) fee, which cannot be charged to visitors under 16. The operator would receive ticket revenue, and the Forest would receive the REA fee revenue. The Forest would not pay for any portion of the service but, using funds from the REA fee, would staff the site with seasonal rangers to provide interpretation and enforcement. Additional costs for parking are unknown, as the exact pick-up location is uncertain. Ridership is estimated to be 110,000 people per season, with a maximum of 615 people per day (the new maximum capacity set by the Forest in the management plan).

⁴ Plan is accessible here:

http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/105366_FS_PLT3_4049871.pdf

Corridor Analyses

Several of the major recreation sites along the border of the Angeles National Forest and the foothill communities experience high levels of visitation and parking congestion, particularly on weekends and holidays. These sites are also relatively near, though not connected, to rapid transit due to the extension of the Gold Line (completed in 2016). This report analyzes the viability of implementing a shuttle or transit service from the Gold line to four popular recreation areas along three corridors (Figure 6):

- **Chantry Flat Corridor** accessing the Chantry Flat Recreation Area
- **Pasadena Corridor** accessing the Sam Merrill or Eaton Canyon Trailhead
- **San Gabriel Canyon Corridor** (State Route 39) accessing the East and West Fork of the Canyon

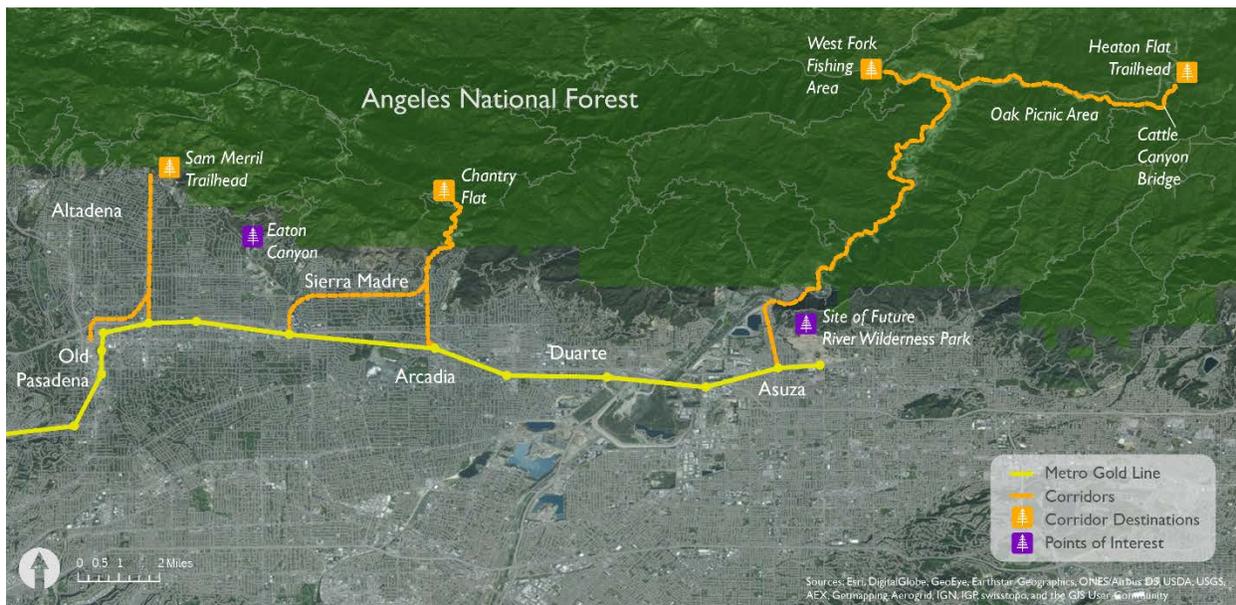


Figure 6. Corridors included in analysis. From left to right: Pasadena, Chantry Flat, and San Gabriel Canyon.

The following analyses discuss two different types of services for the three corridors that are important to distinguish: urban transit routes and special shuttle services.

- **Urban transit routes** make multiple stops along a fixed route and enable passengers to board and alight at any stop. Passengers pay the same price for tickets to ride any route, regardless of how far they are going or the volume of passengers on their route (popular routes subsidize less used routes). Many passengers, such as commuters, use these services daily. Operation of the services are usually funded through fare box recovery (passenger tickets) and substantial subsidies from state, federal and local transportation funds.
- **Dedicated shuttle services** provide access to a specific destination from one or a handful of pick-up points. Examples include shuttles to airports, shuttles to major sports or entertainment venues, or shuttles from remote parking lots to employment sites. These services can be publicly or privately operated. If they are publicly run, they may not operate under the same business model as the regular municipal bus routes. There is a range of ticket prices for this type of service, depending on demand, purpose, and the operator's business model, but if there is a charge, they are usually more expensive than a municipal bus service.

Each type of service is **appropriate under different circumstances to provide access to public lands**. Urban transit services are best suited for sites that are along or adjacent to existing municipal bus routes. This type of service typically does not entirely replace vehicular access to a site, but rather supplements personal vehicles and provides access for visitors without personal vehicles. Since these routes serve passengers accessing multiple destinations along a route, they do not have the capacity or resources to serve as the primary means of access to high-use recreation sites.

Dedicated shuttle services are often preferable for providing access to popular recreation sites on public lands, because they are better at providing the type of point-to-point transport over long distances typically needed for recreation. Since this type of service has fewer stops than a municipal bus route, it can efficiently and rapidly provide visitors with access to a specific location on a public land. Visitors value high frequency and relatively few stops on the shuttle, particularly if they are unable to access a site using their own vehicle. Willingness and ability to pay for this type of service may be higher than for urban transit, given the benefits in efficiency and the fact that visitors are not using the service daily.

Regardless of the type of service used, alternative transportation services to public lands can best reduce congestion from visitors' vehicles when they are **mandatory or partially mandatory**. It is difficult to address congestion through voluntary services since visitors usually elect to use personal vehicles whenever feasible. This issue is discussed further in the analysis for the Chantry Flat Corridor.

Angeles National Forest and its partners' goals for recreation sites along the foothill communities include **reducing congestion, increasing transit access for underserved communities, and improving safety**. Given the above considerations and results of the analysis described in this report, the report team finds that the most feasible and appropriate options for alternative transportation are:

- 1.) ***A partially mandatory dedicated shuttle service between the Gold Line and Chantry Flat paired with controlled access to Chantry Flat Road***
- 2.) ***A new Pasadena urban transit bus route to provide access to Cobb Estate/Sam Merrill Trail and/or an enhanced existing urban transit route to provide access to Eaton Canyon***

The recommendation for the Chantry Flat corridor is promising because its geography and the high level of visitation enable a partially mandatory shuttle service system that has potential to address all the Forest's and partners' goals. However, the timeline for starting shuttle service to Chantry is likely to be two to five years, depending on the need for a capacity analysis and other processes.⁵ Meanwhile, the City of Pasadena may be able to provide access to Sam Merrill Trailhead and/or Eaton Canyon by extending its existing bus network. While this option would not address congestion, it would expand access for underserved communities and is feasible to complete within a shorter timeframe. Finally, the San Gabriel Canyon sites are less feasible at this time due to the long distance from the Gold Line/foothill communities and the inability to effectively control access.

The following sections provide detailed analysis of the three corridors, outlining potential ways to implement alternative transportation and providing support for these conclusions.

⁵ For example, White River National Forest spent five years conducting the studies and processes needed to implement a fully mandatory shuttle system and limit daily maximum capacity to Hanging Lake recreation area. Other shuttles that do not limit capacity may take less time to implement.

Chantry Flat Corridor

Chantry Flat is a high-use recreation site located three miles within the Forest boundary, due north of Arcadia and Sierra Madre, California (Figure 7). The site offers picnicking and access to several trails and around 80 recreation cabins further in the Forest.⁶ The cabins are only accessible on foot from Chantry Flat; no vehicle access roads lead to them from the site's parking lot. Cabin permit owners and visitors leave their vehicles in the Chantry Flat parking lot during their stay. Chantry Flat also has restroom facilities, but they do not accommodate the current level of visitation. The Forest is in the preliminary phase of developing plans for upgraded facilities (restrooms, visitor center, etc.) at the site. The site is also home to Adam's Pack Station, which sells supplies to visitors and rents llamas for carrying supplies to campgrounds and cabins. Forest staff note that the majority of visitors are day-use hikers or picnickers who spend a few hours at the site.⁷ The site is busiest on weekends, resulting in vehicle congestion and overflow from the parking lots. Some weekdays also experience high visitation, particularly in summer months.

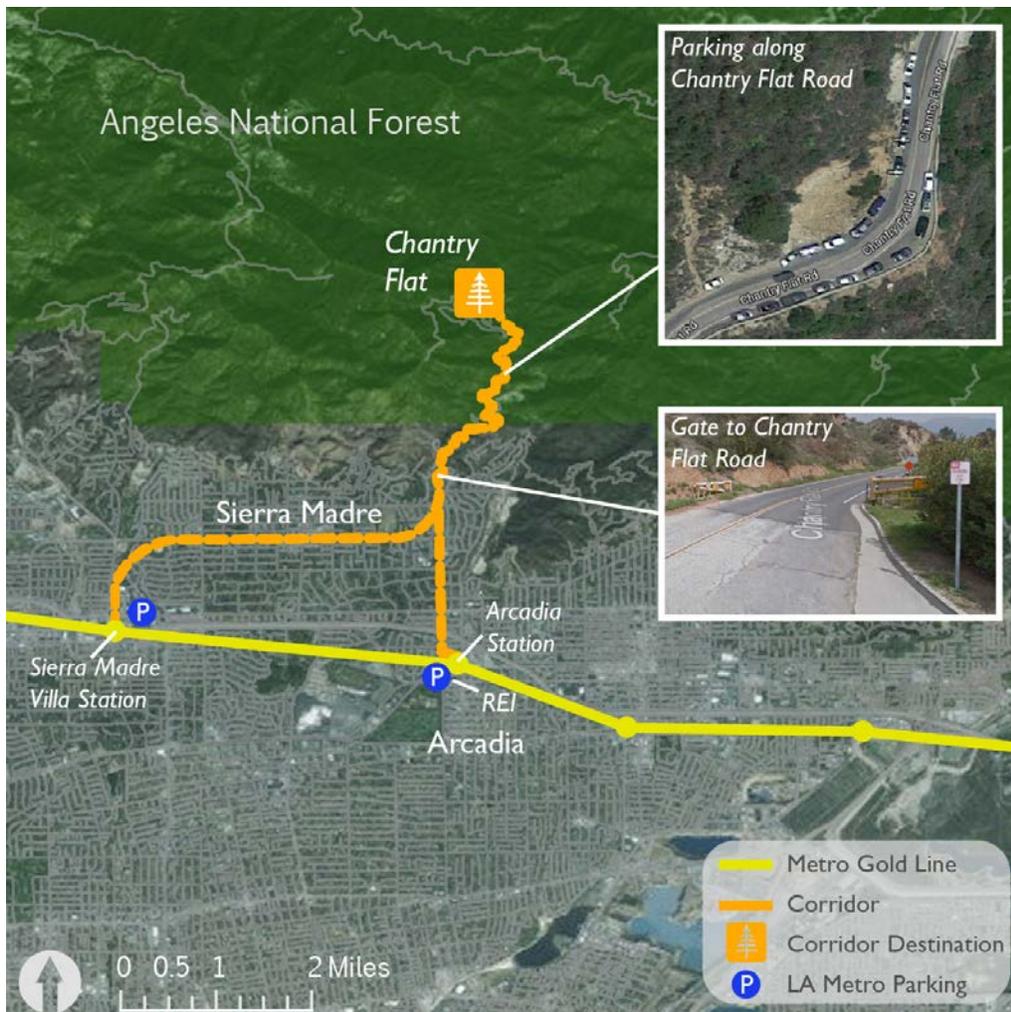


Figure 7. Chantry Flat Corridor and points of interest.

⁶ The cabin users hold special use permits, which are typically in the form of 20-year leases

⁷ Specific data on length of stay is not available. Further analysis of the feasibility of a shuttle service will require collecting data on the length of stay.

Chantry Flat Road, which is owned and maintained by LA County, is the only road providing access to the site. The City of Sierra Madre operates a gate at the head of the road, which it closes between 8:00pm and 6am. The road is steep, curvy, and narrow, climbing more than 1,100 feet⁸ from its base with a 9 percent maximum gradient around sharp bends.⁹

The site has two parking lots: a lot owned and operated by the Forest Service that has 85 parking spaces and a lot owned and operated by Adam's Pack Station that has 30 spaces. Visitors are required to have a National Forest Adventure Pass, which costs \$5 per day or \$30 for an annual pass, to park in the Forest Service lot.¹⁰ Parking at the Pack Station costs \$10 per day. The Forest Service lot is open from 6:00am to 8:00pm, the entire time that the road to the site is open. Despite the high visitation, expanding the size of the parking lot to accommodate all the visitors (up to doubling the number of parking spaces) is not desirable, due to geography and cost. However, there may be an opportunity to increase its size to better accommodate transit or a few additional parking spaces.

Therefore, the Forest and its partners are seeking alternative transportation solutions to improve safety, reduce congestion, and expand access to this site for car-less households.

Based on the following analysis, the report team concludes:

- 1) A dedicated shuttle service paired with gate-controlled access to Chantry Flat Road on weekends will most effectively achieve the Forest's and its partners' goals regarding safety, congestion, and access.** The recommended approach is to prohibit visitors from parking outside of the designated spaces and requiring them to use the shuttle when the parking lot is full.
- 2) Additional data on the length of visitor stays and the volume of traffic in each direction on Chantry Flat Road will provide a more refined estimate for shuttle ridership.**
- 3) It would be most efficient for the Forest to collaborate with LA County on improvements to Chantry Flat Road that will disallow visitors to park on the side of the road**
- 4) Collaboration and discussion with the Forest partners will help identify the most feasible route and scheme for the gate at the bottom of Chantry Flat Road.**

The following section provides preliminary analysis and recommendations for a shuttle service to Chantry Flat, detailing:

- the transportation challenges and opportunities at Chantry Flat
- analysis of visitation patterns
- recommended type of service based on visitation and geography
- estimated ridership for recommended service type
- route options and estimated costs
- concepts for controlling vehicular access to the site
- how a shuttle service would improve access to Chantry Flat for underserved communities

⁸ According to Google Maps.

⁹ Angeles National Forest, "Chantry Flat Pilot Shuttle Program Project Report," Los Angeles: U.S. Forest Service, December 2016, page 4.

¹⁰ Visitors can purchase an Adventure Pass online, at Adam's Pack Station, or other locations. The Adventure Pass is required for parking at a number of Forests in Southern California.

Transportation Challenges and Opportunities at Chantry Flat

Chantry Flat exhibits a number of site specific challenges and opportunities. The challenges to consider when developing concepts for transit service to the site include:

- **Congestion and Illegal Parking:** Every weekend, and many weekdays, the parking lots at Chantry Flat are full, and hundreds of vehicles park along the access road. Visitors are permitted to park along this road, so long as their vehicle does not cross over the white edge line. However, Forest Service staff frequently find vehicles parked over the line, obstructing the roadway. The volume of vehicles using and parking along the road creates heavy congestion.
- **Safety Concerns:** Since there is not room for sidewalks, visitors parked along the road must walk on the curvy, narrow road to access the recreation area. This increases safety risks. As visitors park up to (or even more than) a mile down Chantry Flat Road, they must walk this distance uphill and around bends, while other vehicles simultaneously use the road.
- **Fire Safety Concerns:** It would be difficult to evacuate the high number of people and vehicles at the site in the event of a fire or other emergency. The volume of vehicles would cause heavy congestion.
- **Pets and Equipment:** Many visitors enjoy hiking with their dogs and bring supplies for picnicking. A shuttle service is unlikely to accommodate pets or extensive space for picnicking equipment, so any implementation of a service would need to properly communicate this information. Chantry Flat is also a popular destination for recreational bicyclists, so ideally any shuttle service should accommodate bicycles.
- **Overnight Parking:** Forest staff estimate that 20 - 40 vehicles park overnight at the site on weekends. The vehicles' owners are cabin permit owners and backpackers that are staying overnight in the forest or in the cabins located in the forest. It may be difficult to operate a shuttle that accommodates these visitors and their supplies. However, a shuttle service may not affect them, since they typically arrive very early in the morning before any service would begin.



Figure 8. Vehicles parking along the narrow Chantry Flat Road and making U-turns, obstructing traffic, on Saturday, May 12, 2017



Figure 9. Visitors walk up the road after parking.

The Forest and its partners can also take advantage of the following opportunities:

- **Planned Roadwork:** The County is planning on resurfacing Chantry Flat Road in the upcoming years. The Forest Service and its partners have the opportunity to work with the County to investigate ways that resurfacing could discourage illegal (or any) parking on the side of the road by using bollards or other methods. Collaborating with the County on any redesigns can create cost-efficiencies if the County can incorporate those improvements into its re-paving plans.
- **Parking at Sierra Madre Villa:** The Gold Line stop at Sierra Madre Villa, located 7.8 miles from Chantry Flat, has more than 900 parking spaces. During weekdays, this parking lot fills up with commuters. However, during the weekends, the parking lot remains largely empty and could potentially provide space for people to park their vehicles before taking a shuttle to Chantry Flat. LA Metro currently allows anyone with an activated Transit Access Pass (TAP) card to park at any of its park and ride facilities,¹¹ but it also has an agreement with a local theater to allow

¹¹ Parking at LA Metro stops is free for transit users at some sites, while others impose a fee. Parking is currently free for transit users at Sierra Madre Villa for 841 spaces and paid/reserved for 124 spaces, although LA Metro reserves the right to charge for parking in the future. More information on parking accessible here: https://www.metro.net/riding/paid_parking/gold-line/

their customers to use this parking structure in the evenings. A shuttle operator could discuss with LA Metro the possibility of developing a similar agreement to provide parking for shuttle users.

- **Parking at Arcadia:** The Gold Line stop at Arcadia, located 5.5 miles from Chantry Flat, has 300 parking spaces available. The parking spaces are currently free, but LA Metro may charge for these spaces in the future. No agreement currently exists for non-Metro users to park in this parking lot. While Sierra Madre Villa has more parking spaces and LA Metro already has an outside agreement regarding these spaces, it is important to note that the Arcadia stop also provides an opportunity for parking for a potential shuttle.

Visitation Rate

Chantry Flat's high visitation rate on weekends indicates that there is adequate demand for a shuttle service. Angeles National Forest law enforcement staff collected data on the number of vehicles parked at the Chantry Flat Parking Lot and along the road every weekend between the summer of 2015 and October 2017. Figure 10 illustrates the staff's count of the number of vehicles in total (in the Forest Service and Pack Station lots and along the road) and the average number of excess vehicles (parked along the road) each day of the data collection period.¹² The site experiences peaks in visitation in the spring for both 2016 and 2017 and the overall trend indicates that visitation appears to be increasing. However, data from additional years is needed to confirm any long term projections of visitation.

¹² Data collected by the Angeles National Forest covers 127 days of which 52 are Saturdays, 68 are Sundays, 5 are Mondays, 1 is a Friday, and 1 is a Tuesday (holiday weekends). The majority of days (93) include two data points (one from the morning and one from the afternoon), on 33 days only one data point was collected (mostly in the morning), and on one day four data points were collected. This graph illustrates the higher/highest number collected on a collection day. This is not necessarily the maximum number per day, but the highest of the observed points in time. It is possible there were more vehicles at other times of day. The data collected specifies the time of collection to the quarter of an hour. However, when the dataset was compiled, the analysis team entered the data into hourly buckets, to provide for a higher number of samples per hour. The total data set include 223 data points. The number of data points per hour varies from 1 (6:00am hour) to 54 (9:00am hour). These data do not include the vehicles parked at the Pack Station (30 spots). However, since nearly every data point indicates that vehicles were parked on the side of the road (the number reported was higher than the 85 spots available in the Forest Service Parking Lot), this analysis assumes that that the Pack Station Lot was full.

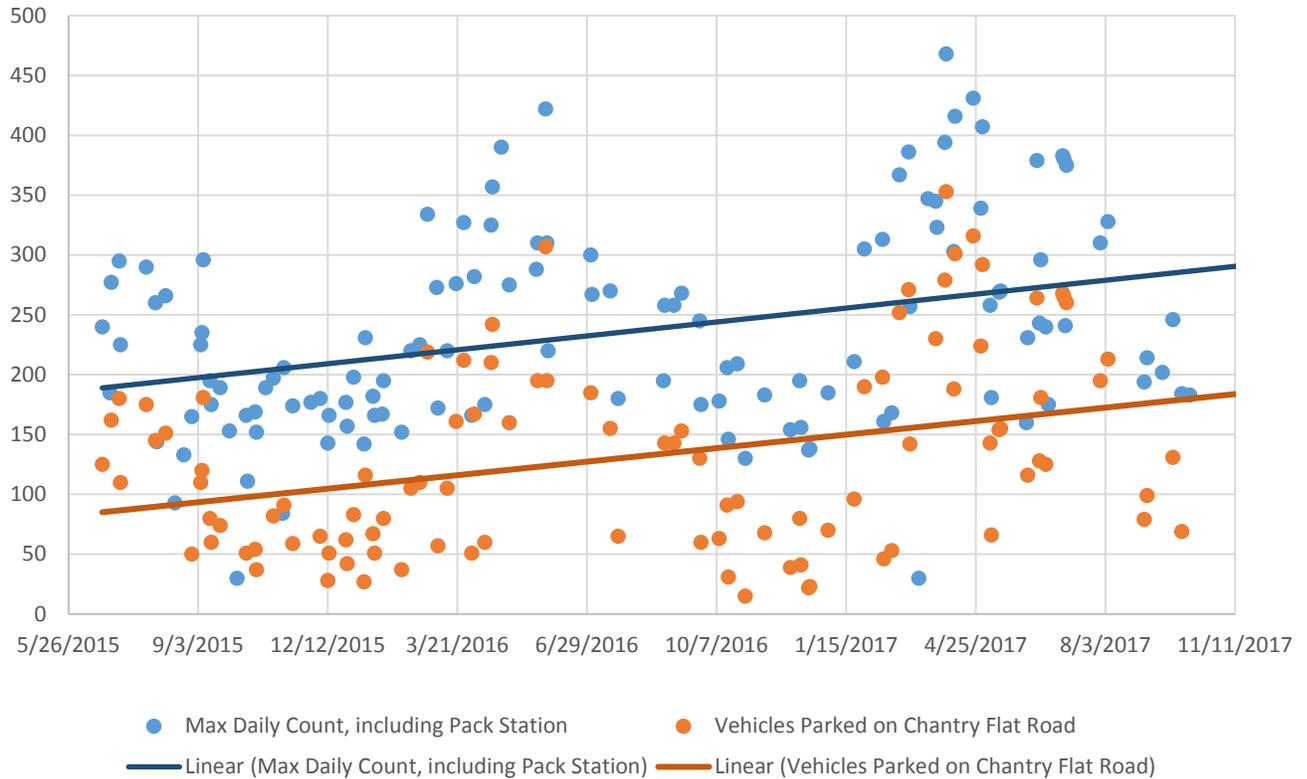


Figure 10. Maximum Count of Vehicles with trend line, weekends in May 2015 to October 2017. Source: Angeles National Forest data and Volpe Center analysis.

Recommended Type of Shuttle Service Based on Visitation Rates

The number of vehicles parked on Chantry Flat Road demonstrate that the site receives a level of visitation on weekends beyond the capacity of the official parking lots to warrant a shuttle service. Figure 10 illustrates that on some days, the amount of cars parked along the road is equal or greater than the amount parked in the parking lots. Furthermore, these data do not account for the number of people who would like to visit the site, but leave upon finding no safe, accessible parking spaces. This number is not measurable without precise traffic counts (and possibly a visitor survey), but the popularity of the site indicates that the real demand for access may be higher than the visitation data in the report suggest.

Within this context, the Forest and its partners can consider one of three types of service:

1. A voluntary shuttle
2. Controlled access to the site and a mandatory shuttle for all visitors
3. Controlled access to the site and a mandatory shuttle once the parking lot is full

If the service were voluntary, the report team expects that most people would still try to park alongside the road, causing two major issues for the shuttle service. First, the shuttle would not receive adequate ridership to justify its cost. A Department of the Interior [report](#)¹³ on transit usage and demand in public

¹³ *Alternative Transportation System Demand Estimation for Federal Land Management Agencies*. Department of Interior, September 2011.

lands found that voluntary services provide transportation for low percentages of visitors – ranging from five to ten percent. This level of usage would result in a high cost of operation per passenger and not address the congestion issues the site currently faces. Second, the continued congestion would prevent the shuttle service from running on schedule, as the buses would be delayed waiting for vehicles finding parking and visitors walking up the road from their parked vehicles. Controlled access is therefore crucial to combat the congestion and safety challenges at the site. Controlled access can be paired with a fully or partially mandatory shuttle service.

Under a controlled access system, only the shuttle service and emergency vehicles would be permitted to enter the road. Controlling access and mandating the shuttle for all visitors has a number of benefits: it is equitable across visitors and it simplifies the type of controlled access system. Using this approach, there would be no need to install a system that permits some visitors but not others. However, there are also a few drawbacks. First, the shuttle system would need to have the capacity to move a large number of people (significantly more than only the visitors who currently do not have parking spots), meaning it would need to operate enough buses to fulfill demand. This level of service would increase operating costs. Second, the fully mandatory system would eliminate parking revenues for Adam’s Pack Station.¹⁴ Third, visitors who wish to bring their pets (apart from service animals) or camping/picnicking equipment would likely not be able to use the shuttle service¹⁵ and therefore not have access to the site during its operation. Finally, community members who are used to having the option to drive to the site would likely oppose this level of change. For these reasons, the report team does not recommend a fully mandatory system.

The final option is to implement a shuttle service that is mandatory only when the Forest Service and Pack Station parking lots are full. The data illustrate that there are enough visitors to sustain this type of service on weekends based only on the number of vehicles that currently park on the side of Chantry Flat Road. However, this number is significantly lower than the total number of visitors, reducing operating costs. Furthermore, this approach retains the option for visitors to park at the site (as long as space is available). The major challenge with this type of service is the need to purchase, operate, and maintain a gate system that only permits visitors to enter when parking spaces are available.¹⁶ In conclusion, the report team recommends this partial mandate, as it provides the most benefits and avoids the biggest challenges with the other two approaches.

It is important to note that any option that includes controlling access and changing the use of the site may trigger a capacity analysis or a NEPA process, the details of which are discussed in the final recommendations and next steps section at the conclusion of the report. The following sections detail the ridership estimate, route options, and preliminary costs for a weekend shuttle service that is mandatory for all visitors once the parking lots have filled. The analysis assumes that the site would be fully open (without controlled access) during the weekdays.

¹⁴ Further discussion with Adam’s Pack Station is needed to determine their concerns and priorities.

¹⁵ While some transit vehicles can accommodate pets and large amounts of equipment, the type of vehicles required for high volumes of riders would make it difficult and undesirable for many passengers with pets and equipment to use the service. Also, many operators prohibit non-service animals.

¹⁶ The options for this system are discussed later in this section.

Estimated Ridership

The report team developed an initial estimate for ridership for a shuttle service to Chantry Flat based on data available regarding the number of vehicles parked at the site. However, additional data collection and analysis are needed to develop a more robust estimate. Two key pieces of data still needed are (1) average length of stay for weekend visitors over the course of the year and (2) traffic counts in both directions on Chantry Flat Road to verify the number of people entering and exiting the site.

Furthermore, additional analysis is needed to identify the demand from potential future visitors who currently do not have access to personal vehicles and therefore do not visit the site. A shuttle service connecting to the Gold Line and other transit services opens access to new visitors, but this report does not provide a specific estimate for this level of demand.

Figure 11 illustrates the average number of vehicles at Chantry Flat per hour during data collection weekends. The report team used these numbers to estimate the total number of people at Chantry Flat per hour on weekends. Beginning from the 6:00am hour, the estimated visitation steadily increases over the course of the morning until the 10:00am hour, where it peaks near 667. After a slight dip to 587 during the 11:00am hour, visitation has a secondary peak during the 1:00pm hour at 615 visitors. Average visitation decreases for the remainder of the afternoon, except for a slight increase at the 5:00pm hour.

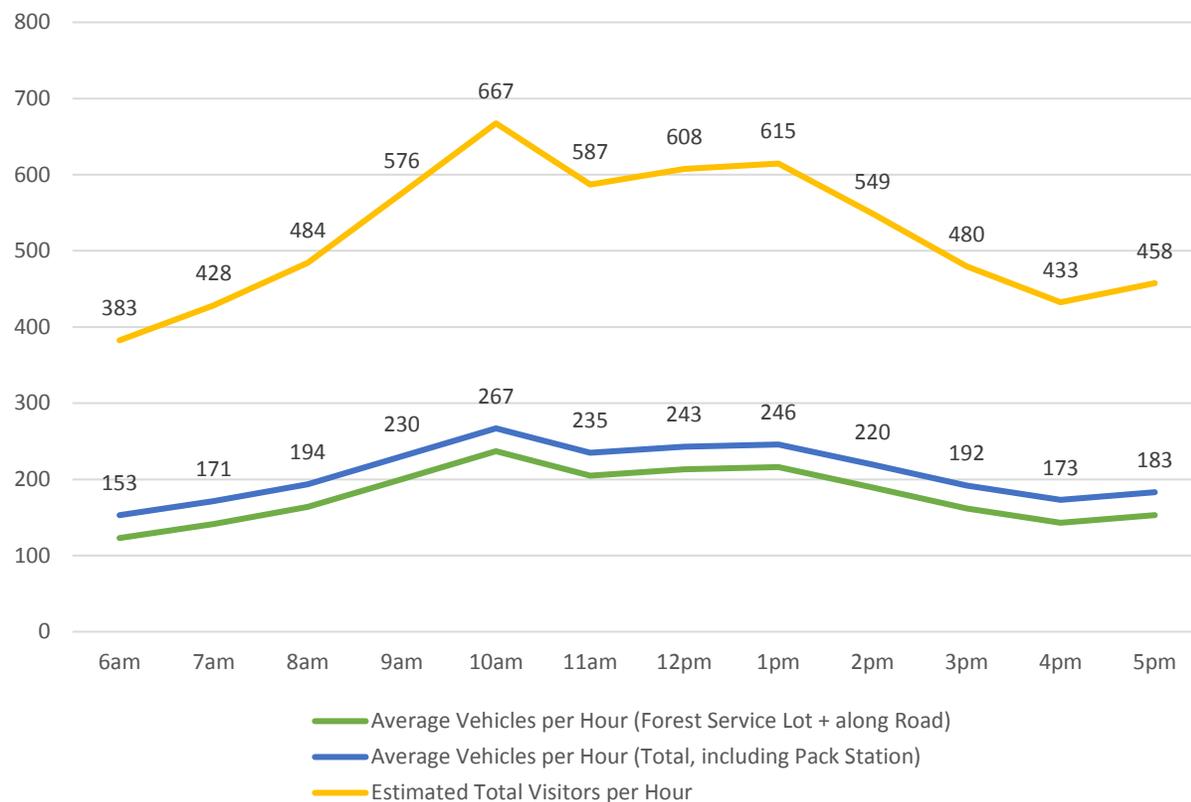


Figure 11. Average Number of Vehicles and Estimated Number of People at Chantry Flat on Weekends per Hour.¹⁷ Source: Angeles National Forest data and Volpe Center analysis.

¹⁷ The average number of vehicles per hour (total) assumes that the Pack Station lot (30 spaces) is full at all times when vehicles are parked along the road. The estimated total number of visitors at the site per hour assumes 2.5 people per vehicle.

These data illustrate the number of visitors/vehicles at the site (and parked on the side of the road) each hour, but do not provide an exact understanding of the number of vehicles/visitors arriving and departing each hour, which is needed to develop estimates for transit ridership. Some additional insight could be gathered by finding how many additional (or fewer) vehicles are present each hour by subtracting the number of vehicles during the previous hour. However, this approach would not account for “replacement” vehicles (outgoing vehicles that are replaced by incoming vehicles).

The report team elected to estimate the hourly demand based on the average number of vehicles counted on Chantry Flat Road during the 10:00am hour each month. The team selected the 10:00am hour for two reasons: (1) it would illustrate the peak need since this time period tended to be one of the busiest times and (2) it minimized the ‘replacement’ problem, since most visitors would not have both arrived and departed between the time a shuttle service may begin (assumed as 8:00am) and 10:00am.

Table 1 shows the resulting estimates for hourly ridership demand per month, based on a vehicle occupancy factor of 2.5, the average passenger load suggested by Forest staff. It is likely that a portion of current visitors would choose to not visit the site or change the day on which they visit instead of taking a shuttle. This analysis estimates that 70 percent of the average estimated number of visitors that currently park alongside the road would use the shuttle service.¹⁸ The highlighted boxes illustrate how the rate changes throughout the year. April, May, and June are the busiest months, shouldered by medium levels of visitation in March, July, August, and September. October through February are relatively quiet. This pattern suggests that a shuttle operator may consider only providing service from March to September or varying service frequency depending on projected demand.

This analysis also rests on the assumption that most of the inbound trips in the morning would be full, but many outbound trips would be less full or nearly empty. However, as the day progresses, the inbound and outbound trips would even out. As visitors arrive through midday and the afternoon, they would fill the inbound shuttle trips while visitors who arrived earlier would fill the outbound trips.

This analysis provides a conservative estimate for ridership so as to reduce the risk of overestimating demand and, consequently, the cost of service operation. It does not incorporate any effect that the cost of parking may have on shuttle ridership. Generally, high parking costs can result in higher demand for transit, whereas low parking costs lead to lower transit demand. The current cost of parking at Chantry Flat, which is set through the Adventure Pass program, is fairly low. An increase in the cost of parking at Chantry Flat could encourage additional transit use, but this report does not account for this potential increase in its analysis. The estimated hourly ridership (70 percent of the average visitors per hour) also does not account for any new visitors that might result from access to the site via the Gold Line or other transit routes.

¹⁸ The survey provided during the pilot in the fall of 2016 asked: “Would you be willing to pay a small fee for this shuttle if it was available on a permanent basis?” 90 percent of the 563 respondents answered yes. This indicates not only a willingness to regularly take the shuttle, but a willingness to pay for it. However, the sample is skewed, since the respondents were self-selecting to voluntarily take the shuttle during the pilot service. Therefore, this analysis estimates that 70percent of current visitors would use the shuttle service, as some current visitors may queue at the gate to await an open space, elect not to visit the site if parking is not available, or come at another time.

The following section will outline the different scenarios of shuttle services that could serve this level and pattern of ridership.

Month	# of Data Points	Average # of Vehicles on Chantry Flat Road (10:00am hour)	Estimated # of Visitors	Average Visitors per Hour (8 – 11:00am)	70percent Average Visitors per Hour (8 – 11:00am)
January	3	86	216	72	50
February	2	78	195	65	46
March	1	212	530	177	124
April	6	230	575	192	134
May	1	307	768	256	179
June	1	264	660	220	154
July	5	203	507	169	118
August*	0	125	313	104	73
September	4	110	275	92	64
October	1	35	88	29	20
November	1	59	148	49	34
December	3	44	109	36	25
All Year	28	152	380	127	89

*No data existed for the 10:00am in August, these data are from the 9:00am hour and assess average visitation from 7:00 – 10:00am

Table 1. Estimated Ridership for Chantry Flat Shuttle. Source: Angeles National Forest data and Volpe Center analysis.

Transit Route Scenarios and Cost Estimates

Based on available resources, visitor needs, and the location of the Gold Line stops, there are three shuttle route alternatives for accessing Chantry Flat:

1. **Existing Pasadena Bus Route 40:** this service would extend the existing bus route 40 (from Old Pasadena to Sierra Madre Villa station of the Gold Line) to include a stop at Chantry Flat.
2. **New Sierra Madre Villa – Chantry Flat Shuttle Route:** this service would begin at the Sierra Madre Villa station, stop in Sierra Madre Downtown, and finish at Chantry Flat.
3. **New Arcadia – Chantry Flat Shuttle Route:** this service would travel between the Arcadia station of the Gold Line and Chantry Flat.

The Forest Service and its partners may consider implementing one of these routes or offering multiple, depending on resources and demand. This report provides analysis of the operations and estimated costs for implementing each on its own and also splitting the service between the Sierra Madre Villa (SMV) and Arcadia metro stops origins. All the scenarios rest on the following assumptions:

- **Weekend ONLY Service:** All routes are only considered for weekend service.¹⁹
- **Peak Season:** The two “new” route options would operate at higher frequencies during peak seasons to accommodate the higher estimated ridership. The peak season occurs March 1 to July 31, around 35 service days of around 104 total service days.
- **Roundtrip Time:** The buses would travel on average 15 miles per hour, accounting for traffic, traffic signals, and the curves and steepness of Chantry Flat Road. This analysis also builds in a 10 minute buffer around travel time to account for passenger boarding and alighting.
- **Service Hours:** Service occurs on Saturdays and Sundays from 8:00am to around 7:00pm. The first bus would leave the Gold Line Station at 8:00am, and the last bus carrying passengers would leave the Gold Line Station at 3:30pm. After 3:30pm, all bus service would be one-way from Chantry Flat to the Gold Line to ensure spaces for all visitors on the return trips.
- **Business Model:** A discussion of business models follows the Corridor Analysis.
- **Vehicle Capacity and Cost:** 30-40 foot diesel bus, carrying 30 seated, 40 with standing room. All calculations for maximum daily capacity assumed 40 passengers per trip. If the Forest Service and its partners collaborated with an entity that already owns buses, the cost of vehicle replacement over time would replace the upfront cost of vehicle purchase.
- **Cost/Revenue Hour:** Estimated costs are based on \$75 per revenue hour²⁰ for the operation of service. Revenue hours are calculated based on the hours of operation per year multiplied by the number of buses. This figure includes the costs for drivers, fuel, maintenance, insurance, administrative overhead, and all other factors covered by the service contract. It does not include the vehicle purchase. The subsequent analyses identify the cost per rider for the service operating at 70 percent of maximum capacity (a conservative estimate for total annual

¹⁹ This analysis accounts for 104 service days (52 weekends per year). It does not incorporate holidays in the costs.

²⁰ Revenue hours are the hours a transit vehicle is in service operation, meaning passengers can use the service. Non-service hours include the time it takes to transport a vehicle to the beginning and from the end of the route and other use outside the passenger-accessible route. This figure is based on the City of Pasadena’s FY2017 contract rate with its operator First Transit, and would escalate 3percent annually in the future.

ridership) in order to provide an initial understanding the financing required in relation to the volume of passengers served, and to inform decisions about an appropriate fare and subsidy.

Table 2 summarizes the findings and the following sections provide additional details and discuss the benefits and drawbacks of each service scenario.

	Old Pasadena – SMV – Chantry Flat	SMV – SM – Chantry Flat	Arcadia – Chantry Flat	<i>Split Service: SMV – SM – Chantry Flat</i>	<i>Split Service: Arcadia - Chantry Flat</i>
Hours of Operation (weekends only)	Saturdays 7:00 – 11:00am SMV – Chantry Flat 11:00am – 5:00pm full route Sundays 7/8:00am – 4/5:00pm	8:00am – 6:45pm	8:00am – 6:30pm	8:00am – 6:45pm	8:00am – 6:30pm
Roundtrip Time	76 min SMV – Chantry Flat ²¹ 132 min full route	72 min	54 min	72 min	54 min
Service Frequency	30 min	Peak: 15 min Shoulder: 30 min	Peak: 15 min Shoulder: 30 min	30 min	30 min
# of Vehicles in operation	5 (3 at certain times)	Peak: 5 Shoulder: 3	Peak: 4 Shoulder: 2	3	2
Hourly Capacity	80	Peak: 160 Shoulder: 80	Peak: 160 Shoulder: 80	80	80
Daily Roundtrip Passenger Capacity	Approx. 800	Peak: 1,240 Shoulder: 600	Peak: 1,240 Shoulder: 600	480	480
70 Percent Annual Capacity	58,240	59,780	59,780	43,680	43,680
Revenue Hours	1,564 (Sat.), 1,365 (Sun.)	4,182.5	2,975	3,354	2,184
Estimated Annual Operations and Maintenance Cost	Additional cost above current service: \$118,950 for Saturday and \$102,375 for Sunday	\$313,688	\$223,125	<i>This portion: \$251,550</i> Total: \$415,350	<i>This portion: \$163,800</i> Total: \$415,350
Roundtrip Cost/Rider at 70 Percent Capacity	\$3.80	\$5.25	\$3.75	\$5.75	\$3.75
Partners Required	<ul style="list-style-type: none"> • Pasadena • LA County • La Metro 	<ul style="list-style-type: none"> • Pasadena • Sierra Madre • LA County • LA Metro 	<ul style="list-style-type: none"> • Arcadia • Sierra Madre • LA County 	<ul style="list-style-type: none"> • Pasadena • Sierra Madre • LA County • LA Metro 	<ul style="list-style-type: none"> • Pasadena • Sierra Madre • LA County • LA Metro
Other Factors	<ul style="list-style-type: none"> • Pasadena as operator • Lack of parking 	Parking at SMV	Lack of parking at Arcadia	Parking at SMV	Lack of parking at Arcadia

Table 2. Chantry Flat Service Options. Source: City of Pasadena and Volpe Center analysis.

²¹ The City of Pasadena provided this time estimate. It is not derived using the same methodology as the others.

Pasadena – SMV – Chantry Flat Bus Route

The City of Pasadena currently runs its bus route 40 from Old Pasadena to Sierra Madre Villa every 30 minutes on Saturdays from 11:00am to 7:50pm. Sunday service (from 7 or 8:00am until 4 or 5:00pm) is planned for FY 2019. The City of Pasadena proposed to the report team that it would consider expanding Saturday and Sunday service to stop at downtown Sierra Madre and Chantry Flat and increase the Saturday operating hours to begin service at 7:00am. The City would not consider this unless additional funding were identified.

Under this proposal for Saturdays, the city would operate a bus between Sierra Madre Villa and Chantry Flat between 7:00am and 11:00am and operate the full route (Old Pasadena – SMV– SM Downtown– Chantry Flat) between 11:00am and 5:00pm. After 5:00pm, the City would run the current route (Old Pasadena – SMV), without the extension to Chantry Flat. Pasadena estimates that this expansion would require three additional buses. Under this proposal, the City of Pasadena would extend service planned for Sundays to stop at SM Downtown and Chantry Flat during the full hours of operation (7 or 8:00am to 4 or 5:00pm). On both days, this service would provide access to Chantry Flat every 30 minutes, meaning up to 80 visitors could arrive per hour and around 800 per day.

Pasadena staff calculated that the expansion of Saturday operation would cost \$118,950 more annually than the current operation (\$68,250), totaling \$187,200 in annual operations. The expansion of the planned Sunday service from the regular route to include Chantry would cost an estimated additional \$102,375. The City also indicated that they would be able to run the service between Sierra Madre Villa and Chantry Flat at a 15-minute frequency using six buses if adequate funding were available.

The benefit of this service is that it is already in place and does not require any partner to implement a brand new service. The partner (the City of Pasadena) is already planning to expand service to Sunday. Also, since this service connects to Sierra Madre Villa, it also benefits from the parking and bus connections available at this location (described below). Furthermore, this service currently reaches a part of Pasadena where low-income and underserved populations live. Therefore, this service would achieve a core goal of the Forest and its partners by expanding access to the Forest.

However, this scenario has several drawbacks. Primarily, it may be difficult to pair this proposed service with a system to control access to Chantry Flat, since this service is a blend of an urban transit route and dedicated shuttle. As discussed in the beginning of the corridor analyses, dedicated shuttle services are preferred to urban transit routes for providing the sole means of access to a high-use recreation site. Dedicated shuttle services are simpler for operators and passengers alike and more flexible to operate. This proposed service also has the longest roundtrip travel time of all the proposals due to the distance traveled and the number of stops along the route. Furthermore, the frequency (30 minute headways) may not provide for the level of demand for the service when access for private vehicles is prohibited. Together, these aspects may result in a lower capacity and level of service than the other proposals. Finally, as compared to the other proposals put forward by the City of Pasadena, this service is more expensive to operate (see Pasadena Corridor section).

SMV – SM Downtown – Chantry Flat Shuttle

The second route option for a shuttle service would run from the Sierra Madre Villa Gold Line station to Chantry Flat, making a single stop in downtown Sierra Madre. The estimated round trip travel time for this route is 72 minutes, 62 minutes for traveling at 15mph and 10 minutes for passengers to board and alight. Given the roundtrip travel time, the service would need to operate five buses every 15 minutes during the peak months to accommodate the estimated hourly ridership. This frequency would provide access to Chantry Flat for up to 160 passengers per hour and 1,240 passenger per day, which would nearly meet the estimated demand of up to 179 visitors per hour.²² The service could operate every 30 minutes during non-peak months to provide an hourly capacity of 80, accommodating the hourly demand during this period (up to 79). Using the estimate of \$75 per revenue hour, a service contract for this type of service would likely cost around \$313,688 annually. A potential service provider may consider first operating the route with fewer buses at a lower frequency (every 20 or 30 minutes) to test the demand, and then consider expanding service once deemed necessary.

This option has three key benefits:

- **Parking:** the Sierra Madre Villa Gold Line station has ample parking that is available on weekends. The parking lot adjacent to the transit stop fills up with commuters on weekdays, but remains largely empty on weekends, when it could be used by shuttle users.
- **Partnership:** The Cities of Pasadena and Sierra Madre have both expressed interest in partnering with the Forest Service on this type of service, as it aligns with their goals. Sierra Madre may also be interested in participating as the service could stimulate economic activity in downtown Sierra Madre.
- **Bus Connections:** The Sierra Madre Villa Station is a major hub for local bus connections. A shuttle stop at this location would enable visitors to access the site from numerous communities, particularly those identified in the LA County Parks and Open Space Needs Assessment as needing better access to open space.

Given the estimated annual operating and maintenance costs, any potential entity who manages the service will likely consider charging riders. If this service operated at 70 percent capacity all year, the cost per passenger to operate would be near \$5.25 per roundtrip. A service provider could account for this cost in their fare pricing and business model. Even if a municipal transit provider operates the service, this shuttle would be a special shuttle service and may require a higher fare than the regular transit service fare, depending on visitors' willingness to pay and extent to which the provider could subsidize the service. Further analysis is needed to identify the appropriate price, subsidy, and business model.

Arcadia – Chantry Flat

The third route option for a shuttle service would follow the route used for the 2016 pilot service, running between the Arcadia metro stop on the Gold Line and Chantry Flat. The estimate for roundtrip travel time is 54 minutes. The service would need to operate four buses every 15 minutes during peak

²² It is unnecessary to match the maximum demand needs exactly, since ridership fluctuates throughout the day. Visitors during peak time may need to wait for the next bus if one is full, but there would be plenty of space at other times. Building a system for peak travel would require more resources and result in emptier buses at non-peak times.

months to reach an hourly capacity of 160 and a daily capacity of 1,240 people, nearing the estimated demand. Like the SMV-SM-Chantry Flat route, the service operator could reduce service to every 30 minutes in the off peak months and still accommodate the estimated hourly demand (up to 79 people). Using the estimate of \$75 per revenue hour, a service contract for this type of service would likely cost around \$223,125 annually. Similar to the SMV-SM Downtown-Chantry Flat route, an operator could choose to start this service at the 30-minute frequency year-round to reduce costs while assessing demand.

The major benefit of this option, as compared to the SMV-SM-Chantry Flat route, is that the reduced travel time would enable the service provider to operate with fewer buses (four rather than five) and therefore reduce costs by around \$90,000 per year.

However, passenger parking would be a challenge, as there are fewer spaces in the parking structure (300) at the Arcadia station on the Gold Line. LA Metro also does not have any current agreements with local businesses for its use on weekends. REI allowed use of their parking lot for the pilot project in 2016, but this could not be a permanent solution. As parking demands for the service would likely outstrip the size of the REI parking lot. Another major drawback is that there would be less incentive for Pasadena and Sierra Madre to be financial partners, as the service would not benefit either municipality. Although the service has lower estimated annual costs than the second scenario, this means it may rely heavily on one municipality for funding.

Given the estimated annual operating and maintenance costs, a potential service provider will likely consider charging for the service. If this service operated at 70 percent of maximum capacity, the average cost per passenger would be around \$3.75 per roundtrip. Even if a municipal transit provider operates the service, this shuttle would be a special shuttle service and may require a higher fare than the regular transit service fare, depending on visitors' willingness to pay and extent to which the provider or funder could subsidize the service. Further analysis is needed to identify the appropriate price, subsidy and business model.

Split Service: "SMV – SM Downtown – Chantry Flat" and "Arcadia – Chantry Flat"

A fourth option for shuttle service is to run the Sierra Madre Villa and Arcadia route simultaneously. If both routes operate simultaneously, the service provider could reduce the frequency for each and still meet rider demand. The service proposed in Table 2 outlines one way in which service could be split, with each running at a 30-minute frequency, together serving up to 160 visitors per hour. The annual operating costs are estimated around \$415,000, more than the cost of running each service on its own.

One potential benefit of splitting service is that it could involve an additional partner (the City of Arcadia) beyond those relevant to the SMV – Chantry Flat service. The more partners involved in providing service will reduce pressure on any one partner and make the service more viable. Additionally, riders would benefit from having the option to take the shuttle from whichever location is more convenient for them.

However, one drawback to this option is the increased cost, which is due to the number of buses needed to run both routes simultaneously. Another drawback is that the operator would still need to operate five buses at once, yet any given passenger would not receive the same level of frequency as they would with only one route in operation. This reduces the quality of service, as passengers value

high frequencies for bus services. Finally, running two routes at once increases the complexity and resources required for organizing the overall service and creates confusion for visitors navigating two services. Visitors would need to take precaution to ensure they board the correct return buses. Therefore, the potential cost savings from partnership with Arcadia and increase in options for riders may not justify the reductions in service quality and increased complexity.

Controlled Access Systems

Controlling vehicular access to Chantry Flat is essential to solving the congestion and safety issues and creating an environment for a viable transit service. Without controlled access, visitors would likely continue to try to park along the side of the road and any shuttle service would be underused and hindered by congestion at the site. Buses would be significantly slowed by traffic from vehicles looking for parking spaces in the parking lot and along the road (these vehicles are slow and make unpredictable moves), as well as pedestrians walking up the road from vehicles parked along the road.

There are two main methods the Forest Service, in cooperation with the City of Sierra Madre and LA County, can employ to control access:

- **Parking Reservation System at Chantry Flat:** A reservation system would require all visitors accessing the site in personal vehicles to sign up in advance for a parking space at a particular time. The system would then require the visitor to provide proof of the reservation in order to open a gate at the bottom of the route before driving up to the Chantry Flat parking lot. This could be done through a variety of mechanisms. The shuttle service would have a transponder to open the gate at all times. Any buses or special reservation groups could also be accommodated through such a system.
- **First-Come, First-Serve:** This type of system would operate in the same way many parking structures operate, providing vehicles with a ticket upon entry and not permitting vehicles to enter once the lot is full. Information about space availability could be provided using an electronic dynamic message sign or other mechanisms. This approach also requires a controlled gate or structure for controlling access at the start of Chantry Flat Road.

A reservation system would better enable the Forest Service to spread out visitor use across different times of day, as visitors would be able to see the times at which the parking lot was still available. This type of system works well for locations that people plan to visit in advance such as Hanging Lake Recreation Area (discussed in the Case Examples). However, most local visitors to Chantry Flat may not plan out trips in advance (as they would a site they are visiting on vacation), but rather view the site as a conveniently located local hiking spot. Therefore, a first-come, first-serve system would likely work better for this site.

There are four main options for gates that enable first-come, first-serve access:

- **Fully Automated:** A fully automated gate would enable vehicles to enter up until the point when the parking lot is full and then prohibit entry (until spaces have opened up). It would remain closed and only open when a vehicle approaches, if there is space in the parking lot. This type of system would require the gate to track visitor vehicles entering and leaving. It would also need to enable the shuttle bus and any Forest Service vehicles (rangers, staff) to enter and exit at all times. Their entry and exit would likely be controlled by a transponder. While this type of

system maximizes the number of visitors able to park, it risks visitors queuing up to wait for the gate to open once another vehicle has departed. Queuing may cause traffic congestion that slows down the bus service and concerns for residents who live near the entrance to Chantry Flat Road.

- **Partially Automated:** A partially automated gate would function the same way the automated gate functions, remaining closed and opening for approaching vehicles, except it would not track the number of vehicles within the parking lot. Therefore, once the parking lot is full, a gate attendant would need to change the gate setting so that it only allows vehicles with transponders to enter (shuttle bus, Forest Service vehicles). The departure side of the gate would need to automatically open for all vehicles exiting. This gate is therefore more labor intensive than the fully-automated gate, requiring an attendant to operate it on weekends.
- **Remote Controlled with Transponders:** A remote-controlled gate would remain open at all times until an attendant at the parking lot closes the gate using a remote control. In the closed position, the gate would only open for vehicles with a transponder. The attendant would then open the gate again once vehicles have departed the parking lot. The departure side of the gate would need to automatically open for all vehicles exiting. This option is more labor intensive than the automated system, but would allow an attendant to be up at the parking lot rather than at the gate location since they may have other job responsibilities. Further analysis is need to determine feasibility for a remote controlled system considering the specific location and geography at Chantry Flat.
- **Transponder ONLY system:** A driver could only open a closed gate using a transponder. Using this approach, the Forest and shuttle operator would need to identify a specific time when the gate would be closed to all vehicles, based on analysis of when the parking lot becomes full and when it begins to empty. The Forest would clearly publicize that Chantry Flat is closed to private vehicles during these specific hours and only permit the shuttle service and other special vehicles with transponders to enter.

The installation price for the gate alternatives ranges from \$20,000 to \$100,000 depending on the sophistication and customization required. The more automated and nuanced the gate procedure, the more expensive the system will cost. The cost estimates do not account for labor associated with gate operation nor the cost of bringing power to the site of the gate installation.²³

Any gate or controlled entry system except the transponder-only approach would need to take into account the potential for ride-hailing services (e.g., Uber or Lyft) and community-organized vans or buses needing access to drop off and pick up visitors. Currently, Chantry Flat does not receive cell service, so visitors generally cannot use ride-hailing services to access the site. However, this may change in the future, if the cellular needs for these types of services change or cell service becomes available. Furthermore, successfully attracting underserved communities to the Forest and Chantry Flat will likely require additional outreach to organize community group trips. Any gate or controlled entry system would also need to account for these types of vehicles, which would not have transponders. This

²³ For all the options, the gate operator would need to work with the power company to extend power to the gate location and install a meter and service panel. This type of adjustment typically costs around \$1,000.

could be accomplished through a reservation system or providing these vehicles with a special accommodation that provides access.

Further analysis and discussion are needed to identify the appropriate controlled access system to pair with a shuttle service to Chantry Flat.

Collaboration with LA County on Rehabilitation of Chantry Flat Road

The shuttle service outlined in previous sections is structured for weekend operation to accommodate visitors during the most congested periods. However, weekday visitation can also create congestion and safety issues. Currently, Forest Service staff indicate that the site can become congested on Fridays, particularly in the summer. This trend may continue, especially if a shuttle service and controlled access encourages some visitors to come by personal vehicles during the week. Physical improvements and changes to the design of Chantry Flat Road could prevent or discourage dangerous and illegal parking at all times, regardless of when the gate is open and the shuttle is operating.

As discussed in the challenges and opportunities, LA County plans to repave the road in the next few years. It would be most cost efficient to make any physical changes to the road that prevent or discourage parking at the same time as repaving. Angeles National Forest currently works closely with LA County on projects relating to Chantry Flat Road. The upcoming repaving work therefore presents an opportunity to work with LA County on design concepts that can reduce parking alongside Chantry Flat Road. These changes could include narrowing the shoulder, constructing bollards or other physical barriers to prevent parking, and other measures. The Forest and its partners will need to continue to work closely with LA County to determine the most effective, safe, and feasible solutions.

Outcome for Transit Linkages to Underserved Communities

An important goal for the Angeles National Forest and its partners is to expand transit access to Forest recreation sites among low-income and underserved populations in the metropolitan area, particularly those without personal vehicles. Connecting Chantry Flat to a Gold Line station by shuttle would enable anyone with access to LA Metro to use public transit to reach the recreation area.

Figure 3 illustrates how a shuttle from the Sierra Madre Villa Station to Chantry Flat would connect to the LA Metro bus and rail network and how this would improve access for underserved communities (highlighted in purple).²⁴ The map illustrates the approximate time it would take to travel from every train stop across the network and from intermittent bus stops on the bus lines that have a stop at Sierra Madre Villa Station. The buffer zones around each stop are a ½ mile for the rail stops and a ¼ mile for the bus stops, reflecting the approximate distance people are willing to walk to each type of station. The key takeaway from this analysis is that a shuttle connection to the Gold Line would enable underserved communities in Pasadena and north of downtown Los Angeles to access Chantry Flat in 45+ minutes and communities near parts of LA Metro’s Red, Blue, Expo, and Green lines to access Chantry Flat in 90+ - 105+ minutes.

²⁴ This analysis identified underserved communities by selecting all Census tracts where more than one third of the population was living below 125percent of the poverty line. This metric is not inclusive of all types of disadvantage, but identifies where concentrations of poverty exists. Future analyses could use different metrics or build an index using multiple metrics.

An important next step for further analysis is to quantify the impacts of the proposed connection between the Gold Line and Chantry Flat. A study could identify estimates for the number of people without personal vehicles and the number of low-income people who would be able to access Chantry Flat from the LA Metro service through implementation of a shuttle. Further study could explore the estimated demand for access to unique natural sites like Chantry Flat among these communities and populations.

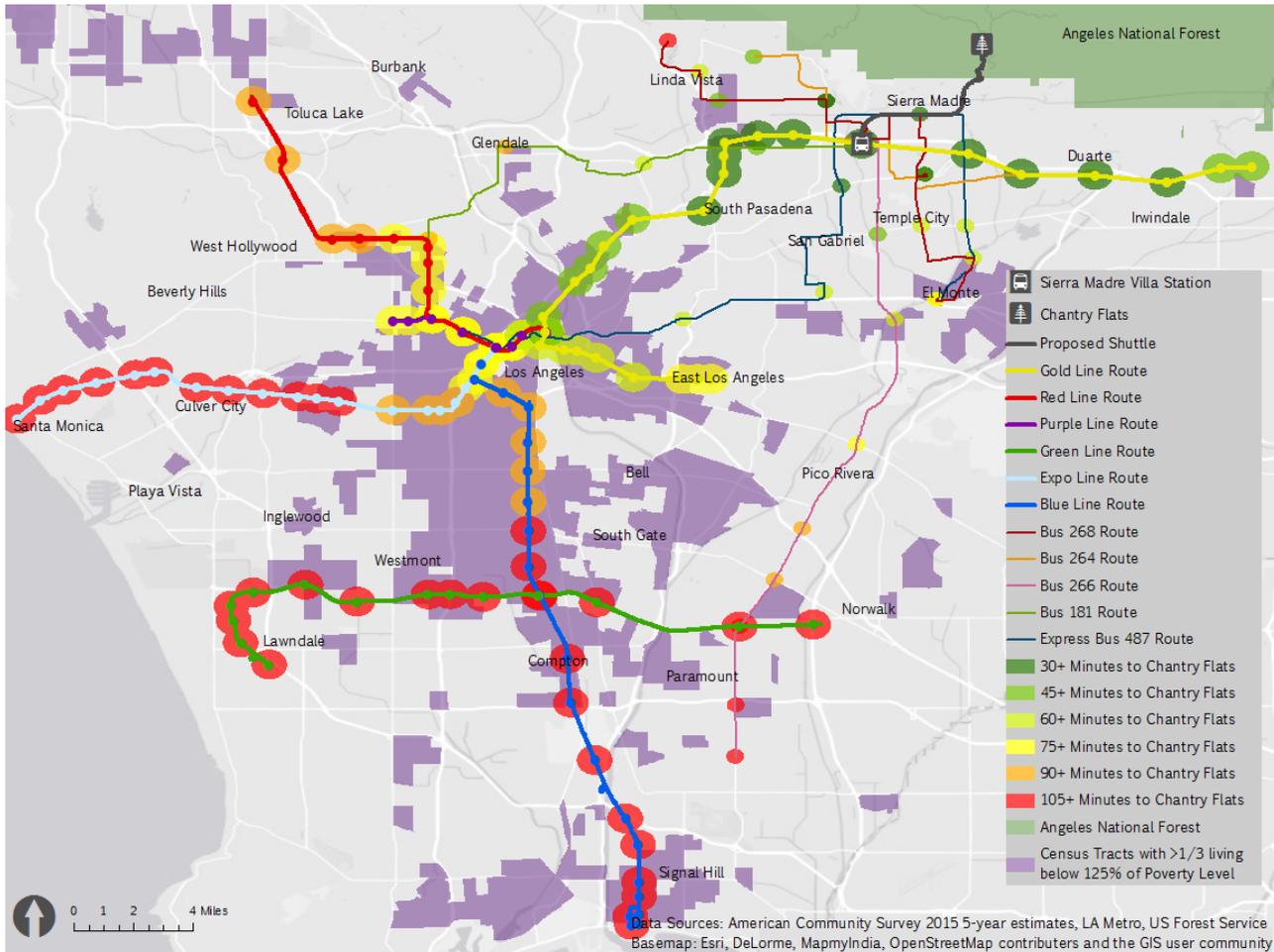


Figure 12. Time (minutes) to access Chantry Flat by transit via Sierra Madre Villa station and location of underserved communities.

Figure 12 demonstrates that a shuttle connection to the Gold Line would effectively expand access to the Forest via transit to underserved communities across the metropolitan region. Given the lengthy travel times from many neighborhoods, it may be important to consider coupling a shuttle program with other outreach efforts to community organizations to 1) increase awareness about how to access the forest and 2) initiate alternative means of access (via community organized vans or carpooling).

Pasadena Corridor

The Pasadena Corridor includes access to two locations: the Sam Merrill Trailhead and Eaton Canyon each located on the western end of the southern foothills of the San Gabriel Mountains. While neither trailhead is on National Forest property, the trails provide access to the Forest. They are some of the closest access points to the mountains from urban areas, so they are popular among hikers for quickly experiencing spectacular scenery.

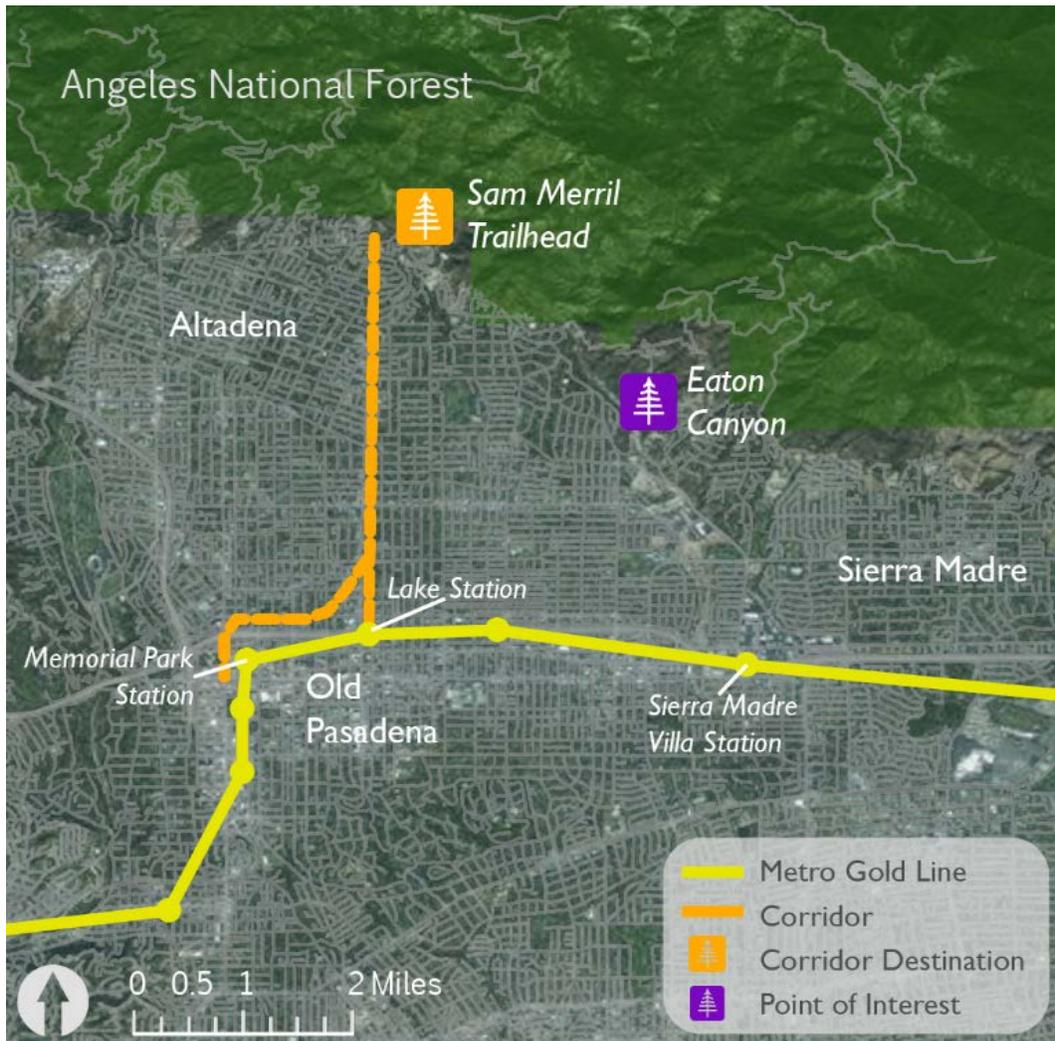


Figure 13. Pasadena corridor and relevant points of interest.

The Sam Merrill Trailhead is located at the old Cobb Estate entrance at the intersection of the north end of Lake Avenue and East Loma Alta Drive in Altadena, just north of Pasadena. The Cobb Estate is named after the mansion and property that used to occupy the site, which was purchased by community groups and turned into a park in the 1970s. The Sam Merrill Trail to Echo Mountain is the most popular of the several trails accessed at this point. In addition to natural scenery and vistas, the area is also the site of many historic landmarks and ruins from the period when this area had more tourist infrastructure. The site does not have a parking lot. Visitors park on the adjacent streets and use the street or sidewalks (when available) to access the site.

East of the Sam Merrill Trail, Eaton Canyon Park and Nature Center is a LA County regional park located just off North Altadena Drive above its intersection with New York Avenue in Pasadena. The park includes an auditorium, barbecues, equestrian staging area and trails, a gift shop, a museum, nature center, outdoor amphitheater, picnic areas, and trailheads for hiking. Hikers can access trails into the Angeles National Forest including the old Mount Wilson Toll Road into the canyon that leads far into the forest and up steep mountain ridges. The site includes a parking lot managed by the Nature Center.

Since access to these trails is integrated into Altadena and Pasadena's urban street network and the sites are not on Forest land, it would be difficult to effectively control access to them. The report team focused on solutions to connect existing urban transit to the site with the aim of providing access for underserved communities and an alternative for visitors who elect not to drive. During the development of this report, the City of Pasadena provided two proposals for extensions of their existing services that would address these goals (in addition to the proposal regarding access to Chantry Flat provided in the previous section). These proposals are detailed in this section.

Based on analysis of existing conditions and these proposals, the report team recommends the Forest and its partners:

- 1) Support the most feasible proposal for weekend service by Pasadena Transit**
- 2) Identify funding to build a bus shelter at the entrance to Cobb Estate that accesses the Sam Merrill Trail (if this service is pursued)**
- 3) Introduce a branding scheme to identify access to the Forest at the stops on a new transit service to the Cobb estate and on the existing Route 32 near Eaton Canyon**
- 4) Conduct counts and a survey of trail users at both locations about their travel decisions**
- 5) Increase awareness of the transit option once it is in place through marketing and communications**

The following section describes the rationale for these recommendations, detailing:

- the transportation context and challenges at each destination
- recommended type of service for each destination and estimated costs
- how a shuttle service would improve car-less access to the Pasadena/Altadena trails for underserved communities

Sam Merrill Trailhead/Cobb Estate Entrance

Hikers destined for either the Cobb Estate area or the Sam Merrill Trail arrive primarily by car and must use on-street parking in the surrounding neighborhood in Altadena. Residents of this area frequently complain about the amount of street parking hikers occupy, particularly early in the morning when the greatest number of visitors arrive.



Figure 14. Visitors arrive at the trailhead early on a Saturday morning. Cars begin to line the street.

There are currently no bus routes that directly access the Cobb Estate entrance. The closest route is LA Metro Bus Route 180, which comes at irregular frequencies between 30 minutes and one hour and stops at Altadena Drive and Lake Avenue, roughly one mile south of the Cobb Estate entrance. No continuous sidewalk exists between this stop and the entrance. The closest Pasadena Transit stop is at Woodbury Road and Lake Avenue, roughly two miles from the Cobb Estate.

The Cobb Estate is not far from the existing Pasadena and LA Metro bus networks. Extending the LA Metro Bus Route 180 to this area is probably not viable because it does not have enough space for multiple vehicles to layover or make a turnaround like the current terminal at Altadena Drive.

The City of Pasadena is a more feasible potential partner for providing future transit service to this area due to a number of factors:

- **Availability of Urban Transit Vehicles:** City of Pasadena staff informed the Report Team that Pasadena Transit currently has several excess vehicles it does not use on the weekends, which may be repurposed to provide a new service.
- **Transit Plans:** Pasadena is currently updating its transit plan, expected to be adopted in early 2018, and has identified “access to the mountains” as a goal for the transit system. It also would like to improve service to an area with high public transit demand along Fair Oaks Avenue into Altadena, which would bring Pasadena Transit’s service area further north than currently available.
- **Pilot Service:** The Trust for Public Land has funded a pilot service, operated by Pasadena Transit, to operate a bus from the Memorial Park Gold Line station up Fair Oaks Avenue to the Cobb Estate.

- **Coordination with LA County:** Pasadena Transit has approached LA County about possibly serving this area of Altadena on a more permanent basis and has included the route proposed in this report as a possible one for its future service.

Eaton Canyon

The second possible transit destination in the Pasadena area is Eaton Canyon. It is easily accessible by personal vehicle or bicycle and has an abundance of free parking spaces available in two lots, though these lots sometimes become crowded on weekend days. There is no direct bus service to the Eaton Canyon Park and Nature Center, but there is a bus stop roughly 600 feet south of the park driveway at the corner of North Altadena Drive and New York Avenue. It is then another 1,000 feet or so from the driveway to the Eaton Canyon Trailhead. Visitors would therefore need to walk about a third of a mile (10 minutes) from the bus stop to access the trailhead.

This bus stop receives limited service by LA Metro Route 264/267 and Pasadena Transit Route 32. Route 264/267 operates hourly for 7 days a week and connects to Sierra Madre Villa Station and Memorial Park Station on the Gold Line. Route 32 operates Monday through Saturday. The Saturday service has an hourly frequency and begins at 10:45am and ends at 8:05pm. Route 32 connects with Sierra Madre Villa Station on the Gold Line.

Because this existing bus stop is so close to the Eaton Canyon Park, visitors could use it today to access the trails. Currently service runs on a fairly limited schedule, which might not be useful to most hikers, but the option is nonetheless available. However, there is no on-site information indicating that the stop is close to the park and the entrance to the park is not visible from the bus stop, so it is not widely known that these trails are accessible via public transit.

Proposed Services and Estimated Costs

Table 3 summarizes the two proposals the City of Pasadena provided for expanding transit access to Cobb Estate/Sam Merrill Trailhead and Eaton Canyon. For both services, the report team recommends the Forest work with the City of Pasadena and LA Metro to identify a logo or decal that they can place on the bus stop signs at Eaton Canyon and Sam Merrill Trailhead (if pursued) indicating the stops are part of a network that links to the Forest. The following sections detail each proposal. The report team recommends supporting the most viable public transit service possible in the Pasadena area with buy-in from the City of Pasadena, Altadena, and LA County.

	Fair Oaks Avenue – Sam Merrill Trail	Route 32: Sierra Madre Villa – Eaton Canyon
Hours of Operation (weekends only)	7:00am – 5:00pm	7:00am – 5:00pm
Roundtrip Time	25 min	10 min between SMV and Eaton Canyon; total route is approximately 1 hour
Service Frequency	30 min	30 min
# of Vehicles in operation	2	2
Hourly Capacity	80	80
Daily Roundtrip Passenger Capacity	800	800
Revenue Hours	2,080	4,182.5
Estimated Annual Operations and Maintenance Cost ²⁵	\$156,000	\$98,280 more than current service costs
Partners Required	<ul style="list-style-type: none"> • Pasadena • LA County • LA Metro 	<ul style="list-style-type: none"> • Pasadena • LA County • LA Metro
Other Factors	<ul style="list-style-type: none"> • Construction of basic ADA-compliant bus stop required 	<ul style="list-style-type: none"> • Need for wayfinding at bus stop

Table 3. Proposals for services to Sam Merrill Trailhead and Eaton Canyon. Source: City of Pasadena.

Proposal for Access to Sam Merrill Trailhead

The City of Pasadena’s preferred option for serving Sam Merrill Trail is to create a new route that would begin at Memorial Park Metro Station in Old Pasadena and travel north up Fair Oaks Avenue to East Loma Alta Drive and then on to the Sam Merrill Trailhead. Pasadena’s priority is to serve Fair Oaks Avenue in Pasadena and Altadena because it is a densely-populated area that has a lot of transit riders. This route would both serve that community to access metro and provide access to the mountains.

²⁵ These costs are based on the City of Pasadena’s FY2017 contract rate with its operator First Transit, and would escalate 3percent annually in the future.

Proposal for Increased Access to Eaton Canyon

The options to extend transit directly to Eaton Canyon are limited, because there is not enough space within the parking lot to accommodate a bus turnaround. Instead, the report team recommends improving wayfinding and public information at the bus stop at Altadena Drive and New York Avenue to indicate the existence of and direction to the park entrance. Additionally, the Forest and its partners could work with LA Metro and Pasadena Transit to change their route maps and schedule information to clearly identify the stop as the ‘Eaton Canyon Park stop.’

The City of Pasadena indicated that Pasadena Transit could increase service to begin at 7 or 8:00am on Saturday and Sunday mornings to accommodate people hoping to access the trails at Eaton Canyon. The City provided a proposal to improve transit access to Eaton Canyon that adds additional frequency and extends the operating hours for the existing Pasadena Transit Route 32.

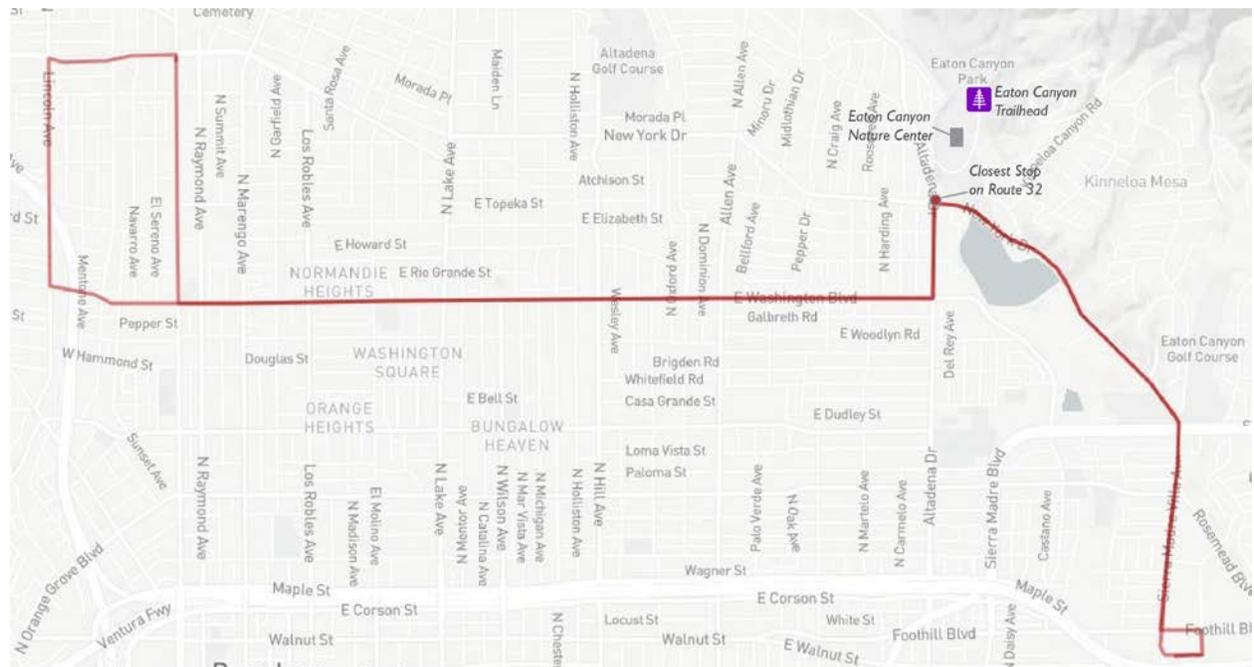


Figure 16. Pasadena Transit Route 32. Source: City of Pasadena.

Route 32 currently runs on Saturday between 10:45am to 8:05pm with an hourly frequency. Sunday service is planned for FY19 and will likely start between 7:00 and 8:00am and run until 4:00 or 5:00pm with an hourly frequency. The cost projection (Table 3) shows estimated additional costs to meet a 30-minute frequency, extend hours to start service at 7:00am on Saturday, and provide 30-minute frequency service on Sundays, assuming no Sunday service is budgeted.

One important consideration for this proposal is the estimated demand for increasing this service. Eaton Canyon currently has ample parking available, so the proposed expansion of the existing bus service may not attract many passengers, as the majority of trail users will likely continue to use their personal vehicles.

Estimated Ridership

Unlike with Chantry Flat, there has not been consistent data collected on the number of hikers who access the Sam Merrill Trail at the Cobb Estate or the Eaton Canyon trails. Therefore, it is not possible to accurately estimate the ridership to these locations. Any data collection effort would need to include both counts of trail users and surveys of users to indicate whether they would be willing to take a bus to the trail, since using public transit to access the site access would be purely voluntary.

The Angeles National Forest and its partners could conduct counts and the partners could conduct surveys once transit service has started to the Sam Merrill Trail in order to evaluate the effectiveness of the service at attracting trail users, including those without personal vehicles.

Outcome for Transit Linkages to Underserved Communities

The proposed Sam Merrill Trailhead/Cobb Estate Route that would travel up Fair Oaks Avenue would have a clear benefit of serving transportation-disadvantaged communities. An estimated 17,094 people live within ¼ mile of the proposed route. Twenty-two percent of this population lives in poverty, 84 percent are people of color and 16 percent of households do not have access to a car, according to the City of Pasadena's transportation department's estimates.

Also, both the proposed Sam Merrill route and Route 32 to Eaton Canyon would connect the destinations to the Gold Line. The level of access from areas of large low-income concentration would be slightly better than the proposed Chantry Flat service due to time savings. The trailhead destinations are closer to the Gold Line than Chantry Flats, so the time spent on the bus would be reduced.

San Gabriel Canyon Corridor

State Highway Route 39 runs the entire course of the canyon and provides access to the recreation sites associated with the canyon. This analysis initially focused on the potential to provide transit to two of these sites in order to ease parking congestion and expand access: West Fork Fishing and Recreation Area at the head of Forest Road 2N25 and several sites on East Fork Road, including the Heaton Flat Trailhead, a popular hiking trail at the end of East Fork Road, and the Oak Picnic Area at the confluence of Cattle Canyon the East Fork San Gabriel River (Figure 17). East Fork Road also provides access to additional non-Forest operated roads and sites including Shoemaker Canyon Road; Camp William, a mobile home community; and Glendora Mountain Road.

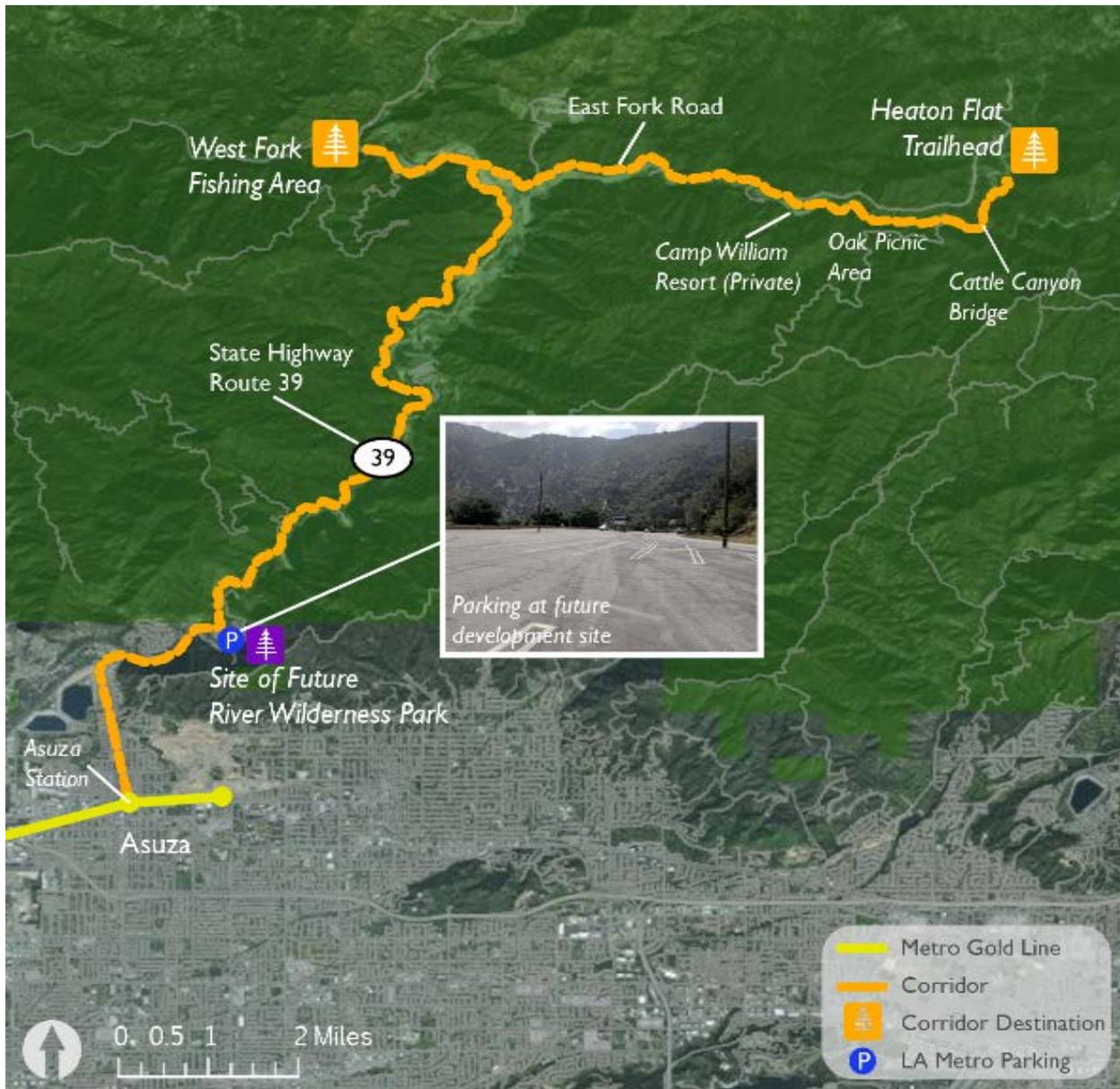


Figure 17. San Gabriel Canyon Corridor.

State Route 39 is owned and maintained by Caltrans, the State Department of Transportation. East Fork Road is owned and operated by LA County. After the site visit, the team decided to focus on the East Fork Road area, because it faces the most parking congestion and resulting safety issues, and the road provides access to more river areas (each with their own parking lot).

The parking lot at the East Fork Trailhead, which is owned and operated by the U.S. Forest Service, contains 34 parking spaces. Like Chantry Flat, vehicles must have an Adventure Pass to park in the parking lot. Forest Service staff estimate that 75 percent of the East Fork recreational users are day-use hikers and that between 10 and 20 percent (40 – 70 people each day) are using privately operated recreation sites further in the Forest. The visitors accessing privately operated recreation sites frequently park early in the morning and leave their vehicles in the parking lot all day. Also, people who spend weeks or months in the adjacent wilderness areas use the parking lot, leaving their vehicles for long periods of time.

Based on the existing challenges and following analysis, **the report team concludes that implementing a dedicated shuttle service from the Gold Line to the East Fork sites is not feasible at this time.** This conclusion is primarily influenced by the long distance between the Gold Line and the recreation sites and the inability to effectively control access and require shuttle usage (thus boosting ridership). Future developments of the recreation sites on East Fork Road may make a shuttle more feasible.

The following sections of the report provide evidence for this conclusion and describe the type of shuttle service that may be appropriate in the future, detailing:

- the challenges and opportunities relevant to transportation to the East Fork sites
- analysis of visitation patterns
- recommended type of service based on visitation and geography
- estimated ridership for a potential voluntary shuttle
- route options and estimated costs for a potential voluntary shuttle

This section does not include an analysis of how a shuttle service would improve transit access for underserved communities, because the report team is not recommending pursuing a shuttle service at this time.

Transportation Challenges and Opportunities

Like Chantry Flat Road, East Fork Road is congested on weekends, and many visitors park on the side of the road once the parking lot at the Heaton Flat Trailhead is full. However, the San Gabriel Canyon corridor presents several challenges for potential transit service:

- **Location and Access:** It would be difficult to control access to this site and make the shuttle service mandatory once the parking lot is full, as outlined in the Chantry Flat discussion, since East Fork Road also provides access to other roads and sites. The Forest Service could not restrict these access points, so it would be difficult to implement a workable controlled access system.
- **Distance:** The Heaton Flat Trailhead is located 16.8 miles from the nearest Gold Line station in Azusa. The time it would take a shuttle bus to traverse this distance (more than 40 minutes) is a deterrent, as it would likely result in an infrequent service or require a higher number of buses.

- **Long-term Parking:** A number of parking spaces that day-use hikers could use are taken up by the visitors who leave their vehicles in the parking lot overnights, weekends, and for weeks at a time.
- **Parking at the Azusa Gold Line Station:** The parking lot, which contains 237 spaces, at the Azusa Gold Line Station is currently only available for transit riders. The spaces are free for transit riders on weekends. Additional coordination would be required to make these spaces available to non-Gold Line users.



Figure 18. This vehicle has been in the East Fork Trailhead parking lot for weeks or months.

Despite these challenges, there are also a few opportunities related to the site that the Forest Service and potential partners may consider:

- **Recreational Site Improvements at Cattle Canyon:** The Angeles National Forest is currently pursuing plans to make improvements along a 2.5-mile stretch of East Fork Road near Cattle Canyon. The development will improve the visitor amenities and address environmental degradation of the river in certain areas. Included in the facilities improvements is an expansion of parking at the Heaton Flat Trailhead and other parking lots along East Fork Road.
- **Development Plans for River Wilderness Park:** There are also existing plans to develop River Wilderness Park, located just south of the entrance to San Gabriel Canyon. The site currently has ample parking. The site could serve as a stop on a potential shuttle service.

Visitation Rate

This analysis uses data from a 2014 Visitor Use Survey to determine estimated visitation. California State University conducted a Visitor Use Survey in the summers of 2013 and 2014 at recreation sites along East Fork.²⁶ The surveyors counted an average of 273 total vehicles at the sites, with an average of 131 at the Oaks Picnic area sites and 142 near the East Fork Trailhead. The survey data indicate that vehicles near the Oak Picnic area sites had an average of 5.1 passengers (total of 668.1 visitors per day), and the vehicles near the East Fork Trailhead had an average of 3.1 passengers (total of 440.2 visitors per day). The Oak Picnic area sites have a high rate of passengers per vehicle due to the number of large groups (mostly families and church groups) visiting the area.



Figure 19. Vehicles parked along East Fork Road.

²⁶ On-site surveys were conducted on weekends and holidays from Memorial Day to Labor Day weekend, a total of 31 days each survey year. Report is accessible here: https://d3n8a8pro7vhmx.cloudfront.net/wca/pages/81/attachments/original/1511200024/2014_SGR_Visitor_Use_Preliminary_Report.pdf?1511200024

Recommended Type of Service for San Gabriel Canyon

As discussed in the Chantry Flat section, the Forest and its partners can consider three types of service:

1. Controlled access to the East Fork sites and a mandatory shuttle for all visitors
2. Controlled access to the site and a partially mandatory system
3. A voluntary shuttle

The Forest and its partners should only consider a mandatory system if it plans to limit or manage visitation to the site. A fully mandatory system would require significant resources to fund operating the service and enforce the mandate/prohibit parking at the sites. Despite the high cost, the benefit of a fully mandatory system is full control over the level of visitation. Therefore, this type of system and the associated cost only makes sense if the Forest and its partners seek to manage visitation. The report team did not consider a fully mandatory shuttle system, because the Forest was not pursuing limiting or managing visitation at the time of writing this report.

A partially mandatory dedicated shuttle service with controlled access, similar to the system proposed for Chantry Flat, is not feasible for two reasons related to the geography of the site. First, it is not possible to control access at a point near to a potential shuttle pick-up location, such as the Asuza Gold Line station.²⁷ Any potential gate or control system would need to be placed at the Cattle Canyon Bridge or even closer to the East Fork Trailhead parking lot, so as not to limit access to the other properties and roads accessible from East Fork Road. Using this approach, visitors that reach the site after the parking lot has filled and the gate has closed would need to drive more than 30 minutes to reach any feasible shuttle origin outside of the canyon.²⁸ These visitors will then have spent more than an hour total (more than 30 minutes to drive to the gate and 30 minutes to drive to the shuttle origin) trying to access the recreation site before boarding a shuttle (which would take an additional 40–45 minutes to reach the destination).²⁹ This scenario would reduce the visitor experience and likely dissuade many visitors from making the trip to the East Fork area.

The second key limitation is that the Heaton Flat Trailhead parking lot is a significant distance (almost 17 miles) from the nearest Gold Line station, meaning that the service would take around 90 minutes round trip including time for passengers to board and alight.³⁰ It would be difficult to operate a system that runs with high frequency (more than once every hour). The low frequency and length of the ride would deter many visitors.

These two factors indicate that a shuttle service similar to the service outlined for Chantry Flat would be difficult to replicate for the East Fork Road sites. Any potential shuttle service would therefore need to

²⁷ The Chantry Flat corridor has a gate at the bottom of Chantry Flat Road, a 3.3-mile winding road leading to the recreation site. Visitors arriving when the parking lot is full would avoid driving all the way up and down the road (20–25 minutes total), since they would be notified at the gate that they would need to take the shuttle from either Sierra Madre Villa (10 to 15-minute drive from the gate) or Arcadia (8-minute drive from the gate) stations. This set up saves them a significant amount of time.

²⁸ Asuza Gold Line Station or River Wilderness Park are two potential locations.

²⁹ One alternative is to install signage on Route 39 that will indicate whether or not the parking lot is full. However, visitors in similar circumstances often ignore the signage and will continue to the destination to make sure there is not parking available.

³⁰ Assumes a 25 mph speed for buses. A regular vehicle could make the trip in 1 hour and 10 minutes.

be voluntary in order to maintain visitor experience. Such a service would likely not improve parking congestion at the East Fork area sites, since the majority of visitors would continue to use their personal vehicles.

The following sections provide preliminary analysis on estimated demand and cost for a voluntary shuttle service.

Ridership Estimate

The visitation data from the surveys conducted in the summer of 2014 indicate that around 1,100 people access the East Fork Road sites daily on weekends. As described in the previous section, a partially mandatory shuttle service paired with controlled access is not feasible for this site. Therefore any service would be voluntary.

A voluntary service would only receive a small fraction of the total visitation (likely between 5 and 10 percent). Based on the visitation data, the estimated demand for a voluntary shuttle service to the East Fork Road sites is between 55 and 110 people daily. This level of demand is relatively low as compared to Chantry Flat and other high-use recreation sites.

Transit Route Scenarios and Cost Estimates

A potential shuttle service could operate a 15 passenger van or small bus at a frequency of once every 45 minutes (two vehicles) to meet the estimated daily demand. If this type of service operated between 8:00am and around 7:00pm, with return trips only after 3:30pm, it could serve a maximum of 165 people daily.

The cost per revenue hour for this type of service may be lower than the cost per hour for the 30 – 40 passenger vehicle. However, it is likely in the same range, since the most expensive aspect of providing transit is the labor cost. Therefore, this analysis uses an estimated cost per revenue hour of \$70.

The estimated annual costs are \$160,160. The cost estimate for this service is comparable to the estimates for the Chantry Flat routes, but the service would serve a much smaller number of visitors. This ratio illustrates how the proposed Chantry Flat service offers a greater benefit (to a larger number of visitors) for the estimated cost.

Business Model Options

There are four types of business models³¹ the Forest Service uses to operate transit services on public lands:

- **Commercial Services:** The Forest Service authorizes a private entity to provide transportation through a Concession Special Use Permit. The private entity provides services to visitors for a fee, from which the private entity covers its costs and earns a return on investment. The Forest Service develops a prospectus proving reasonable potential for profitability and then develops a contract with the private entity providing the service. The contract may specify a certain percentage of revenue or amount paid to the Forest Service annually to cover the cost of administering the contract.
- **Service Contract:** The Forest Service funds a contractor to provide transportation services to visitors. The parameters of the services are outlined in the contract, as well as the performance metrics by which the contractor will be assessed. The Forest may need to conduct annual reporting on the contract. The Forest Service may purchase/provide the vehicles and contract with a third-party for operation or may contract with an operator who provides the vehicles.
- **Partnership Agreement:** The Federal Land Management Agency has a legal agreement (Memorandum of Understanding, cooperative agreement, or other legal agreement) with an agency or organization (such as a local transit agency) regarding the provision of transit service and/or extension of an existing service to provide access to public lands. The agreement outlines the roles and responsibilities of each party in running the service and may or may not have a financial component.
- **Federally Owned and Operated:** The Federal Land Management Agency owns and operates the service, meaning it purchases, maintains, and stores the vehicles, hires all personnel related to operation, and administers daily operations.

The Forest Service does not have the resources to operate its own permanent shuttle service nor to fully fund and manage a service contract. Therefore, the Angeles National Forest will need to either enable service provision through a commercial service or partner with a local municipality or transit agency. The following sections outline the possibilities, benefits, and drawbacks of each of these options.

Commercial Service Contract

A Commercial Service Contract, authorized by a Concession Special Use Permit, enables a private entity to provide for-profit transportation services. Such services are typically bundled with recreational activities (e.g. a company that guides rafting trips and offers the necessary transportation as part of the ticket price). Prior to entering into a contract, the Forest Service may need to demonstrate profitability of the investment in a prospectus. The Forest Service does not pay for the transportation services, as the company is collecting the revenue, but rather charges the private entity an annual fee (a fixed fee or a percentage of revenue). The contract details clauses that ensure the concessionaire is in line with the Forest Service's mission and the private entity owns and operates the entire service (vehicle purchase,

³¹ Begley, Justin and Ann Joslin (Center for Urban Transportation Research), "Alternative Transportation Systems Business Models Decision Support Tool," Paul S. Sarbanes Transit in Parks Technical Assistance Center (TRIPTAC), 2014. Report is accessible here:

http://www.fedlandsinstitute.org/Documents/RepositoryDocuments/ATS_Business_Model_Final_Report.pdf.

insurance, etc.). This business model is best suited for tours/provision of recreational activities and in situations where there is a high willingness and capacity to pay for such services, and so ticket prices for these services tend to be higher than regular transit services.

The major benefit of this arrangement is that the Forest Service and its partners do not need to provide funding. However, one drawback is that this type of service is less accessible for individuals and families with lower incomes, as the higher ticket prices may result in their exclusion.

Regarding the corridors assessed in this report, the Forest Service and its partners could consider this business model for a dedicated shuttle service to Chantry Flat and for the operation of the gate and parking lot at Chantry Flat. However, this approach may result in high ticket prices for visitors.

Partnership Agreement

The Forest Service and other organizations can collaborate to provide transportation through a partnership agreement. This business model is flexible and represents a variety of types of services and agreements. In essence, multiple parties will agree to certain roles and responsibilities regarding the funding and operation of services through a legal agreement. The types of agreements include cooperative agreements (incorporating the transfer of funds from one entity to another); Memorandums of Understanding (MOU); and Challenge Cost Share agreements, which enable organizations to pool funds and split funding responsibility and share risk. Agreements specify responsibilities including purchase of vehicles, maintenance, provision of and payment for drivers, fares, and other features related to the service. The Forest Service often assesses the partner's capacity and financial viability to enter into an agreement prior to establishing an agreement. California law also enables jurisdictions who wish to be partners to create a Joint Powers Authority (JPA). A JPA is a more formal administration of the service with an independent board made up of members from the participating jurisdictions.

This business model is best suited for situations in which a partner operates an existing transit system and/or partners who share a common interest. The benefit of this type of business model is that it is less costly than owning and operating a service or using a service contract. Furthermore, many partner agencies own transit vehicles, which provides significant capital cost savings. The drawback is that the approach requires a high level of communication, and each entity has less control over the entire service.

An alternative method to implement a service is to develop a cooperative or Challenge Cost Share agreement through which a set of partners fund a service contract for provision of transit. This approach is most appropriate for the Chantry Flat shuttle service option, where some of the partners have existing contracts with third-party providers for provision of transit.³² The Challenge Cost Share could provide funding for expanding an existing contract with a municipal service provider.

³² The City of Pasadena owns transit vehicles and funds a contract with a third-party provider for their operation.

Final Recommendations and Next Steps

This assessment reveals various viable options for providing transit access to recreation sites on the Angeles National Forest and the surrounding region. It also details the challenges to implementing a successful shuttle service.

Due to geography, visitation, and the potential partnership opportunities detailed in the prior sections, pursuing access to Chantry Flat and/or the Altadena/Pasadena Trailheads is the most feasible option at this time. Chantry Flat has a number of features that make it a feasible and attractive place to implement a shuttle service: it is a highly popular site experiencing congestion issues, it is relatively close to more than one Gold Line station that has parking available, and it is feasible to control access to the site since it is accessible by only one road that already has a gate. Also, the pilot service demonstrated that visitors are amenable to the concept. The partnership potential with the City of Pasadena and momentum around expanding their existing bus service also makes the transit alternatives for the Altadena/Pasadena Trailheads practical solutions. Transit options for San Gabriel Canyon are less feasible at this time, due to considerations of geography and cost effectiveness.

The report team recognizes that the Forest and its partners have the opportunity to pursue a number of different paths. Their decisions moving forward largely depend on the availability of funding and grant opportunities and the ability of partners to collectively contribute to provision of a service. The following section summarizes the report team's recommended general and corridor-specific next steps with caveats.

Chantry Flat Next Steps

A shuttle service to Chantry Flat that addresses the existing congestion issues and provides expanded access for underserved communities requires a series of actions over the course of the three to five years, particularly since a successful system will require controlled access. Changes in access to the site may require a capacity analysis and a NEPA process, which involves an environmental review and public engagement. This process can be lengthy, depending on the types of changes in access and capacity proposed.

If the Forest and its partners decide to pursue a shuttle service and controlled access to Chantry Flat, they may consider the following steps. The steps outlined below are complex and require a high degree of coordination among the Forest and its partners. The group would likely need to meet on a regular basis to ensure efficiency and success. Some of these steps could occur concurrently, though the general order is as follows:

1) Determine need for further analysis and gather additional data

The forest and its partners need additional data on total visitation and length of stay to determine whether the capacity of the shuttle service would adequately meet demand. The Forest or its partners can collect this data by counting cars entering the road or using a temporary electronic counter, counting the number of individuals in vehicles to arrive at an estimate of average vehicle occupancy, and sampling the length of stay through monitoring license plates or conducting surveys of visitors on weekends. This type of data collection could occur in the spring of 2018, when visitation peaks. The analysis of these data will provide a more accurate estimate for ridership.

Furthermore, collection and analysis of these data will support the Forest in identifying the need for a site capacity analysis and possibly a NEPA process, which may be necessary if the Forest seeks to reduce the volume of visitors at the site. During this process, the Forest may identify whether it would contract with a concessionaire to operate the parking lot and gate system or operate it internally. If a concessionaire is pursued, the Forest would need to develop a prospectus.

In parallel, Forest partners and local agencies such as LA Metro may consider further investigation of potential demand for a shuttle service among underserved populations who currently cannot access Chantry Flat. This type of analysis could quantify the extent to which a shuttle service would be used among communities living along the LA Metro Light Rail lines or major bus routes throughout the county.

2) Select a route: This analysis outlined three route options:

- Old Pasadena – Sierra Madre Villa Station – Downtown Sierra Madre – Chantry Flat
- Sierra Madre Villa Station – Downtown Sierra Madre – Chantry Flat
- Arcadia Station – Chantry Flat

The best route option is the one that is most feasible to operate and has the most buy-in from partners. Any of these three could satisfy these criteria, but it is likely that a shuttle service between Sierra Madre Villa Station and Chantry Flat is most feasible for a number of reasons:

1. The most effective type of service would likely be a dedicated shuttle service.
2. The Sierra Madre Villa Station has a large parking structure that is mostly vacant on weekends, and LA Metro has already allowed a local business to utilize the parking structure after peak hours on weekends.
3. Sierra Madre Villa Station is a major transfer point for buses connecting to neighborhoods to the south of the Gold Line, which would significantly expand access for these communities and add value to any funding requests. Several of these neighborhoods are identified in the LA County Parks and Open Space Needs Assessment as needing better access to open space.
4. The City of Pasadena has a number of unused urban transit vehicles on weekends that it may consider using for this service. It also has an existing contract to provide Pasadena Transit service.
5. The City of Sierra Madre may have an interest in this service because it would serve downtown Sierra Madre and provide access for its residents.

If the partners pursue this option, it would be the City of Pasadena's decision whether to combine the route with the existing Route 40 or operate it as a new route. The benefit of operating the service as its own route is that it may increase the efficiency of the service and clarity for riders about the purpose of the shuttle, since it would only have three stops. If it is combined with the longer route, the likelihood for delay may increase and the service would operate more as an urban transit route than a shuttle service. This could diminish the visitor experience and cause frustrations for users who are unable to access the site by personal vehicle. While creating a dedicated shuttle for Chantry may be more costly than amending an existing route, a dedicated shuttle may not need as large of a subsidy, depending on the business model used and fare structure.

3) Work closely with LA County on the rehabilitation of Chantry Flat Road

The Forest has an opportunity to improve some of the safety problems associated with illegal parking on the road with the upcoming resurfacing of Chantry Flat Road by LA County. The Forest Service can continue to articulate its needs to the county to help inform the work and identify any possible ways to improve the safety of the road along with this project. The Forest should request that the County install barriers to spots that are currently used but pose safety problems because of poor sightlines or lack of room.

4) Work with partners to identify funding and feasibility

The Forest Service lacks resources to fund service to Chantry Flat as well as the purchase and operation of an automated gate on its own. A successful service would likely require an agreement (such as a joint power agreement, cooperative agreement, etc.) between Pasadena, Sierra Madre, Arcadia, LA County, and the Forest Service that identifies the roles and responsibilities of each entity. This joint group could apply for funding from one of the sources listed below. Any service would not begin until the new controlled access system is in place.

Potential funding sources include:

- **Federal Lands Access Program (FLAP):** This funding source is available from the Federal Highway Administration. California has a certain amount of funds it can use from this program, which is designed to support communities who want to improve access to and from public lands. This funding source can only be used for capital projects and rolling stock, therefore it could be used to either purchase buses or purchase items necessary for improved access. One possible item that could potentially use FLAP funds would be the new automated gate and associated infrastructure like a dynamic message sign that would alert drivers if Chantry Flats parking lot is full.
- **Measure M funding:** This new LA County funding source is available to all cities within the county for a variety of transportation projects. Because of the recent passage of Measure M, there is an increase in overall funding for transportation for local governments to use for street and trail projects or public transit. Pasadena, Sierra Madre, Arcadia, and LA County itself could all potentially use this funding. Subsidizing new transit service is an eligible purpose for receiving Measure M funding. Each city can use its discretion on how it wishes to spend its annual allotment of Measure M funding.

A certain amount of funding from Measure M is dedicated to subregional programs. Subregional councils of government, such as the San Gabriel Valley Council of Government (SGVCOG) and the Arroyo Verdugo Council of Governments (AVCOG), of which Pasadena is a member, will develop these programs. The subregions will decide a portion of Measure M through the development of 5-year programs of projects. The Forest and its partners should work closely with the SGVCOG and AVCOG on all aspects of project planning to advocate for including transit to the Forest in the plan. As of the completion of this report, the subregions are still developing the administrative and procedural details on how to use these funds. It

appears, however, that the shuttle service could be eligible under the Bus System Improvements category if the projects are added to the existing projects list. The public information, signage, and wayfinding aspects of all of the recommendations in this report could be eligible under the First/Last Mile category.

The county adopted the [Measure M Final Guidelines](#) in July 2017. The guidelines detail the relevant stakeholders and basic process for how funding programs will be approved. Further detail about the process for Measure M decision-making are currently being developed.

- **Measure A funding:** This parks and open space funding source from Los Angeles County may be available though it has never been used for providing transit service.
- **Mobile Source Air Pollution Reduction Review Committee (MSRC)³³:** This committee funds projects that reduce air pollution from motor vehicles in the South Coast Air District in Southern California. This committee has funded shuttle service in the past, such as the Dodger Stadium Express.

In order to develop a successful application, the report team recommends developing a formal partnership of all communities and agencies involved in the project and applying for funding for a one-year pilot project using a combination of the above sources (managed by different partners). Because of these shared roles and responsibilities among partners, the financial burden would not fall on any one single entity.

5) Develop marketing/communications plan

The Forest would need to clearly communicate to visitors the new rules regarding access to Chantry Flat and indicate through signage where visitors can access the shuttle pick-up point when the parking lot is full. A dynamic message sign could provide up-to-date information at the gate location, or the Forest may place seasonal staff members there to provide directions during the transition period.

The Forest and its partners could advertise the service on the LA Metro transit system, particularly along the Gold Line and other connecting bus lines. Other potential advertising locations include outdoor-oriented retail shops and County and local parks.

6) Implement controlled access and shuttle service system

Once all the other steps are complete, the service operator and any other relevant parties would need to install the gate system and implement the new service.

As discussed in the ridership estimate section for Chantry Flat, the price of parking will likely influence the level of ridership. When implementing a controlled access system, the Report team recommends the Forest consider increasing the cost for parking at Chantry Flat so as to encourage use of the shuttle system. Increasing the cost of parking will require advance planning, as the Adventure Pass is currently uniformly priced across multiple Forests in the region.

³³ More information available here: <http://www.cleantransportationfunding.org/>

Pasadena/Altadena Next Steps

Sam Merrill Trail and Eaton Canyon are the best suited of destinations discussed to serve with regular bus routes because they are close to densely populated areas with municipal transit systems. The report team recommends supporting the most viable public transit service possible in the Pasadena area with buy-in from the City of Pasadena, Altadena, and LA County. At present, the Sam Merrill Trail may be the best corridor to prioritize because it accomplishes several objectives.

Sam Merrill Trail – Cobb Estate

As described in the section on the Pasadena corridors, there is momentum to provide some new Pasadena Transit service to the Cobb Estate/Sam Merrill Trailhead. This service would accomplish several objectives:

- Provide a car-less option to access Sam Merrill Trail from the Gold Line Memorial Park Station
- Serve a low-income community in need of improved public transit along Fair Oaks Avenue
- Reduce the demand for on-street parking far near the entrance to the Cobb Estate

Pasadena is already discussing providing a pilot service using funding from the Trust for Public Land. This pilot will be an excellent opportunity to assess the operation and test demand. However, the City would need a more permanent funding source to sustain transit service and to develop the associated bus facilities that would make this service more visible and usable.

LA County is one possible funding partner, as this service would cross from Pasadena into Altadena (unincorporated land in LA County). This route would therefore not only serve the trail users but also many households living along the route who rely on public transit. These households will benefit from this service, as the route currently lacks access to transit. The other funding sources listed for Chantry Flat service could also be considered for expanding the Pasadena transit network to access the Forest.

The Forest would not be directly involved in implementing this service, since the proposed route does not overlap with Forest land. However, the Forest may consider demonstrating commitment to it through a number of actions:

- Assist Pasadena or LA County to apply for FLAP funding to construct an accessible bus stop at the entrance to the Cobb Estate on the east side of Lake Avenue. Only local government agencies are eligible for FLAP funding, but the Forest can support the application formally and also provide some technical assistance in developing the grant
- Actively market use of the new transit service using all communications channels it has. This should also include working closely with its community partners and LA Metro to advertise the service on the Metro Rail and Bus systems
- Collect data on visitor use during the initial years of the service to help refine the service qualities and also to demonstrate whether the transit service is meeting performance objectives. Such a commitment to evaluation may help to secure funding from community partners who will want to see demonstrated success if they are to continue to fund service

Eaton Canyon

As described in the section on providing transit access to the Pasadena/Altadena trailheads, there is already a bus stop within a ten minute walk to Eaton Canyon regional park and Nature Center. The

service to this stop, however, could be significantly improved to be more useful to individuals who want to hike the trails into the Angeles National Forest, and the communities could improve customer awareness of the public transit option as well as the location of the park. LA Metro, the City of Pasadena, LA County Parks and Recreation, and the Forest Service could all take the following steps immediately to improve awareness of the public transit option:

- Clearly identify Eaton Canyon Park and Nature Center on all schedules and transit service maps for both LA Metro and Pasadena Transit
- Install a sign on the bus stop sign post indicating the access point for the trails
- Install one additional wayfinding sign from the bus stop to direct passengers who alight from the bus in the direction of Eaton Canyon
- Identify how visitors can get to Eaton Canyon by public transit on all public communications materials including the Angeles National Forest website, the LA County Parks and Recreation website, and other materials used by each of the partners for outreach to passengers

In the medium-term, all partners should work together to obtain additional funding to extend service on Saturdays and Sundays beginning at 8:00am. Currently, service begins at 10:45 on Saturday and is non-existent on Sunday. This start time is generally too late for many people who like to hike the trails in the early morning. In order to be most useful and achieve the greatest ridership possible, service should skew to the earlier hours.

San Gabriel Canyon Next Steps

Angeles National Forest is currently developing a plan for improvements to the Cattle Canyon sites. There are no immediate next steps regarding alternative transportation to East Fork Road, but the report team recommends continuing to monitor the improvement plans for opportunities to integrate alternative transportation. The Forest Service and its partners may also be able to assess demand and feasibility based on the Sam Merrill Trail and/or Chantry Flat services, if those are implemented.

In the meantime, the Forest may consider continuing to focus on reducing the number of vehicles that park for long periods of time, which could significantly increase the availability of parking spaces for visitors that only use spaces for part of the day.

General Conclusions

This report summarizes preliminary analysis of the data available and provides initial conclusions and concepts for transit alternatives for three corridors accessing Angeles National Forest. The analysis frames the recommendations around three key goals for several high-use recreation sites: reducing congestion, increasing safety, and improving access for underserved communities and carless households.

Achieving all three goals likely requires a mandatory or partially mandatory transit service, as voluntary services have significantly lower ridership levels. Some concepts achieve all the goals by outlining partially mandatory transit services. Others that outline voluntary services only achieve the goal related to expanding access. How the Forest and its partners decide to move forward in refining the alternatives and collecting additional data will depend on their specific goals, needs, and available resources.